Music and Medicine
MUSIC
AND MEDICINE

Edited by
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and
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There is a Charm: a Power that sways the breast; 
Bids every Passion revel or be still; 
Inspires with Rage, or all your Cares dissolves; 
Can sooth Distraction, and almost Despair. 
That Power is Music.

A Poet he, and touch'd with Heaven's own fire; 
Who, with bold rage or solemn pomp of sounds, 
Inflames, exalts, and ravishes the soul; 
Now tender, plaintive, sweet almost to pain, 
In Love dissolves you; now in sprightly strains 
Breathes a gay rapture thro' your thrilling breast; 
Or melts the heart with airs divinely sad; 
Or wakes to horror the tremendous strings.

Such was the bard, whose heavenly strains of old 
Appcas'd the fiend of melancholy Saul. 
Such was, if old and heathen fame say true, 
The man who bade the Theban domes ascend, 
And tam'd the savage nations with his song; 
And such the Thracian, whose harmonious lyre, 
Tun'd to soft woe, made all the mountains weep; 
Sooth'd even th' inexorable powers of Hell, 
And half redeem'd his lost Eurydice.

Music exalts each Joy, allays each Grief, 
Expells Diseases, softens every Pain, 
Subdues the rage of Poison, and the Plague; 
And hence the wise of ancient days ador'd 
One power of Physic, Melody, and Song.

JOHN ARMSTRONG, 
The Art of Preserving Health (1744) 
IV 481-485, 497-518
The tragic years of World War II witnessed an amazing growth in the interdependence of music and medicine. The growth was apparent in particular in the heightened role played by musical therapy in military hospitals and in the increasingly frequent use of industrial music in factories. But the times of stress, while they developed in higher degree methods first employed centuries ago, could reduce to no ordered whole the complicated forces acting upon one another in the fields of music and medicine, and the result in too many cases was confusion and bewilderment.

It is the hope of the editors and publisher of this volume that the essays here presented will serve to throw into relief some of the problems involved and to institute a scientific approach to their solution. Music and medicine touch upon one another in other fields than therapy, and musicians and physicians alike will help one another the more in proportion as they are alert to the entire range of possibilities for co-operation. To be so alert they need both an historical background and a thorough understanding of contemporary practices; from such knowledge they can further with benefit to all concerned the scientific research and practical application which are necessary to insure an even closer relation between music and medicine.

It is entirely fitting that this volume should have had its inception in the Army Medical Library where for so many years Colonel Fielding H. Garrison demonstrated the joy which a physician can take in music. In the summer of 1944 Thomas E. Keys, then Officer-in-Charge of the Cleveland Branch of that library, conceived the idea of a symposium on the subject of
Preface

music and medicine and invited the undersigned to act as co-editor. Publication was guaranteed by Henry Schuman who, when Lt. Colonel Keys became involved in the pressure of other duties and relinquished his active part in the project, assumed as well the responsibilities of the co-editorship. These responsibilities he yielded early in 1946 to Dr. Max Schoen of the Carnegie Institute of Technology; Dr. Schoen had been unofficial adviser long before, and from his vast knowledge in the field of music he has collaborated in seeing the volume through to its completion.

The grateful acknowledgment of both past and present editors is due to their contributors and to the many musicians, physicians, and librarians who have given assistance and support along the way. The encouragement of Dr. Max H. Fisch and of Mr. Robert B. Austin has been heartening throughout. Dr. C. F. Mayer has made available the entries on music which will appear shortly in Volume X of the Fourth Series of the Index-Catalogue of the Library of the Surgeon General's Office. Unpublished bibliographies by Miss Ella M. Salmonsen of the John Crerar Library and by the Music Division of the Library of Congress have been of great service. The vignette on the cover is from a medal in the collection of Dr. Bruno Kisch.

Dorothy M. Schullian

Army Medical Library

January 1, 1947
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Music and Medicine
To discuss meaningfully the nature of the relationships between music and medicine among primitive peoples we must, from the outset, be clear on one point. Both fields have adhesions and associations recognized by the peoples themselves as fundamental and relevant, but regarded by us as secondary and largely adventitious. Among primitive peoples music is primarily associated with dance, with words, or with dance and words. It is never composed for purely aesthetic and emotional enjoyment, but always in connection with larger social objectives and goals. Instrumental music is practically unknown. Since music permeates every phase of primitive life, the secular as well as the sacred, it is not always easy to determine what specific reference the use of drum, rattle, flute or bells, or the singing of songs has in the treatment of disease. In very few
instances indeed can we say that a given musical instrument belongs specifically to a given individual in his capacity as a leech or healer. Not even the famous drum of the Siberian and Eskimo shaman is used primarily in connection with the curing of the sick.

The use of songs is somewhat different, for although many of those sung during a curing séance have no immediate relationship to curing, others do. Indeed, a man may call a particular practitioner simply because that practitioner possesses the songs that will heal his individual ailment. Considerable specialization may occur here. Thus, among the Winnebago Indians, a practitioner who has obtained his powers from the grizzly-bear spirits is always called upon to heal wounds, and he does so through the power inherent in the songs that have been bestowed upon him. But, be it remembered, it is the words and not the music that function here.

What we should like to know, of course, is the extent to which the actual music, the sounds which issued from drum and rattle and flute and from the human throat, were regarded by either the patient or the practitioner as aiding in recovery. Concerning the attitude of the patient on this point our information is pitifully small; for that of the practitioner it is much better but still hopelessly inadequate. Since the intense pleasure which all aboriginal peoples experience from music is well known, it is obvious that its effect upon a sick man will be that of heightening and intensifying his resolve to become well, in that he realizes that he is participating in what is, to all intents and purposes, a ritual curing-drama wherein he is the central figure. It is hard to believe that he is not aware of this, yet it is equally clear that only the professional healer, the practitioner, is likely to be sufficiently articulate to formulate this awareness or to develop secondary theories concerning the efficacy of the musical paraphernalia of his profession.

However, to understand at what point the use of music be-
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comes, even if only secondarily, an integral part of the curing procedure, it is necessary to understand what concepts primitive peoples hold as to the nature of disease, its causation, and the manner of its cure. To this we shall accordingly turn, indicating, as we proceed, those areas where music enters into the curing-procedure and those where it does not.

No presentation of aboriginal man's conception of disease and the methods employed to diagnose and treat it can be free from controversy, for it is bound to represent the views held by the white investigator, be he ethnologist, theorist, or layman, concerning primitive man's mentality. Fundamentally, it is the ethnologist himself, as the actual collector of the facts, who is mainly responsible for most of our difficulties, for not only has he been swayed, whether consciously or unconsciously, by the same type of assumptions and prejudices which have influenced many of the theorists, but he has rarely given us complete descriptions of the theory and practice of medicine among primitive peoples. He has almost always failed to assess critically what has been told him, to distinguish adequately between the "lay" native viewpoint and the "priest-practitioner's" viewpoint, and he has largely operated with the vague idealistic philosophy prevalent in his own culture. For him ideas determine actions. In the realm of primitive medicine this means that if a disease is explained as due to the temporary extraction of a man's soul, then the only practices that count and are significant are those connected with the restoration of the soul, and all others are meaningless and unimportant. Indeed, there is a marked tendency either to deny them outright, to overlook them, or to attenuate them where it is manifestly impossible to dismiss their existence. Because of the ethnologist's own strictly idealistic approach, the semi-idealistic approach of many a native practitioner has been accepted unhesitatingly, and a whole series of problems important to the understanding and history of primitive medicine has thus been conveniently elim-
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inated. What, for instance, is the relationship between such specific therapeutic measures as the use of herbs, the giving of cathartics, vapor-baths, massage, cupping, etc., and the priest-practitioner's theory of disease? What is the relationship of the priest-practitioner's theory to that of the layman? What economic advantage, if any, accrues to him from his theory?

Let me give an example, one that is all the more apropos because it comes from an area, Polynesia, where the use of therapeutic measures is supposed to be rare and where, in discussing Polynesian practices, ethnologists and theorists have been accustomed to disregard such measures and dismiss them as unimportant. My example relates to the method of curing an abscess in the throat, in Tahiti. The practitioner, named Tiurai, had the patient walk on all fours and run for a little while, and subsequently forced him to bite into and tear up a banana. As a result of this activity the abscess broke. Then the patient was told to rinse his throat with coconut water and subsequently to gargle with fresh coconut water. He was then dismissed as cured. In commenting upon the treatment, Tiurai had this to say: "In order to treat my compatriots, it is necessary to represent the simplest things as though they were the most complicated, and it is only by the successful outcome of a treatment that they realized I was right. If I had explained to the old man and to his son all that I was going to do beforehand, it would have been just a waste of time." Our case is all the more instructive because Tiurai represented only one type of practitioner in Tahiti. There were others, some using other practical therapeutic measures, some purely religious-magical ones. So we see that where our information is reasonably adequate, we encounter various methods of treating disease and various theories of its nature.

Wherever the priest-practitioners are highly organized, however, as in certain parts of Polynesia and Malaysia, we hear little about those who use herbs and employ practical therapeutic
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measures. The reason for this, in all probability, is not that such practitioners do not exist there but that, as our Tahitian example would seem to indicate, they are the last to whom recourse is made. Presumably their status is not as high as is that of the priest-practitioner, and it is, indeed, always the latter’s viewpoint and theories that the investigator obtains most easily in caste societies or in cultures where the priest-practitioner has great prestige and considerable economic power. In fact, it might be contended that if only the magical or the purely religious theory of the causation and curing of disease prevails in any group (and this is a situation definitely demanding explanation and clarification) we may expect to find the reasons for this condition to lie in some special advantage possessed by the promulgators of such theories for disseminating and enforcing them.

It is the disregarding of such economico-political factors that has so frequently distorted our picture of aboriginal society and led so many theorists and not a few ethnologists into a cul de sac where they are forced to fall back, as does Ackerknecht, upon the theory that “magic medicine satisfies . . . a basic craving in humanity, a certain metaphysical need.”

II

Whatever else aboriginal man may have included in his understanding of the nature of disease, this much is clear, that illness is not held to be simply a physical condition. It must always imply the inability of an individual to fulfill his normal social obligations and duties. What degree of pain, what degree of physical or mental discomfort, will so disqualify and incapacitate an individual, depends clearly upon cultural and personal factors. The data at our disposal seem to indicate that even acute pains did not, in native opinion, necessarily imply a
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significant illness, and that simple colds and catarrhs were generally disregarded. For pains to become disease symptoms, other factors of a social and an interpersonal nature had always to be added—the knowledge, for example, that some individual in the more or less immediate environment was evilly disposed to another and actively interested in doing him injury, or that a taboo had been broken, or that a deity had become incensed, etc.

It is of fundamental importance, in this connection, to have some information about the incidence of disease in aboriginal communities before the coming of the whites or before their contact with members of the more complex Asiatic civilizations. Here, unfortunately, accurate data are completely absent. Certain facts are, however, reasonably certain. Infectious diseases were uncommon; and while neuroses were manifestly present, no evidence for the existence of true psychoses has ever been presented. The vast majority of ailments seem to have been respiratory. To these are to be added skin infections and infections brought about by the bite of insects or caused by food poisons. To be included, of course, are all bodily injuries, no matter how incurred. If the degenerative diseases of old age have not been mentioned, it is because, popular belief to the contrary, the life-span of aboriginal man was not high and individuals over sixty were probably not very common.

Nor must we imagine for a moment that anyone went out of his way trying to discover who, among his fellowmen, was likely to cause him to become sick or fill his mind with uneasiness. People first became ill or uneasy and then sought the human cause, not the reverse. Manifestly no individual desired to be socially incapacitated and cut off from his normal functioning. The conditions of life, be it remembered, were never easy. Many tribes lived on the margin of economic security, some, indeed, on the very edge of starvation. Under such circumstances a
week's stoppage of work meant a great hardship for a man's immediate family and often for the community also.

Aboriginal man, we can thus confidently insist, resisted being placed in the category of a patient as long as he possibly could, and he bitterly resented not only the physical discomforts accompanying actual illness but the social consequences as well. For that reason, among many others, it is highly problematical whether any society such as the one Reo Fortune has described for the Dobuans ever existed. There, we are told, disease making counts for more than disease curing, and every man's hand is, literally, turned against his neighbor. But even if Fortune's delineation were not so justifiably suspect, we would need a very special explanation to account for it, certainly a much better one than that presented by those who have used it to depict a special culture pattern. At best, one might contend that the Dobuans had developed a fiction that they were paranoiac. Since, according to Fortune himself, they did not behave like paranoiacs in the practical affairs of life, it is obvious that his description is erroneous.

This resistance to being placed in the sick category, this resentment of disease just because of its economic and social consequences, is one of the cardinal facts we must bear in mind if we wish to understand aright the relationship of a patient to the priest-practitioner and if we wish to understand the theories and the procedures which the latter has been so instrumental in developing and molding.

From the point of view of the sick man ethnologists are indeed stressing the wrong end of the disease complex when they concern themselves so exclusively with the cause of the disease. The sick man is, after all, only secondarily interested in the measures used for curing him and only marginally in theories of disease causation. His only objective is to become well as rapidly as possible, not simply in order to escape pain and suffering, but,
more urgently, because of his realization, as we have just pointed out, of the socio-economic implications of illness.

The practitioner, on the other hand, as the Tahitian Tiurai so succinctly stated, tends, for many reasons, most of them social and economic, to emphasize the obstacles to recovery and to stress the seriousness of the disease, its non-natural causation, and the semi-mysterious and often occult nature of the treatment to be administered. He is impelled to do so for a variety of reasons, among which the fact that he is being paid, and paid in food, is assuredly not the least important. Nor must the ambivalent attitude of his patient toward him ever be forgotten. Is he not frequently the giver as well as the healer of disease?

Practitioner and patient are thus oriented toward different goals. Since, however, the former, particularly the priest-practitioner, is generally far more articulate and always represents a systematized approach, it is easier to obtain his viewpoint—which, incidentally, the ethnologist regards as the only valid one—than that of the patient and layman. It is, of course, true that the patient rarely has a systematized viewpoint; frequently, in fact, he has no viewpoint at all except that of insisting upon obtaining results. If the outcome of the treatment is successful, he is quite willing not only to admit and accept the priest-practitioner's theories but even to propagandize for them, just as are we. There must, however, be results; the practitioner knows that very well. His prestige and, at times, indeed, his life are at stake when he fails. However, and this we must never forget, he is generally an individual with other societal affiliations, and his position enables him to develop ideological formulae, as well as what may be termed a series of alibis. These alibis form a not inconsiderable part of the material which ethnologists secure. We cannot hope to understand some of the basic aspects of primitive medicine unless we examine, among other things, these alibis and the magico-religious phraseology in which they are couched. These, in turn, can
only be given their true perspective when discussed in terms of the economico-political structures upon which they have been based or together with which they have emerged and been elaborated.

III

There exist today four primary food-economies among aboriginal peoples. The first is based on food-gathering, the second on fishing-hunting, the third on agriculture, and the fourth on animal-herding, that is, pastoralism. The age of the first can obviously not be determined. Bearing in mind the present distribution of food-gathering, which is always marginal to the other economies and is located in barren and inhospitable areas, one cannot escape the feeling that no peoples have willingly sought out these places. It is safe to assume that they have been forced into their present abodes and that therefore the fundamental lineaments of their way of life developed in association with a more varied method of securing their food supply. There is, indeed, satisfactory evidence to this effect for the Bushmen, the Congo pygmies, and a number of the food-gathering tribes of the western United States.

The paleolithic record makes it clear that the fishing-hunting economy is practically coeval with the appearance of man, for it must have arisen very shortly after the invention of fire-making. Agriculture and the domestication of animals are admittedly late. In the Old World they can nowhere be older than 7000 years. For most so-called primitive peoples they are rarely, if ever, more than 3000 years old, and for many, in fact, 1000 to 1500 years would be adequate. The age of pastoral-nomadism is difficult to determine. With the exception of a very limited area in Africa, it does not occur among aboriginal peoples. At best, it is of relatively small importance for the understanding of their ideological superstructures, and it is
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about these, after all, that we must become clear if we wish properly to assess the activities of the priest-practitioner and the interlocking relationships existing between him and his patient.

Now what correlation exists between the various types of economy we have just mentioned and the different theories of disease causation? Strangely enough, none. At all economic levels we find illness explained in very much the same manner: extraction of the soul, injection of some disease object, contravention of a taboo, etc.; at all levels we are likely to find it ascribed either to a human agency or to spirits or deities, and at all levels magical practices form an integral part of the so-called curative process. Apart from special elaborations and refinements, the situation did not in fact change materially until the emergence of the Greek civilization of the seventh century B.C. In other words, not even the highly complex economies of Egypt, Babylonia, and India and the very special socio-political structures reared upon them ever led man to the realization that disease was due to pathological conditions within the physical organism itself and that it did not result from the extraction of the non-physical soul, from objects shot into the body by malevolently disposed individuals, or from the breaking of taboos.

How is this to be explained? Why should man throughout this long period, during which in Egypt, Babylonia, India, and Palestine he did some very profound thinking, never once have made the discovery which the Greeks did? For aboriginal man the answer given by the vast majority of ethnologists and theorists has taken two main forms. The first and older one is that of evolutionists proper as represented by such thinkers as C. S. Myers, W. H. R. Rivers, and A. W. Niewenhuis. All of them grant quite correctly to primitive peoples the capacity for logical thought, that is, the capacity for drawing logical inferences from specific premises. It is the premises that are
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wrong. But more than that, these ethnologists insist that the creations of the mind are there given the same reality as those of the material world, that mental concepts constrain and direct practical activities. Primitive man is for them an undiluted, albeit a crude and not always consistent, idealist.

Opposed to this view is the one so clearly articulated in the famous works of Levy-Bruhl and widely accepted by many theorists, laymen, and, unconsciously, by not a few ethnologists. For all these scholars, the thinking of aboriginal man is on an essentially prelogical, unindividualized level and is hopelessly enchained in an undifferentiated subject-object relationship. Magic and mythical thinking are its earmarks. In their view, too, primitive man is an unrelieved idealist. One of the best and most recent representatives of this position, E. H. Ackerknecht, can find no other explanation of the use of herbs and drugs and of treatments like massage, bloodletting, etc. than to assert that these are all employed in a non-rational and a magical sense, since spells and prayers, rites and dances accompany them. It is, for instance, not the herb that fights against the disease but the "spirit" of the herb that fights against the "spirit" of the disease.

Given the validity of either of these theories of primitive man's mentality, his failure to arrive at a correct understanding of the true origin of his physical ailments is self-evident. Yet no one has ever contended that the same type of mentality held for the ancient Egyptians and Babylonians.

Clearly the predication of a special type of mentality for primitive man, even if it could be proved, as it definitely cannot be, would vouchsafe us no explanation here. We are all ready to admit that the theory of disease as outlined above was propounded by the priest-practitioners in all primitive societies and repeated by the community at large. However, the question to be investigated is not whether this is an indication of a special collective mentality, but whether it may not be the
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theory of the practitioner himself. We will not derive much help by falling back upon the aprioristic collective conditioning of a man's actions as taught by such French sociologists as Durkheim, Mauss, and Hubert. What we must do is face the priest-practitioner himself and attempt to discover why he chose his profession, what type of man he was, what the emoluments of his profession were, what the risks, and, finally, what his relation was to the community at large, healthy and sick, and its relation to him. We shall then be in a better position to appreciate the fact that doctor-practitioners formulate theories of disease, not laymen and definitely not patients, and that they are not guided wholly by magico-philosophical considerations but also by such considerations as spring out of the economic and social role they play in their society. That they also have a professional pride and that their goal must be to cure the sick goes without saying.

IV

In all aboriginal communities, a practitioner, healer, medicine-man, whatever be his name, is never selected at random. He must fulfill certain initial requirements. He is always a person of a special temperament, a temperament characterized by marked emotional instability. Broadly speaking, it may be said that he sets a high value on the necessity of solitude for acquiring wisdom and on the educative effects of suffering. But solitude and suffering are, among primitive peoples, regarded universally as fundamentally antisocial in their implications. It is not too much to say, then, that by and large the priest-practitioner is selected from among the few maladjusted individuals in the community. In addition, he represents a special class, whether organized or not, and a class that is specifically paid for its services. Moreover, these payments are generally
made in food. A priest-practitioner, in other words, is the one individual in the community who is spared some of the hardships and rigors attendant upon the quest for a living. To complete our picture, only one more thing should be remembered; he is definitely the thinker in every aboriginal community.

This last fact must not be forgotten. Primitive peoples have at all times recognized the differences between the "thinking" and the "non-thinking" types. This is brought out very clearly whenever we are fortunate enough to secure the point of view of the matter-of-fact individual. What an Eskimo told Knud Rasmussen can well be taken as representative: "People don't like to think. They are reluctant to puzzle about anything that is hard to understand . . . but the man who keeps his eyes and ears open and remembers what old folks tell him, that man is sure to know something that can fill the emptiness of our minds." 11

Let us remember well these two contrasting types of personality, those whose minds are empty and those who fill them. We shall then be better able to understand certain characteristics of the typical priest-practitioner, why he developed the theories of disease causation he did, why it was to his interest to indoctrinate the community with them, and why it was also to his interest to perpetuate them. Then we shall also properly comprehend why, so frequently, purely practical therapeutic measures are relegated to the background and why the cures achieved are never ascribed to these practical, non-magical methods. It is perhaps significant that very rarely indeed did the professional priest-practitioner succeed in entirely eliminating these rational and purely practical therapeutic measures, and that where a lay practitioner undertook the treatment there was only a modicum of reference to magical theories or magical practices. Anyone who wishes to satisfy himself on this point can do no better than to read P. Schebesta's descriptions of
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the pygmies of the Malay Peninsula and the Congo.\textsuperscript{12} Rivers,\textsuperscript{13} a firm believer in the magical theory of disease causation as characteristic of all primitive peoples, had to admit, nevertheless, that throughout Melanesia and Papua the sorcerer, priest, or leech is called in only when the practical remedies have apparently failed. This seems to hold in most other areas as well. Since, however, these practical measures are often continued even after the professional practitioner has been called upon the scene, there is reason for assuming that, in part at least, the patient is attempting to reinvigorate his remedies and to incorporate them into the larger and fuller treatment which the professional priest-practitioner alone can give.

To disregard the lay point of view here is to fall into grievous error. This lay attitude is one with which even the most obstinate of priest-practitioners must reckon. At times, in fact, he seems himself to partake of it. It is of far more vital concern to an aboriginal community than most ethnologists are willing to concede. Its importance and living force are concretely reflected in the care with which practical remedies and therapeutic procedures have been perpetuated and improved upon from generation to generation. Indeed, in not a few tribes, particularly in the Americas, there are professional practitioners who devote themselves almost exclusively to this branch of primitive medicine. In general, it can be stated that the smaller the hold of the priest-practitioner and his ideologies upon a given people, the greater the use of practical medicines and therapeutic procedures and, conversely, that the greater the employment of the latter, the less important is the role of the magical formulae and paraphernalia in the treatment of disease. All this, be it remembered, despite the fact that magical ideas and magical practices may otherwise permeate every aspect of the culture.

What we have said above would seem to bear out completely our view that the determining factor in the development of
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primitive medicine from roughly rational and effective practices to non-rational, magical, and purely ideological explanations was the professional priest-thinker-practitioner. It is possible that he was impelled to substitute his ideological theories for the more matter-of-fact “explanations” attempted by such individuals as the Tahitian Tiurai because of his personality type and the economic advantages accruing to him. Only on such an assumption will the riddle of why primitive medicine took the developmental course it did, a riddle which Ackerknecht finds so difficult to comprehend, be solved.\textsuperscript{14} Students of the subject will then no longer be compelled to clothe their bewilderment in theories of a special primitive mentality. Nor will it be necessary to fall back on such solutions as those advanced, with archaic psychology, by W. Artelt: “Neither empiricism nor magic is the beginning of the inner application of drugs by men, but the animal function of instinct.”\textsuperscript{15}

To what extent can it be said that music plays a distinct role in the two types of disease treatment mentioned above? Here it is easy to overgeneralize. This much, however, one is justified in saying, that songs often accompany the administration of a given herb or drug, treatment by vapor-bath or massage, cupping, etc., and that these songs symbolize the powers which a practitioner of this type possesses. They constitute, in a sense, his diploma. At times, and this is not uncommon in the two Americas, these songs, as well as the musical instruments employed, the drum or the rattle for instance, are considered efficacious in driving away illness or healing wounds. Among the Ojibwa, for example, the so-called jessakid-practitioners are supposed to function simply by sitting near the patient and singing songs to the accompaniment of their gourd rattles. Similarly, among the Winnebago, those who have obtained their powers from the grizzly-bear spirits can heal wounds by merely singing their songs. In the case of the priest-
practitioner the situation is somewhat different. Music, for him, is integrated with the whole curing complex. Like so many other aspects of the method and theory of treatment, it stresses the psychotherapeutic side of the relationship between the priest-practitioner and his patient. In other words, music is employed by the priest-practitioner to help the patient obtain a maximum of concentration of mind and body and to intensify his will to recover and to attain physical well-being. In sharp contradistinction to his passive role, where herbs alone are administered, the patient plays here an active and conscious role.

But let us return to the larger, more complex, and fuller treatment of disease which is so prominent throughout the aboriginal world and with which we are so unusually well acquainted.

In more than one sense this treatment is a true drama, a ritualistic performance in which there are always two participants, the priest-practitioner and the patient. Frequently there is a third participant, not bodily present, the spirit with whom the priest-practitioner communes. Generally there is an audience that may, at times, act almost as a chorus.¹⁶

These curative-dramas are amazingly well-integrated creations, aesthetically, psychologically, and practically. No means are forgotten or neglected that can help to attain the one and almost obsessively desired goal, namely, the restoration to health of a sick individual and his re-inclusion as a functioning member of the group. Everyone helps, in diverse fashion and in interlocking and constraining relationships. Frequently the patient is asked to diagnose the cause of his illness, to give it specific contours, and he thereby prepares himself psychologically to contribute toward his own cure. Psychotherapy, it is well to remember, has always been regarded by primitive man as essential for the attainment of most personal and many socially desirable goals.¹⁷ It is, however, in the restoration of a
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sick man to health that it receives its optimum utilization. This recognition of the importance of psychotherapy for the curing of illness, while it unquestionably has its roots in the belief of the people at large, is, however, in its refinements and elaborations manifestly the creation of the priest-practitioner, just as are the theories of disease, the systematization of magical actions and beliefs, etc.

The constituent elements of such a curative-drama are essentially the same throughout the aboriginal world. Naturally, different portions are more heavily stressed in one tribe than in another, depending very largely upon the extent of the organization of the priest-practitioner, the measure in which his ideologics have been victorious, and the degree to which he has become economically and politically entrenched.

To this curative-drama we shall now turn, taking our examples mainly from the Americas, where our information is unusually detailed and where it has frequently been obtained in texts and under conditions that exclude from the record the observer's personal theories and prejudices.

Let us begin with the Winnebago, a tribe that did not become agricultural before A.D. 1200 at the very earliest. There we find the curative-drama divided into four parts. The first part consists of what might be called the practitioner's display of his diploma, the recital by him of the manner in which he was trained both by his earthly teachers and by the spirits in the healing arts. It always contains a symbolical demonstration of the powers he received from the spirits. The second part contains the assurance from the patient that he has complete trust in the practitioner. There follows then the practitioner's appeal to the patient to concentrate all his energies upon getting well, and lastly we have the administration of herbs, one of which must be a purgative, etc.

The cause of the disease is not touched upon, and although the description given above comes from the priest-practitioner
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himself, we find no exposition of his theory of disease causation and no attempt to discover how the patient became ill. The whole stress is on the nature of the practitioner's powers, psychotherapy, the administration of medicines, etc. Clearly there is no marked victory here of the priest-practitioner's viewpoint over that of the layman. Very rarely, in fact, among the Winnicbago is the layman's theory completely overwhelmed.

The case is quite different among the Ojibwa of Ontario, a marginal agricultural community where such a triumph of the priest-practitioner is quite common, although by no means universal. In contradistinction to the Winnicbago example, the priest-practitioner here is really more important than the patient, and the economic aspects of the profession come more blatantly to the fore.

The same concern with the priest-practitioner and the economic aspects of the profession is even more marked among the Mataco, a simple agricultural tribe of the Argentinian Chaco. Here the theory of the priest-practitioner has gained complete ascendancy. According to his theory, illness is here caused by a disease spirit which must be ritually expelled. Music, in this tribe, has been pressed into the specific service of celebrating him and aggrandizing his position. As Métraux aptly says:

[The ritual of curing] consisted of a song without words. The singing was punctuated by the rattling of the gourds and, from time to time, by the clacking of hoof and rattle necklaces and the whistling of the flutes. Each blowing of the whistle indicated a new phase in the traditional sequence of events associated with the ceremony—new metamorphosis of the spirit of the medicine man, its arrival or departure from a given place. The rattle gourd is sometimes brandished in a threatening manner, as though to scare away an invisible being.20

Among the Mataco, curing has thus, at least for those who can afford it, been transformed into a special priest-practitioner's ritual. If, now, we turn to the Eskimo, we shall find that it has become, to all intents and purposes, a short drama.

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Rasmussen presents a very interesting Eskimo account in which the patient is a shaman, and the cause of the disease and the help received from the patient in determining it are the fundamental features. The treatment is thus essentially a psychotherapeutic one. The answers are exclusively in terms of the priest-practitioner's formula, the breaking of a taboo, which has here apparently displaced all other theories and rules almost supreme. Theoretically, the priest-practitioner’s problem is to discover who has broken the taboo, he, his wife, or the patient. Actually, of course, it is always the patient. The audience functions as a real chorus, always sympathizing with the patient and belittling the efforts of the priest-practitioner to make out the illness to be more serious than it really is.

But it is in northeastern Asia, that is, in the area of shamanism proper, that the priest-practitioner has attained his greatest triumph. Siberian shamanism has been described so frequently and is so well known that there is no need for dwelling upon it here except to point out its two essential features, the displacement of all other treatments by psychotherapy and the prominence of music, as symbolized in the shaman’s drum. The drum and its music, however, just as in the case of the Mataco, have no connection with the curing of the patient. They are exclusively a symbol of the shaman’s power over his spirits.

In contradistinction to these tribes from America and southeastern Asia are those in Polynesia, Indonesia, and Malaysia, where the administration of medicines and the use of therapeutic practices have also been pushed into the background; here, however, it is not so much the priest-practitioner as his theories that have won the victory. Significantly enough, throughout this extensive region there are three protagonists who take part in the curing-drama, each with a prescribed role. We have first the patient, both victim and sinner, a breaker of taboos; second, the priest-practitioner, healer and controller of
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the spirits; and third, the spirits, who are, essentially, dei ex machina, puppets pressed into the service of the spirit-practitioner. That the economic aspects of the profession should consequently play a determining role and that the priest-practitioner should here possess considerable political power need occasion no surprise.

Turning now to the last of the great areas, Africa, we find a situation not easy to summarize. Be it remembered that, to a far greater extent than in Polynesia, Indonesia, or Malaysia, the native populations, with the exception of those in southern Africa, have been profoundly influenced by the complex civilizations of the Mediterranean, beginning with the Egyptian. The priest-practitioner's theories and formulae, although not he himself, are everywhere recognized and dominant. Yet alongside these theories we find the administration of medicines and the employment of therapeutic measures on a large scale. Correlated with the relative unimportance of the priest-practitioner's person is the minor stress placed on psychotherapy.

From what we have pointed out, the following conclusions can safely be drawn: first, that the practical and fundamentally rational aspects of disease curing, both diagnosis and treatment, exist everywhere among primitive peoples alongside the "non-rational" ones; second, that the displacement of these rational-practical aspects by essentially non-rational theories of disease causation and treatment is proportionate to the influence and power of the priest-practitioner; and third, that the victory of the priest-practitioner is due, in large measure, to specific economic and socio-political causes.

Music, specifically songs, is always present, but its actual connection with curing is minimal except where psychotherapy is of fundamental importance. It plays a great and significant role, however, as a symbol of the priest-practitioner's power, par-
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ticularly as regards his control of spirits and deities. At all times, likewise, it is an emblem of his profession.

NOTES

1 Cf., for instance, W. H. R. Rivers, Medicine, Magic and Religion (1924) 42-44.
5 Cf. C. Singer, Greek Biology and Greek Medicine, p. 80: “The medicine of the ancient and settled civilizations of such people as the Assyrio-Babylonians, for instance, of which substantial traces have been recovered, is hardly, if at all, more effective though far more systematized, than that of many a wild and unlettered tribe that may be observed today.”
6 Article “Disease and Medicine” in Hastings’s Encyclopaedia of Religion and Ethics.
7 Practically all psychoanalysts belong here as do, likewise, not a few philosophers. Cf., for instance, E. Cassirer, Die Begriffsform im mythischen Denken (1922) and Philosophie der symbolischen Formen: Zweiter Teil: Das mythische Denken (1925).
8 Ackerknecht, op. cit., 512.
13 Rivers, op. cit., 81.
14 Ackerknecht, op. cit., 511.
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17 For innumerable examples of this cf. my two books, Primitive Man as Philosopher and Primitive Religion.


Chapter Two

The Use of Music in the Treatment of the Sick by American Indians

FRANCES DENSMORE

Two methods of treating the sick were used by the American Indians in early days and are continued to some extent at the present time. One method involves the private ministrations of a doctor or medicine man and the other a public ceremony, conducted by a number of doctors, attended by many people, and often continued for several days. Music is an important phase of each method and consists of singing by the doctor or his assistants and the shaking of a rattle or beating of a drum. The songs used in these treatments are said to come from supernatural sources in “dreams” or visions, and with them come directions for procedure and a knowledge of the herbs to be used.

Both methods were seen and described by the white men who first went among the Indians, but a study of the songs was made possible only by the recording phonograph, which came into use about 1890. The study of recordings of Indian songs may be compared to the work of a chemist in his labora-
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tory. By this means the structure of the melody can be determined and the song transcribed as nearly as possible in musical notation.

Another factor contributing to our understanding of Indian medical practice is the development of educated interpreters with a knowledge of both English and Indian idioms. The missionaries were the first teachers of the Indians, and among the first English words learned by Indians were those connected with the religious teaching of the period. Such words were applied to many Indian customs that the white men did not understand, and the terms “superstition” and “witchcraft,” as well as words of highest spiritual import, were attached to Indian customs. These terms became permanent and, to a large extent, have influenced the white man’s opinion of the Indian. Similarly the terms music and singing were applied to Indian performances. These did not please the white man, and there is still a reluctance to regard music as an important phase of Indian culture worthy of our consideration.

Early ethnologists attended the healing ceremonies of the Indians but did not write of individual treatment by the Indian doctors. The first ethnologist whom we shall quote is the Rev. Clay MacCauley,¹ who went among the Seminoles in the winter of 1880-81. He attended the annual Green Corn Dance and heard a “medicine song” which was sung as a certain medicine was drunk; the belief was that unless one drank of it he would be sick at some time in the year. MacCauley’s Seminole informant refused to sing the song for him after the feast, saying that he would “certainly meet with some harm” if he did so. This refusal shows an early connection between music and health. MacCauley stated clearly that he did not know what part incantation or sorcery played in the healing of the sick.

One of the most important papers by early ethnologists is “The Mountain Chant; a Navajo Ceremony,” ² by Dr. Washington Matthews. The author selected the mountain chant
from among other Navajo ceremonies because he witnessed it the most frequently. Like other great rites of the Navajo, it was of nine days' duration. The shaman, or medicine man, who was master of ceremonies, was known as the chanter, and the ceremony was "ostensibly to cure the sick." The myth concerning the origin of the mountain chant (Dsilyidje Qaçal) relates that "many years ago . . . the Navajo had a healing dance in the dark corral; but it was imperfect, with few songs and no kethawns or sacrificial sticks." Dr. Matthews describes a ceremony that he attended on October 1, 1884, at a place on the Navajo reservation about twenty miles northwest of Fort Wingate, New Mexico, and he presents descriptions and illustrations of the four wonderful pictures on sand (dry-paintings) that were used on that occasion. The patient was a middle-aged woman and the treatment included "prayer, song and rattling." No information concerning the songs or the form of the rattle is presented.

A remarkable study of the individual treatment of the sick, in contrast to the ceremonial, was made by James Mooney,3 who collected in 1887 and 1888 about six hundred sacred formulas of the Cherokees. The original manuscripts were transferred to the Bureau of American Ethnology. These manuscripts "were written by the shamans of the tribe, for their own use, in the Cherokee characters invented by Skiwâ'ya (Sequoyak) in 1821. Some of these manuscripts are known to be at least thirty years old, and many are probably older." Eleven of the formulas are for the treatment of the sick, and the use of songs is mentioned in connection with the treatment of snake bite, "the great chill" (intermittent fever), and an ailment which "from the vague description of symptoms . . . appears to be an aggravated form of biliousness." The formula for the treatment of chill "begins with a song of four verses, in which the doctor invokes in succession the spirits of the air, of the mountain, of the forest, and of the water."
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serious case the doctor follows the song with a prayer to the whirlwind "which is considered to dwell among the trees on the mountain side, where the trembling of the leaves gives the first intimation of its presence." The doctor directs the whirlwind "to scatter the disease as it scatters the leaves of the forest, so that it shall utterly disappear."

Mooney found that "like most primitive people the Cherokees believe that disease and death are not natural, but are due to the evil influence of animal spirits, ghosts or witches." He quotes Haywood, who stated that "in ancient times the Cherokees had no conception of anyone dying a natural death," and presents a Cherokee myth concerning the origin of both disease and medicine. According to this myth, the animals and all living creatures were happy together until man came and began killing them for food and clothing. They then held a council for their safety and protection. The decision was that each group of animals should inflict a disease upon man. The deer resolved to inflict rheumatism upon every hunter who killed one of their number without asking pardon for the offense. They sent notice of this resolution to the nearest settlement of Indians and told them how to avoid giving offense when necessity forced them to kill one of the deer tribe. The plants were friendly to man and determined to defeat the evil design of the animals. "Each tree, shrub, and herb, down even to the grasses and mosses, agreed to furnish a remedy for some one of the diseases. . . . When the doctor is in doubt what treatment to apply for the relief of a patient, the spirit of the plant suggests to him the proper remedy."

To such beliefs the student finds parallels in recent times in widely separated tribes and in customs that the Indians follow without giving any reason for their observance. The Papago in southern Arizona told the writer of their belief that every disease is caused by an animal or spirit which imparts the secret of its cure to a favored doctor. A song is taught to
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him as an essential part of the treatment. Among the Algonkins it is still customary for a doctor to put tobacco in the ground when he digs a medicinal herb and to “talk a little,” asking the herb to help the sick person. In the old days a hunter apologized to an animal before killing it, saying its flesh was needed for food. The belief in a nature that was friendly to man has always been strong. The Indians did not have the white man’s idea of “conquering nature.” Many offerings have been construed by white men as propitiation when, to the Indians, they were simply gifts to a friend. An exchange of gifts is a common custom, and the Indians acknowledged thus the bounty of nature. Careful interpreters have explained to the writer that the native term did not suggest anger on the part of the spirit to whom the gift was offered. This harmony between man and nature may seem apart from our subject, but it is important to an understanding of Indian therapy. It was the desire of the Indian doctor to restore what he believed to be a natural condition of health, strength, and long life, such as he saw in the natural world. The Indians believed in the existence of evil spirits but also believed that the medicine men had power over them. The laity did not attempt to deal with evil spirits.

Both the individual and ceremonial methods of treating the sick were studied among the Chippewa (Ojibwa) of Minnesota by Dr. W. J. Hoffman. Singing and the shaking of a rattle or beating of a drum were essential parts of both methods of treatment. The sick man was first treated in his home. A member of the Midewiwin would give him a medicinal broth, singing and shaking his rattle as the patient drank. The songs of the Midewiwin are represented by mnemonics, or song pictures; one hundred and fifty of these were collected by Hoffman with translations of the words, and eighteen were transcribed in musical notation. Typical of the words are “The spirit saw me and gave me medicine from above,” and “It is also on the trees, that from which I take life.” If this first treatment was
not successful, the sick man would be carried to the lodge of the Midewiwin and treated by a number of its members in a ceremonial manner. If his condition became hopeless, the singing was generally continued until life was extinct. Since health and long life, as well as a right mode of living, were among the teachings of the Midewiwin, this extensive use of music is important to our subject.

The writer began her study of the Midewiwin and its songs in 1907 by attending a ceremony at Onigum on Leech Lake.

\[ \begin{align*}
&\text{Ki-ma-ni-do-we} \quad \text{hi na wa ki-ma-ni-do-we} \\
&\text{hi na wa ki-ma-ni-do-we} \quad \text{hi na wa ki-ma-ni-do-we} \\
&\text{hi na wa ki-ma-ni-do-we} \quad \text{hi na wa} \\
&\text{hi} \quad \text{en-da-ni-kăn} \quad \text{e-ma-ni-do-wa-no we} \quad \text{hi a we} \\
&\text{ma-ni-do-we} \quad \text{hi na wa ki-ma-ni-do-we} \quad \text{hi na wa ki-} \\
&\text{ma-ni-do-we} \quad \text{hi na wa ki-ma-ni-do-we} \quad \text{hi na wa ki-} \\
&\text{hi na wa ki-ma-ni-do-we} \quad \text{hi na wa hi}
\end{align*} \]

**Words**

Kimanido'wiho' ................. You are a spirit
Kimanido'wii'n ................ I am making you a spirit
Énda'mbiyan' .................. In the place where I sit
Kimanido'wii'n ................ I am making you a spirit

Chippewa healing song, recorded by Gé miwúnac'  
(Courtesy Bureau of American Ethnology)
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Minnesota. This ceremony was conducted for Flat Mouth, the last hereditary chief of the Pillager band of Chippewa, who was very ill. His condition had been pronounced hopeless by the government physician, and he had asked that the native treatment be permitted. The request was granted. Eight members of the Midewiwin were summoned and sang in Flat Mouth's wigwam for several days and nights. As he showed no improvement, a ceremony of the Midewiwin was instituted. Flat Mouth was carried outdoors and placed in the center of an enclosure formed of low branches of trees. There the doctors of the Midewiwin moved around him, singing their songs and ministering to him. The writer stood outside the enclosure listening to the songs for many hours. As the end approached, Flat Mouth was carried into his wigwam, and in a short time the firing of a gun announced the passing of his spirit.

A few weeks later the writer returned to Leech Lake with a phonograph to begin her work of recording Indian songs for the Bureau of American Ethnology. There she met Ge'miwūnac' (bird that flies through the rain), the aged member of the Midewiwin who had charge of the ceremony for Flat Mouth. She asked whether he would record some of the songs heard at that time. He replied that he was so overcome during the last hours of Flat Mouth's life that he could not recall exactly what songs were sung, but he did record a song that he generally sang under such circumstances.

The writer's study of the Midewiwin and the treatment of the sick was continued at White Earth, Minnesota, where Hoffman had witnessed a ceremony of the society in 1889. Certain Chippewa remembered him and aided the later work which continued to some extent his earlier research on the subject.

A certain class of Chippewa doctors are not of necessity members of the Midewiwin. They claim to summon spirits and commune with them. Such men do not administer remedies but rather impress their patients by exhibitions of various sorts.
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intended to show their magic power. They are commonly called jugglers and are here designated as medicine men. The Jesuit Fathers met them early in the seventeenth century and called them “magiciens and consulteurs du manitou” (spirits). In their demonstrations they are tightly bound and placed in a small conical tipi. They sing, the structure sways as though in a tempest, and strange sounds are heard; these sounds are said to be the voices of spirits communing with the medicine man. Nor has this custom entirely passed away. The writer witnessed it in 1930 at Grand Portage, an isolated Chippewa village on the north shore of Lake Superior, where for about two hours in the quiet of a summer evening the little tipi swayed as though a mighty wind were blowing. The next day the medicine man said that he had summoned the spirits to learn whether they would help him cure a certain sick man. Without that assurance he was unwilling to take the case. He added that the spirits “spoke loud and clear” so he was sure his treatment would be successful. A day or two later a “beneficial dance” was held under his direction for the man, whose illness had been diagnosed by a physician and a nurse as “apparently typhoid fever.” They told the man to keep quiet and remain in bed. The dance was held in an enclosure at his door, and a generous feast was cooked and served. The writer attended the dance and listened to the songs, and about two weeks afterward she was informed that the man had recovered.

At Santo Domingo Pueblo, New Mexico, as among the Chippewa, the private treatment of the sick may be followed by treatment in a public ceremony. The healing customs of this pueblo were described and ten of its healing songs recorded in Los Angeles by a man from the pueblo. He said, “If the doctors who give herb remedies fail to help a patient, the medicine men of the Flint society may be summoned.” This is a medicine society which goes into retreat before a communal rabbit hunt and follows the retreat with a ceremony much like that used to
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bring rain or secure good crops. The members of the society, usually fifteen or sixteen in number, go to the house of the sick man, arriving in the early evening. They shake their black gourd rattles and sing until about midnight, with pauses for relaxation and smoking at intervals of about eight songs. If the patient is a woman, they may question her and ask her friends what she has done to bring on the sickness. Then they consult among themselves as to her condition and chances of recovery. There is much ceremonial procedure, including the making and effacing of a meal-painting ("altar") on which certain ceremonial articles are placed. The medicine men "call on the birds and animals," whose voices are distinctly heard. They look in a crystal ball and make use of a special song with these words:

I am fighting to cure you,
I will suck out what is hurting you, to cure you.
The things I shall take out are the things that are causing your sickness.
Now I shall take Mother-bear and put her under my arm,
As I get ready to look in the crystal, and I will help you.
Help us all.
Thank you.

"Mother-bear" refers to the "bear-paws" or "mittens" which the medicine man puts over his hands. They consist of the skin of the forelegs of the bear, with the paws. It is said that the people "never deny what a medicine man says he sees in the crystal."

We have dwelt somewhat at length on the circumstances under which the Indians sing their healing songs. Let us now consider the men and women who sing them and the characteristics of the songs.

I have known the Indian doctors in many tribes, from British Columbia to Florida, and the acquaintance in some instances has continued for several years. Without exception they were
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quiet, conservative men and women, constituting a definite type and respected in their several tribes. They prepare themselves for their calling by a fast in which they receive their “dream” or vision, and they live strictly in accordance with the requirements of that dream. They do not take part in social affairs, but they are not antagonistic toward them. Doctors do not expect to be understood, nor do they seek companionship. A doctor’s wife is usually his principal helper. Through this isolation comes a deepened sense of companionship with all living creatures and an awareness of nature in all its manifestations.

Three women who were engaged in the practice of medicine told me of their work. These were Owl Woman, the Papago (cf. p. 40), Susie Tiger (a Seminole of the northern or Cow Creek group living in the cabbage palm country), and Mrs. Washington, of the Northern Ute. Susie Tiger recorded five songs which she was using in her treatment of the sick. These included songs for lumbago, for a sick baby, for bringing a child into the world, a song addressed to the “white sun-lady,” and a song addressed to the dying in which she besought the spirit to turn back before reaching nine different places in its journey. Mrs. Washington gave no material remedies, for she claimed to have supernatural power. Her specialty was the treatment of illnesses caused by an evil influence proceeding from some person. She recorded six of her songs and said that she usually sang them when the sun was at a height corresponding to its position at about ten o’clock on a summer morning.

Indian doctors were primitive psychologists. They studied their patients and did not always consider it necessary to give medicine. In Santo Domingo Pueblo it was believed that personal jealousy might cause illness, and in a certain northern tribe the patient was sometimes told to “get up a dance and have a big time” and he would be well again. There has been also a distinct feeling that such treatment deserved a fee.
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wika, a Menominee doctor, said, "The medicine will not work unless they pay for it." She had no fixed fee but required the patient to give what he was able—perhaps a little tobacco, a handkerchief, or about four yards of calico. Natawika died in 1918 and this information was supplied by her daughter. Eagle Shield, a Sioux doctor, described a case for which he received a large fee consisting of $100, a new white tent, a revolver, and a steer.

It has been said that primitive treatment of the sick is characterized by affirmation. I have found this practice less frequently in the words of the songs than in the doctor's speech before beginning the treatment. At that time he often tells the source of his power and sometimes relates his former successes. The source of his power is generally a bird or animal known to have great strength, or something in nature that is connected with vibration, such as the wind or the "great water" when it is seething and in motion, or a mountain shaken with mysterious "spirit power." An example of affirmation occurs in a ceremonial song of the Chippewa Midewiwin containing these words:

You will recover, you will walk again.
It is I who say it. My power is great.
Through our white shell [emblem of the Midewiwin] I will enable you to walk again.

There are differences of custom between tribes and between individual doctors, but the prevailing characteristic of Indian healing songs is irregularity of accent. Sometimes this takes the form of unexpected interruptions of a steady rhythm and sometimes there is a peculiar rhythmic pattern throughout the melody. It is my custom to transcribe the phonograph records of Indian songs in musical notation, using ordinary indications. Thus the transcriptions contain frequent changes of measure-lengths. Indians never "sing with expression"; the singing of an Indian doctor is entirely monotonous. By this manner of
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presentation the rhythm is impressed on the mind of the patient. The rhythmic pattern holds his attention and, in some instances, may be somewhat hypnotic in effect. Certain healing songs are sung many times, while others are sung a definite number of times, usually three, four, or five. Some doctors have songs for beginning and ending a treatment and others have special songs for each of the four divisions of the night. Such details of procedure are in accordance with the instructions received by the doctor in his dream.

Songs used in the treatment of the sick have been recorded by the writer in the following tribes and in British Columbia: Cheyenne, Chippewa, Makah and Clayoquot (at Neah Bay, Washington), Menominee, Papago, Seminole, Sioux, Northern Ute, Winnebago, and Yuma. Healing songs were also recorded by Tule Indians from Panama and by Indians from Acoma and Santo Domingo Pueblos. Except for a few British Columbian and Tule songs, the recordings were made by doctors who were using the songs in their treatment of the sick. Many songs of the Chippewa Midewiwin are connected with ceremonies believed to benefit or cure the sick but are not songs of individual doctors, related to the treatment of specific diseases, accidents, or physical conditions. They are accordingly omitted in the following analysis, which is limited to songs used definitely in treating the sick. The total number of such songs recorded and transcribed in musical notation is 197; many others have been studied and were found to be similar in structure.

Mention has been made of a change of accent, or irregular rhythm, in many Indian songs for the sick. A tabulation of these 197 songs, from fourteen localities, shows that such a change occurs in 173, or about 88 per cent of the number. In a similar analysis of 1,510 songs of all classes, from many tribes, only 83 per cent contain a change of accent. In many Indian performances there is a difference in the metric unit, or tempo, of the voice and accompanying instrument, but this does not charac-
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terize the songs for the sick. Only 34 of these songs were recorded with accompaniment, but the metric unit of voice and accompaniment was the same in 24, constituting about 70 per cent of the number. The accompaniment was faster than the voice in six and slower in four songs. A small drum was substituted for the usual rattle when recording these songs. As one purpose of Indian healing songs is to quiet the patient, a tabulation was made also of the tempo of the 197 recorded songs. This shows that 59 songs were sung slowly (\( J = 40 \) to \( J = 66 \)) constituting 30 per cent of the number. In a previous tabulation of 710 songs of all classes in three tribes, the largest groups have a more rapid tempo (\( J = 76 \) to \( J = 104 \)). The latter may be considered the general tempo of Indian songs, though many are much more rapid.

The foregoing analysis shows that the characteristics of recorded Indian songs for the sick are irregularity of rhythm in the melody, a slow tempo, and a coincidence of voice and accompaniment. As the songs under consideration are typical, it is believed that the results would be the same if the analysis included a larger number of such songs.

The ownership of a song, as indicated, was with the man or woman who received it in a dream. Others might know the song and be asked by the owner to sing with him in order to add their power to his in a case of serious illness, but they could not use such songs with authority unless granted that privilege by the original owner. He did not relinquish his own use of the song by this action. Among the Menominee and in some other tribes there was a rule that a man seeking to buy a song and its manner of use must make the request four times, on consecutive nights, and that each request must be accompanied by a gift. The owner would then teach the song, explain its use, and show a specimen of the herb to be employed with it. He did not transfer the plant; this the inquirer had to identify from memory and find for himself.
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Two types of Cheyenne doctors in Oklahoma have recorded their songs for healing the sick. These are Bob-tailed Wolf, who received his songs and power direct from supernatural sources, and Turtle, who obtained most of his songs from an older doctor, and received only one song himself. That song was taught to him by a spirit buffalo.

Bob-tailed Wolf treats all forms of illness. Power has come to him in many dreams, but the first manifestation was connected with an experience in a thunder storm. He was traveling on horseback when the storm arose. A bolt of lightning rendered him unconscious and killed his horse. On the fourth night after this occurrence he had a dream in which he was told how to treat the sick. The day was clear when he recorded that song for the writer, but within an hour the rain was falling heavily. He said this always happens when he sings this song. The word “grandfather” occurring in the song refers to the thunderbird. The song may be translated:

My grandfather has come to see me and taken pity on me and given me this power.

Another song recorded by Bob-tailed Wolf refers to the sun as “my grandfather.” With his songs he uses a rattle made of stiff rawhide; a face is painted on one side, the handle is wrapped with deerskin, and formerly a buffalo-tail was attached to it. Bob-tailed Wolf is a prominent member of the Peyote organization (Native American Church) and was photographed in his costume as a leader in its ceremony.

It is interesting to learn that a man holding such a high position and allied to such sources of supernatural power is also a man who “understands what babies say” and treats their small ailments. Bob-tailed Wolf says that when he is treating sick babies they tell him where they feel bad. He received his power with them in the following manner: One day he came upon a covey of little plovers hardly old enough to walk. He was about to take them away when the mother came and said, “Indian,
Bob-tailed Wolf, Cheyenne (Courtesy Southwest Museum)
Owl Woman, Papago
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don’t take them; I love them and they are so pretty. If you will
spare them I will give you power to treat sick babies.” He ac-
cordingly refrained from taking the tiny birds and their mother
told him to use water in treating sick babies, instructing him to
apply it to their bodies and to use it without herbs. What ap-
pear to be words in his song for the babies are not real words and
cannot be translated. He uses the rattle described above.

Cheyenne song for sick babies, recorded by Bob-tailed Wolf

Turtle, the other Cheyenne doctor, learned his songs from
Dragging Otter, who had received them from an older doctor.
His personal song, received from a buffalo, is sung “when the
spirit of a sick person is in danger of departing.” He says that
when he sings this song, “a young buffalo stands in the way and
tries to keep the spirit from going away.” After recording the
song he made a sound of violent blowing in imitation of the
buffalo; he always does this after singing the song for a sick
person.

The Omaha treatment of a boy wounded by a pistol shot was
witnessed by Francis La Flesche in his own boyhood. The
“buffalo doctors” were summoned, and four leading doctors in
succession sang their personal songs and administered their per-
sonal remedies. About twenty doctors, including two women,
then joined in the songs. The treatment continued over a pe-
riod of four days and was followed by a ceremony of recovery
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and the distribution of many gifts. It is said that the boy recovered in about a month. Two of the songs used on this occasion were published by La Flesche in musical notation.

Mention has been made of the Indian belief that spirit-animals cause various illnesses. This belief was found in a particularly interesting form among the Papago of southern Arizona, who included among causes of sickness the spirits of dead Papago and of Apache slain in war. About fifty healing songs were recorded in this tribe. The bird, animal, or spirit which causes a disease is thought to impart songs and instruction for its cure to a certain doctor. It is the duty of a sia'ticum, or diagnostician, to decide the cause of the illness and refer the patient to the proper doctor. Songs are so closely connected with the illness that the diagnostician may say to a man with sore eyes, "Your trouble is caused by the quail. You had better go to So-and-so who knows the quail songs." If the patient does not improve, the diagnostician is held responsible and sends the sick man to another doctor. Sixteen diseases and ailments attributed to birds and animals were described, and songs used in the treatment of five were recorded, these being songs of the deer, badger, horned toad, rattlesnake, and brown lizard.

A Papago doctor, Owl Woman, was living at San Xavier in 1921 and treating sickness caused by Papago spirits. She used songs which they imparted to her and she believed that the spirits with whom she communed were spirits of dead Papago who followed the old customs. These spirits stayed near their graves during the day, but went to the spirit land at night, traveling a road over which they had even taken her to that mysterious country. Many spirits had appeared to her, described their experiences, and given her songs. These songs were sung by an assistant while Owl Woman herself was engaged in the treatment of her patient. Several persons knew her songs, but she depended on Sivariano Garcia, also a doctor, who lived near her and could be summoned at any time. For an entire day Owl
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Woman directed him in recording her songs for the writer.

Owl Woman always began a treatment with two songs given her by the spirit of a man who was killed near Tucson. As in many of her songs, the words are highly poetic. The first song ran:

Brown owls come here in the blue evening.
They are hooting about,
They are shaking their wings and hooting,

and the second:

How shall I begin my song in the blue night that is settling?
I will sit here and begin my song.

After four songs had been sung she treated the sick man by stroking his body with a bunch of owl feathers on which she sprinkled ashes from his fire. The night was divided into four parts, each with its own songs.

Jose Panco, a Papago doctor, has treated the sick for twelve

Sandy Loam Fields, on top of these lands Elder Brother (Montezuma) stands and sings.
Over our heads the clouds are seen, downy white feathers gathered in a bunch.

Papago healing song, recorded by Jose Panco

41
years, each year represented by a notch in the handle of the
gourd rattle with which he accompanies the songs. Panco re-
corded several songs, among them a song with two verses that
he received from his grandfather. A deer gave this song to a
hunter from Sandy Loam Fields, a native village. It is a gentle,
pleasing melody and an excellent example of irregular rhythm.

Not far from the Papago reservation, to the west, is the reser-
vation of the Yuma and Cocopa. Charles Wilson, the leading
Yuma doctor, recorded four songs that he used in treating men
suffering from gun-shot wounds in the chest. Each song has a
special purpose. With the singing of the first song he expects
the patient to regain consciousness. With the second he calls
upon a small insect that lives in the water and is believed to
have power over the fluids of the body; the purpose is to check
the hemorrhage. The third mentions a lively insect, and with
this song Wilson expects the patient to regain the power of mo-
tion. The fourth mentions a certain kind of buzzard that has
white bars on its wings and flies so high that it cannot be seen
by man. Wilson said, “Each of these insects does his best, but
it is the buzzard whose great power gives the final impetus and
cures the sick man.”

A unique explanation of the cause and cure of sickness was
given by Pa’gits, a doctor of the Northern Ute tribe, living on
the high plateau at the base of the Uinta mountains. He claimed
to receive his power from “a little green man who lives in the
mountains and shoots arrows into those who speak unkindly
of him.” Pa’gits said, “He tells me when he has shot an arrow.
Then the man sends for me and pays me to get it out.” In re-
turn for this co-operation he sometimes left a handkerchief or
other small gift at the abode of the little green man in the moun-
tains. Pa’gits said that he usually had to sing five or six times
before he could extract the cause of the pain, which was some-
times an inch or two in length, red in color, and in texture like
a fingernail. He recorded nine of his songs, which are very slow
Eagle Shield, Sioux (Courtesy Bureau of American Ethnology)
Brave Buffalo, Sioux (Courtesy Bureau of American Ethnology)
in tempo and have no words. He never took a case if he had any doubt of his ability to cure it.

A Sioux Indian on the prairie of North Dakota defined the limits of Indian therapy by saying that an Indian doctor “would not try to dream of all herbs and treat all diseases, for then he could not expect to succeed in all or to fulfill properly the dream of any one herb or animal. That is why our medicine-men lost their power when so many diseases came among us with the advent of the white men.” Sioux songs were recorded in 1911-1914.

Brave Buffalo was one of the most powerful doctors on the Standing Rock Reservation in Dakota. He related a dream in which a pack of wolves formed a circle around him; as they stood looking at him he noticed that their nostrils and paws were painted red, and then he lost consciousness. When he regained his senses, the wolves took him to a den on top of a high hill. The details of his dream are not of present interest, but the wolves gave him a song that he used in treating the sick. The words reflect the high regard which Indian doctors, who usually treat the sick at night, have for the owl:

Owls hooting in the passing of the night,
Owls hooting.

Another prominent doctor on this reservation was Eagle Shield, who had treated fractures for more than forty years; he also treated wounds and general illnesses, and he ascribed his power to the bear and badger. He recorded eleven of his healing songs and brought specimens of the herbs used with them. Eagle Shield was also a warrior and had the right to wear the crowskin “necklace” which is the insignia of the Kangiyuha, or Crow-owners society, an important military society of the Plains tribes.

A primitive form of socialized medicine was found among the Makah and Clayoquot, two seafaring tribes living in northwest Washington and on the west coast of Vancouver Island. These
tribes had an organization called the Sai’yûk society to which “everyone had to belong in order to have any standing in the tribe.” One of its functions was to supply musical therapy to its members. A group of men and women would go to the house of the sick person, where they danced and sang. The songs were in pairs, the first accompanied by very rapid pounding on planks (a native form of percussion instrument) and the second by a measured beat on small drums, in the same tempo as the song. “Sometimes a pretty song would soothe the sick person and he would go to sleep.” The power of the Sai’yûk included the healing of physical ills, and it was said that they cured a cripple who had been unable to walk for at least ten years. They came and sang for him, and he lived in excellent health to an advanced age. He was a whaler, a vocation which requires strength and endurance. His daughter, Sarah Guy, said, “His reliance was on the songs and meetings of the Sai’yûk, but he sometimes took herb tea.” We can allow him that privilege, as he was a loyal advocate of music as medicine.

Songs of the Indians of British Columbia were recorded near Chilliwack, B. C., where about a thousand Indians were employed in a hop-picking camp. They came from widely separated localities, including Vancouver Island and the reservations on the west coast, Fort Simpson and the regions of the Nass, Skeena and Babine rivers in the north, and the country adjacent to the Fraser and Thompson rivers. Many songs were recorded and among them were 26 songs used in the treatment of the sick. These were recorded by eight singers from various parts of British Columbia and Vancouver Island. John Butcher and Tasalt recorded songs that they were using in their treatment of the sick, and other songs were recorded chiefly by sons and grandsons of old men who treated the sick. The younger men had learned the songs when singing with them. One of these songs contains the words, “The whale is going to help me cure this sick man.”
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John Butcher, whose native name may be translated Dawn, lives at Lytton, on the Thompson River, and treats illnesses of a general character. The four songs he recorded are those he uses in a confinement case. In one song he talks to a sturgeon and a bird, and in the others to the seal, grizzly bear, deer, and eagle.

Tasalt has inherited his name from a remote past and does not know its meaning. He lives on the Fraser River and is commonly known as Catholic Tommy. When the writer's work was explained, he said that he would record his four songs for the treatment of smallpox, fever, palsy, hemorrhage from the lungs, and pneumonia. These were preceded by a long introductory song. The songs were ascribed to mythical spirits; one was said to live in the water and to resemble a dog. It had a golden breast and golden eyes. Another was received from a "wild spirit" that he could not describe. He said these spirits went away when the white men came. Each song has its own characteristics and the rhythms are varied. The tempo is slowest in the song for pneumonia and most rapid in the song for palsy.

The members of the Chippewa Midewiwin continue the treatment which they were using for the sick when Hoffman heard their songs in 1889. The writer talked with one of these men in August, 1945. He was Joe Pete of Lac Vieux Desert, Michigan. Two of his recent cures, with singing, were related.

These examples will suffice to show the close relation between music and medicine among the Indians and the deep faith of these primitive peoples in the healing powers of music. The white man has developed his own methods of musical therapy, but in isolated places the Indian doctor still sings the songs that come to him in dreams, while his patients listen and recover.
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NOTES


2 Ibid. 379-467.


6 The writer’s study of music in the following tribes did not include songs for the sick: Arapaho, Alabama, Choctaw, Cocopa, Hidatsa, Maidu, Mandan, Omaha, Yaqui and Zuñi and Cochiti Pueblos. Nor were songs of this class included in recordings of Indian songs secured at Anvik, Alaska, by Dr. Aleš Hrdlička and transmitted to the Bureau of American Ethnology. Iroquois ceremonial songs were recorded by J. N. B. Hewitt. The study of Cheyenne, Arapaho and Maidu music and that of Santo Domingo Pueblo was under the auspices of the Southwest Museum of Los Angeles, California, and the original recordings are with that institution. A limited number of Mandan and Hidatsa songs were recorded for the Historical Society of North Dakota, which retained the records. With these exceptions the recordings were transferred to the Bureau of American Ethnology, under whose auspices most of the writer’s work was done. The recordings are preserved in the Smithsonian-Densmore collection of American Indian sound-recordings in the National Archives in Washington.

Music and Medicine in Classical Antiquity

Bruno Meinecke

Music, thou gracious, pure art,
With thee vanish grief and pain;
Thou dost adorn the spirit with joy and grace,
Thee I clasp forever in my heart.*

Music and Iatromantics

Music and medicine, Apollo and Aesculapius! What a divine alliance! "I swear by Apollo, the Physician and by Aesculapius," solemnly intoned the ancient neophyte as he formally bound himself, soul and body, to the sire and scion to whom he was consecrating his life.¹ Indeed, two such noble arts could have been engendered only in the bosom of the gods.² And so medical and musical functions were attributed to various ancient divinities by the Greeks and Romans, but in none did these particular arts reach such sublime heights as they did in Apollo and Aesculapius.

* The following prose translation gives the sense of the German quatrain:
  "Music, thou gracious, pure art,
  With thee vanish grief and pain;
  Thou dost adorn the spirit with joy and grace,
  Thee I clasp forever in my heart."
Phoebus Apollo, whose cult exercised more influence in Greek and Roman religion than that of any other god, not excepting even Zeus, radiated from his godhead multiple functions, many of which have their source in a nature-deity. He presided benignly over agriculture, vegetation, cattle and flocks, their meadows and pastures, in the role of an earth-deity. As a symbol of the sacred sunlight—although in Homer Helios is the sun god—he is the dispenser of life and its blessings. Just as he purges the soul of man from guilt, so he cleanses his body of ills, and since he preserves the harmony of life by dispelling evil, thus he becomes the god of healing and the seer. Although his rays may be transformed into lethal weapons which bring pestilence, yet his rhythmic movement through the heavens produces harmony in the universe, imparts measure and beauty of form; wherefore he is god of poetry, dancing, and music. Among those Greek divinities which are largely the personification of cosmic forces as they apply to healing functions, Apollo is definitely one of the earliest, and was universally regarded as medicinae inventor (the founder of medicine). Apollo represents the pure intellect, and is the god of mental and moral purity; therefore his godhood is the very essence of the Greek idea that the aim of life is the purest harmony of soul and of body. As leader of the Muses and god of music, he was known by such appellatives as Musagetes and Citharoedus; as a health-giving deity he was named Apollo Iatromantis (physician and seer or, possibly, physician of the soul), Iatros (physician), Oulios (health-giving), and was identified by similar epithets. Music and medicine therefore were intimately commingled in his divine nature as an integrated unity.

Among the Romans most of these functions of Apollo were appropriated, and several temples are known to have been dedicated to him, one as early as 430 B.C. on the occasion of a pestilence. His medical character was specifically recognized by such titles as Apollo Medicus, Salutaris (healer), and
Raphael's mural, "School of Athens"

Theater and environs of Epidaurus

Aesculapius
others; even the Vestals worshiped him in this capacity. A firm foundation was provided for his cult when the Emperor Augustus adopted Apollo as his special tutelary deity. Through Roman regimentation this god became a favorite in many provincial localities, particularly in connection with medicinal waters and springs, as, for example, at Aquisgranum, the modern Aachen, where he was worshiped as Apollo Granus. The hot sulphur springs there, celebrated for their therapeutic value in the cure of gout, arthritic ailments, and scrofula, still preserve their reputed potency.

The magic charm and entrancing power of pure harmony are also symbolized by such demigods as Orpheus, the tuneful bard, servant of Apollo, who, according to Pausanias, was believed to have discovered mysteries, purification from transgressions, cures of diseases, and means of averting divine anger. As the mythical founder of Orphism, he, like Apollo, was closely identified with oracular powers and purificatory ritual. Through the medium of poetry, music, and medicine, he too applied salutary remedies to soul and body. Musaeus, another priest, poet, and physician, belongs in the same category with Orpheus; he “introduced us to the complete cure of diseases and oracular responses,” says Aristophanes. But Chiron, the famed centaur, was instructed in physical pursuits, music, and medicine by none other than Apollo himself, and he, “der Gott der schmerzmildernden, kunstgewandten Hand,” distinguished in music, in medicine, and in divination, in turn transmitted the father’s iatromantic wisdom to the son, but Galen also credits Apollo with instructing Aesculapius.

Accordingly, in due course after the time of Homer, Aesculapius was apotheosized as Apollo’s son born by the nymph Coronis, and became preeminently the medicinae illustrator (the enlightener of medicine), the divine symbol of the salutary and medicative powers of nature, who always manifests a universal solicitude for her creatures. His temples or Aesculapia
were early established throughout the Greek world, notably at Tricca, Epidaurus, and Cos, functioning not only as health resorts for the sick, but also as shelters for the healthy. It is highly significant, too, as Plato tells us, that at the quinquennial festivals of the god, called Asclepieia, poets and musicians competed for the prizes, a custom suggesting again that the arts of the Muses were accorded a large share in the therapeutic technique of the temple rites. And it is not a mere coincidence that the cults of Apollo and Aesculapius were venerated jointly at such places as Epidaurus, Aegira, Miletus, Rhodes, and others. The close affinity between the two deities, i.e., between music and medicine, is again substantiated by Pindar, to the effect that Aesculapius delivers those who suffer from festering sores or wounds received in battle or whose bodies waste away with the excessive heat or cold of the seasons, and others who suffer diverse pains of body or soul, healing some of them with soft, enchanting strains, applying soothing potions to others or treating their limbs with simples or restoring them by surgery. Indeed, in Roman times too their inseparable relationship is well authenticated by Cicero when he accuses Verres in the looting of Syracuse, strongly excoriating him for removing "the statue of Paean (i.e., Apollo, as god of healing) from the temple of Aesculapius, exquisitely wrought, sacred and holy, which all men went to see for its beauty, and worshiped for its sanctity;—and too, that Paean together with Aesculapius was regularly worshiped among these people (the Syracusans) with yearly sacrifices." 

Psychagogic therapy was an indispensable part of the ritual, for it was imperative to induce in the patient an ecstatic experience in order to awaken the curative power of the soul, and thereby restore the harmonious relation between it and the body. To dismiss Aesculapius and his cult as an extreme form of religious imposture is to lack the proper perspective for judging the progressive development of Greek medicine. One must
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remember that the ancient Greek—and for that matter the Roman as well—was incurably religious, and that therefore the assumed mantic powers of Apollo and Aesculapius resolved themselves into an elemental psychotherapy, which was efficacious mostly because the patient believed in it. The medicative powers of Apollo and Aesculapius were, from the Greek standpoint, rather a form of naturalism than supernaturalism, because both gods represented the healing powers of nature. Herein the dawn of naturalism in Greek medicine is already discernible, and it became a scientific fact for all posterity when the "Father of Medicine" removed it from the temple and illuminated it in its full glory. The arts of Apollo and the Muses, vested in Aesculapius, greatly enhanced those psychological factors which were naturally present in attractive and healthful surroundings, far removed from the distractions of urban centers, since shady groves and thermal springs, even theaters, stadia, and gymnasia offered every opportunity to influence the psychic nature of the patient.

Eventually, in 293 B.C., on the occasion of a pestilence, the cult of Aesculapius was introduced in Rome and was first established on the Insula Tiberina. In this instance too the Romans once more became the custodians of a Greek cult, which continued to function with its iatromantic therapy for many centuries, until it was finally transformed into the modern sanatorium and hospital. The various steps in this development cannot be traced here, but the available data are fully convincing.

From this brief examination of the cults of Apollo and of Aesculapius we may draw the following conclusions:

That, howsoever we may finally explain the godhood of Apollo, very early in Greek history his character is connected with the function of a nature-deity. His various names suggest that he was a symbol of life and purification from guilt. He preserved the harmony of life by divination, music, and medicine. His healing power was therefore iatromantic.
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That all of the above functions were bequeathed to his son Aesculapius, but that medicine became the latter's chief domain. That his temple ritual was closely identified with oracular utterances, in connection with which music and medicaments played a prominent role as a form of therapy; that this treatment was psychosomatic, for the ancient Greeks were well aware that there existed a close interaction between soul and body.

Soul and Body

Although various Greek thinkers may differ on the exact nature and function of soul and body, their interrelation and interdependence are generally recognized. It would therefore be a grave mistake if we sought to estimate Greek musico-therapy by applying modern standards of judgment, which are too mechanical and technological. The remedial impulse inherent in nature, her self-recuperative powers, the vis medicatrix naturae (the healing power of nature), formed the true basis of the Greek Naturgeist (genius for nature), and the keynote always remained constant, namely, homines maxime homines (man, chiefly man). It is always man, acting and reacting through the capacities of the human intellect and imagination, the natural man endowed with soul and body, who is the measure of Greek religion and Greek philosophy.

Homer had already recognized a dual nature in man, the physical and the psychical, expressed by such terms as θυμός, δέιμας, ψυχή. Nowhere in the Iliad and the Odyssey is man a mere clod of earth. Homer, poet and singer, ennobles the dignity of the Greek man, and "must be acknowledged to excel Shakespeare in the truth, the harmony, the sustained grandeur, the satisfying completeness of his images." 25 And in a more enlightened age the cosmologists and iatro-physicists, all of them, from Thales to Plato, whether their immediate task
focused their efforts on the elemental substance or substances out of which matter originated, or whether they were delving among ethical theories, sought to integrate both soul and body. Indeed, Thales attributed a soul even to inanimate objects. Small wonder then that rocks and trees responded to the enchanting strains of Orpheus’ golden lyre and Amphion moved stones by his entrancing melodies! Among these nature-philosophers Pythagoras completely monopolized the limelight, and his influence continued unabated among most subsequent thinkers, including even Plato and Aristotle. In his philosophy psychics and physics were inseparably mingled into a regimen of life, in which he employed an extensive musico-therapy. He deserves to be known as “The Father of Psychotherapeutics.” Even Democritus, a materialist of the day, assumed some sort of soul to vitalize the whole body, and held that it was composed of smooth, spherical atoms which functioned variously in different organs, but that it acquired its perceptions by corporeal contact. He too was reputed to be quite an expert in the arts.

However, it was Plato and Aristotle who reached the very pinnacle of psychosomatic speculation, the one through the medium of the pure intellect, the other through the medium of scientific investigation, but both believed in the unity of soul and body. Raphael in his “School of Athens,” that grand fresco in the Vatican, with transcendent artistry has captured the essential greatness of these two princes of pure thinking: he represents them as advancing from the inner depths of the great hall as they converse together. Aristotle with a copy of his Ethics in the left hand demonstrates his principles of knowledge by pointing to the earth as the foundation of natural science, while Plato, carrying his Timaeus’ gestures upwards towards the heavens as the source of higher inspiration. It is the difference between scientia (science) and sapientia (wisdom) that Raphael so deftly portrays.
Of course, the real impulse for their brilliant theories had been provided by Socrates. What Plato and Aristotle believed about the effects of music on soul and body will be discussed shortly. The succeeding schools and sects held in general to either Platonic or Aristotelian doctrines regarding man's nature, and the basic principles varied but little. Hippocrates the Great, a genius in his own right and himself a product of iatro-philosophic teachers, was eminently fitted to lift the mystic veil which had enveloped the iatromantic symbolism of Apollo and Aesculapius. And by an organic fusion of soul and body he emancipated the healing art, always basing his investigations on an objective nature, in which he saw the vitalizing essence of life. Centuries later the brilliant Galen, a sincere admirer of Hippocrates, admitted that man too is an animal, but that he excels the brute creation in that he is endowed with reason, by which he may apprehend even the divine arts, including the medical art of Aesculapius and Apollo and all of the other branches of the Muses such as music and divination. But philosophy is the greatest of them all, and this man has developed by his own diligent activity. As a philosopher and a physician he aimed to reconcile the doctrines of Hippocrates, Plato, and Aristotle, and he taught that the pneuma, the animating spirit, which permeated man, had psychical and physical characteristics.

Roman thinkers in philosophy and medicine, such as Cicero, Lucretius, Celsius, Seneca, Horace, and Virgil, adopted most of the psycho-physical tenets of the Greeks, but often applied to them a more specific social and political direction. Seneca, for example, made many of the Stoic views on soul and body acceptable even to later Christian philosophers.

And so our understanding of the medical aspect of music in classical antiquity will be conditioned by the proper perspective if we try to view the Greek and Roman man in his own world of thought and action. To him disease was a disharmony
of the component elements composing his physical and psychical nature; a harmony of these elements indicated health. And ψυχή καὶ σῶμα (soul and body) in the words of Xenophon \(^{37}\) were the embodiment of the whole man, whose medical ideal is pertinently expressed by Juvenal’s maxim, mens sana in corpore sano (a healthy mind in a healthy body). \(^{38}\)

**Psychosomatic Effects of Music**

What were the theories of eminent Greek and Roman authorities regarding the effects of music on soul and body? At the outset we must remind ourselves that the ancients defined music as the arts of the Muses, which would include poetry, singing, playing, and interpretative dancing, since harmony, in the Greek sense, melody, and rhythm were their chief constituents.

Homer, who is the beginning of all good things Greek, accords music a prominent place in a variety of human relationships. So he recommends it to avoid negative passions, such as anger, sorrow, worry, fear, fatigue, and to promote healthful recreation for elevating soul and body. Of course, Homer himself is the greatest singer of them all, and any further references to music and divine minstrels in his works are merely personal expressions. Such are Demodocus and Phemius. Both minstrels are cast in roles in which their music plays deeply on human emotions amid varied situations: “For minstrels from all men on earth win their reward of honor and reverence, since the Muse teacheth them the path of song, and loveth the tribe of minstrels.” \(^{39}\) They spread cheer with the lyre when men feast, \(^{40}\) for music is the crown of the festive board. \(^{41}\) They modulate their strains and modes, for many a charming melody do bards rehearse for mortals. \(^{42}\) But their crowning glory lies in the moral power of their music, whereby they were charged
to protect the chastity of Penelope and Clytemnestra, Phemius the one, Demodocus the other, during the absence of their husbands. Homer speaks of these bards as though they were disciplinarians in morality. Surely, no one will deny that Homer had faith in the prophylactic virtue of music.

But it remained for Pythagoras to introduce the youthful intellectuals of the day to the elements of a psychobiosis in which diet and music had a foremost place. So far-reaching was the influence of his doctrines that various ramifications may be found in many subsequent philosophies. Pythagoras formulated his concepts into a definite mode of life and living, based on the premise that man's soul is a harmony, and that the most momentous thing in human life is to win the soul to virtue; for virtue is harmony, and likewise all good and health, mental and physical. Since order, proportion, and measure were to him the essence of life, he and his school devoted themselves ardently to music to attain ethical perfection. It was his belief that if one employed music in daily life according to a prescribed manner, it would make a salutary contribution to one's health. Therefore he investigated the physics of sound, and discovered the basis of music from the monochord, by means of which he fixed the ratios of his perfect musical consonances, namely, the octave, fifth, and the fourth intervals. These are still the fundamentals of our tonal system today. Some further evidence may point to Pythagoras as the inventor of the eight-stringed lyre and as the perfecter of the modern scale; but it suffices for our purpose to know that he used his knowledge of music for his daily singing and playing which were an inseparable part of his "catharsis" or cleansing of the soul. By this term he was accustomed to designate medicine which was administered by the aid of music. It is not difficult to see how profoundly this element of Pythagorean technique affected Plato and Aristotle in estimating music as a vital psychical and physical force.
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To Plato and Aristotle posterity owes a great debt of gratitude for defining the true mission of music as an educational instrument in the state, for their views are just as tenable today as they were then. Indeed, Plato felt so keenly about the importance of music that he linked it with the future welfare of a whole nation, and sincerely believed that by changing a musical mode the very foundations of the state might be undermined. He advocated a search for competent teachers in music, whose natural endowment was such that they would be capable of following the path of true grace and beauty, “that our young men, dwelling, so to speak, in a healthful place, may receive benefit from all things about them, whence the influence that emanates from works of beauty may waft itself to eye or ear like a breeze that brings health from salubrious places, and so from earliest childhood imperceptibly guide them to likeness, to friendship, to harmony with beautiful reason.” And music is a prime factor in such a transformation, for music is a medicine of the soul. Music was bestowed on man for the sake of effecting harmonious revolutions of the soul within us whenever its rhythmic motions are disturbed. Thus when the soul has lost its harmony, melody and rhythm assist in restoring it to order and concord. There must be such close interaction between body and soul that one is never exercised without the other, so that they may always be evenly matched and sound of health; and he who is diligent in molding his body must in turn provide his soul with motion by cultivating music. When there is a coincidence of beauty in the soul and corresponding and harmonious beauties of the same type in the body, this interrelation of beauty leads to the philosophy of universal love, and the union of soul and body in one common motion one may properly call perception. Since the soul is conjoined with the body, the souls of children, while still young and tender, should be charmed by melody. Music should be used as an ennobling educational instrument.
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promoting self-control, not as a means of exciting vulgar sentiment and passion. For with respect to health and disease, virtue and vice, there is no symmetry or lack of symmetry greater than that which exists between the soul itself and the body itself. Plato did not favor the notion that music should engender only pleasurable sensations; he maintained rather that it should be so used as to develop character.

Aristotle’s views, although reflecting more the thinking of a scientist, nevertheless bear a marked resemblance to those of Plato. Aristotle also believed that soul and body react on each other, and that education must provide for them both. He takes a somewhat broader view of the subject than Plato and sees it in its full relation to human life. Music has at least three functions: It is a source of recreation and pleasure, it is suited to the intellectual use of leisure, and it is a powerful ethical force in the molding of character. It serves well the purpose of an emotional “catharsis” in some souls, and its purgative melodies afford harmless pleasure. All of the harmonies should not be employed in the same way, but the most ethical type should be used for education, and the active and exciting kinds for listening to the performance of others. For any experience that brings a violent reaction in some souls exists in all, although the degrees of intensity may vary—as for example in pity and panic, and also in extreme religious excitement. Since some persons are very susceptible to this form of emotion, under the influence of sacred music, when they use melodies that greatly excite the soul, they are reduced to a normal state, just as if they had received medical treatment and purgation. The same experience then must of necessity come also to the compassionate and the fearful and to persons in other emotional states, so that music seems to purge all emotions. The result is a pleasant feeling of relief. Plato also held the view that certain sacred rites produced an effect on the soul comparable to that caused by cathartic medicines on the body.
It was this same theory of psycho-catharsis that Aristotle applied to tragedy, which, he held, through pity and fear effected a purgation or purification of the emotions, since ideally directed art arouses refined and exalted feelings. Music is an important factor in achieving intellectual virtue, which is the ultimate end of education, for music in its melodies and rhythms contains images of anger and gentleness, of courage and temperance, and all their opposites, and other moral qualities that correspond most closely to the true nature of these qualities. And when one learns to feel an emotion, like pain or pleasure, with reference to the musical image, one approximates the experience which he would have towards the reality. Music actually contains in itself imitations of character, reproduced variously by the different modes: The Lydian is decorous and educative, the Phrygian is violently exciting and emotional, the Dorian is more composed and manly. Plato and other Greek writers attributed similar effects to the various Greek scales, and generally concurred with Aristotle's opinions, except that Plato considered the Lydian mode voluptuous and sensual, and therefore enervating. "From these considerations," Aristotle continues, "it is plain that music has the power of producing a certain effect on the moral character of the soul, and if it has this power, it is clear that the young must be directed to music and must be educated in it. Moreover, education in music is well adapted to the youthful nature; for the young on account of their time of life cannot patiently bear anything unsweetened by pleasure, and music naturally belongs to things that have a delightful sweetness. And anyone seems to have an inborn affinity with harmonious sounds and rhythms; therefore many wise men assert that the soul is harmony, whereas others say that it has harmony." And since the soul rules the body and music is akin to the soul, appropriate melodies, harmonies, and instruments must affect both soul and body.
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The permanence of Plato's and Aristotle's theories on music in the life of a well-ordered state is fully substantiated by the many references in later writers. Indeed, music may be a powerful ethnological factor in counteracting the asperity of climate, to the extent that it may soften the extreme hardness of the national character and may humanize a whole people. Polybius has left us a classical example of this. The Arcadian nation, he avers, had a very high reputation for virtue among the Greeks, due not only to their humane and hospitable character, but especially to their reverence for the gods, whereas the Cynætheans, who were also of Arcadian stock, surpassed all other Greeks in depravity, cruelty, and crime. Polybius attributes this marked national disparity to the fact that the Cynætheans had abandoned music, which their forefathers had introduced among them to alleviate the harsh conditions under which all the inhabitants of Arcadia must live, namely, a cold and gloomy atmosphere; but the rest of the Arcadians cultivated music in all of its forms so assiduously through the medium of instrumental playing, choral singing, chanting of hymns and paeans, military parades, and dancing, that they incorporated it in their whole public life. Young men up to the age of thirty were compelled to study it constantly, and it was considered a disgrace to be compelled to confess that one had not studied singing. Only if they devote themselves to education, and especially musical education, can the Cynætheans hope to free themselves from the savagery which has overtaken them, concludes Polybius. Strabo took the view that poetry is a form of elementary philosophy, which introduces men into the art of life, and that this together with music and dancing tends to bring us in touch with the divine; "for although it has been well said that human beings then act most like the gods when they are doing good to others, yet one might better say, when they are happy."

The psychological effect of music is forcefully illustrated by the ancient story of the artist Theon, who cleverly availed him-
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self of this function of the art. When he was about to make a public exhibition of a masterpiece of his, wherein a young warrior was represented as just ready to assail the enemy who had aggressively invaded his fatherland, in order to animate and arouse his audience and to create the proper mood for a ready acceptance of his painting, Theon first stationed a trumpeter near the picture, and had him sound a warlike melody such as was usually employed to stimulate the soldiers for an attack. Then at the proper moment, when the spectators had been sufficiently inspirited, he quickly unveiled the picture portraying the soldier in action. The whole assembly was struck with admiration.\(^70\)

Plutarch too was greatly imbued with the power of music, and states: “Musical education in one’s youth forms and regulates inclinations to applaud and embrace the noble and the generous, to rebuke and blame the contrary—to observe decorum, temperance, and regularity.” \(^71\) “Homer,” he wrote, “sought to inflame the hero’s (Achilles’) courage by employing the incitements of music and poetry.” Not only Achilles, but Hercules and many others made use of music for such a purpose, after having been carefully instructed by the wise Chiron not only in music, but in morality and medicine as well.\(^72\) And elsewhere he stresses the interrelation of soul and body by quoting Plato, who “rightly exhorts us not to employ the mind without the body, nor the body without the mind, but to drive them equally like a pair of horses.” \(^73\) Plutarch held to the general belief that among the various genera of music the chromatic greatly exhilarated the mind, whereas the harmonic composed it; that in a similar manner the harmonious instruments, such as harps, lyres, pipes, and flutes, although themselves devoid of life and sense, readily accord in songs and strains of joy and grief with human experiences, reproducing the judgments, the feelings, and the morals of those who use them, so that even Zeno, when on his way to the theater to
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hear Amoebus singing to the cithara, remarked to his pupils, “Let us go to observe what harmony and music gut and sinew, wood and bone, send forth when they partake of reason and rhythm and order.”

We are further reminded by Athenaeus that music is a powerful educational instrument, and should be the subject of scientific inquiry as pursued by Pythagoras. Through a veritable "Cook's Oracle" he records a highly diversified, but informative and significant discussion of music, poetry, musical instruments, and interpretative dancing, in all of which the interplay of mind and body is recognized: "Quite properly Damon of Athens and his followers say that songs and dances are the result of the soul's being in a sort of motion; and those songs which are good and beautiful produce similar souls, whereas the opposite kind produce the opposite."

That music is an incitement to bravery Athenaeus proves by the reference in Herodotus to the effect that the brave Lacedaemonians march to battle to the accompaniment of flutes, the Cretans to the accompaniment of lyres, and the Lydians to that of Panpipes and flutes: "Many of the foreigners also conduct peace negotiations to the accompaniment of flutes and citharas to soften the spirits of their enemies.—The Getae conduct their negotiations while holding their citharas and playing on them." Capella records similar instances, and adds that flute players led the way to battle for the Sybarites in Italy. And even more interesting is the report of Tacitus, that "the Germans have a type of song which they call 'barditus' (shield song), by the recital of which they kindle their spirits, while they predict the fortune of the impending conflict from the mere act of singing; they inspire terror or feel it, according as the battle line sings the song, which seems to be rather a harmony of valor than one of voices. They strive especially for harshness of tone and a subdued sound, and apply their mouths
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to their shields in order that by the counterpressure the tone may develop a fuller and deeper crescendo." 81

"Music While You Work," as a slogan to increase the working efficiency of modern industry, is not a new idea, for when the Theban statesman Epaminondas began preparations for the building of the city Messene, he ordered stones to be brought, summoning skilled workmen to lay out streets, to build houses, temples, and a circuit of walls; and "they worked also to the accompaniment of music, but only that produced by Boeotian and Argive flutes, and the strains of Sacadas and Pronomus were brought into a competitive contest." 82 And to a similar purport Aristotle suggested the motto: "Play in order that you may work; for amusement is a form of rest; and we need rest because we are unable to keep on working without a break." 83

The charm of music affects not only human beings in various relations, but even some lower animals enjoy it, whole herds and flocks yield to its melodious rhythms, as Plato and Aristotle both stated. 84 Swans and other so-called musical animals, fishes, elephants, birds and serpents and dolphins, all respond to harmonious sounds. 85

The Romans, as the result of a somewhat different endowment, both natural and national, injected a teleological realism into the philosophical speculation and artistic endeavor which they had inherited from the Greeks, but proved themselves worthy custodians and enthusiastic disseminators of the cultural wisdom of such mighty intellects as Plato and Aristotle. However, the curious impression that the Greeks cultivated the arts of the Muses per se without any ulterior motives is certainly erroneous; the ultimate end is the welfare of the State, an ideal to be attained through the medium of an educational system which aims at perfect health for both body and soul. And music was an intimate part of their political philosophy, as has been demonstrated. 86 That the Greeks reached this ideal
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is proof of their remarkable innate capacity for such studies; that the Romans appropriated it pro bono publico (for the public weal) and could assimilate it does not detract from their greatness.

As in Greece, so also in Rome, music and instruction in music were introduced in connection with religious cults. Choruses of young men and young women were instructed in singing and dancing, primarily for religious purposes, but the cultural and salutary influence was also considered. Oribasius expressly recommends choral singing and dancing for young girls, not merely to honor the gods, but to promote their health. Varro included music among his artes liberales, an indication that in the best period of the Republic this subject was a part of polite education. Even such emperors as Titus, Hadrian, Marcus Aurelius, Commodus, and especially Nero devoted themselves assiduously to music. Ancient sources record that Nero was proficient on several instruments, the lyre, flute, trumpet, and organ, but it must be added that Nero never "fiddled while Rome burned," because neither Greeks nor Romans had fiddles.

Then too, among the intellectual elite in Rome, philosophy continued to function as the science and art of living, so that man's psychical and physical well-being and health were a source of deep concern to Roman poets, philosophers, scientists, and scholars. For even a materialist like Lucretius, when sketching the origin of music, could exclaim: "Then little by little men learned soft elegies, which the flute pours forth, when gently struck by the player's fingers.—These soothed their souls and gave them delight when sated with foods, for then songs are close to the heart." Both Greeks and Romans employed music as a delectable dessert after feasts and banquets, because they knew that it aided digestion by its appeal to the mind; for soul and body cling together with common roots. Therefore, when either becomes ill, the suffering may be reciprocal;
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and just as there is medicine for the body, so the soul may also be treated. The mental images produced by rhythmic dancing and the flowing melody of the lyre have a pronounced effect upon our physical behavior. Lucretius frankly confesses that he turned poet-philosopher in the hope of beguiling the reader by employing sweet-sounding Pierian strains to flavor his philosophical subject as "with the Muses' delicious honey," very much like a physician who administers sweet honey with wormwood to children as a medicine. Who that has read and studied the De Rerum Natura would deny that the poet's song touches the heart the more deeply through the placebo of music?

But the master artist of euphonious utterance, the Father of Latin prose-song, was Cicero, whose very name has become a synonym for eloquence. Whenever and wherever his name appears, it bursts upon us like the magic of chords of music. It was his genius that applied the principles of music to the writing and speaking of Latin prose, and made his language the model for all time. "Art," he asserts, "springs from nature, and unless it affects and charms men by nature's means, the result is clearly negative. Moreover, there is nothing so kindred to our feelings as rhythmic cadences and musical sounds, by which we are stimulated and inflamed and soothed and thrown into a state of languor, and often brought to a state of cheerfulness or sorrow, whose most exquisite power is more suited to poetry and music." The basic principles of poetry, song, melody, and rhythm, those delicate gradations of musical expression which resolve themselves into nuances of time and tune, binary and ternary cadences, are the very essence of his speech. With consummate skill he fused music and poetry with prose, for he held that fundamentally the poet is akin to the orator. Psychologically, also, the two aim at the same result: "For all of the power and art of speech must be displayed either in allaying or arousing the emotions." To this end the great

65
orator maintained that man's soul and body are intrinsically intertwined:

Every emotion has by nature its own characteristic look, tone, and gesture; and man's entire body and all of his features and all of the tones of his voice sound like the strings on the lyre, just as they are struck by the emotion. For the tones of the voice like the strings of a musical instrument are tuned so as to respond to each touch, sharp, flat, allegro, lento, forte, piano.—From these also are derived many species of tones, smooth and rough, pizzicato and legato, tenuto and staccato, broken and divided, decrescendo and crescendo with varying gradations. For there is none of these types which cannot be produced by artful control.  

Cicero's psychological laboratory was philosophy, and his clinic was largely supplied by the senatus populusque Romanus. As a scholar and philosopher, whose motto was vivere est cogitare (to live is to think), he was a passionate admirer of Plato and Aristotle, on whom he largely based his eclecticism. With them he believed that man is soul and body; and just as the art of medicine has been devised for the body and is so valuable to it that its discovery has been ascribed to Apollo and Aesculapius, so man needs an art of healing for the soul. and it is to be found in philosophy, i.e., est profecto animi medicina, philosophia (there is actually a medicine of the soul: it is philosophy). Of course, among both the Greeks and Romans, philosophy encompassed the various fields of medicine, health and hygiene, psychology, psychiatries, physics, ethics, and logic. Cicero shows a penetrating insight into all of these fields, but especially into the problem of mental health: The mind rules the body—mens regit corpus—and this is in good health when its judgments and beliefs are in harmonious accord; psychoses and phobias are irrational, hence they are best treated by the application of reason. Among such therapeutics Cicero speaks approvingly of music and song, and tells how his philosophical friend, Diodotus the Stoic—who lived and died in his home—became blind, but notwithstanding his
physical affliction, he devoted himself even more zealously to philosophical study, and employed the music of the lyre in the manner of the Pythagoreans, whereby he diverted the soul to happy sensations. In the same manner he admires the custom of Pythagoras in providing the necessary psychic relaxation and therapeutics through the agency of song and music, and comments on the possibility that this good habit may have influenced an early Roman practice.

We are not surprised that such a personality guided his own mind and soul, not to mention his body, into an harmonious relationship of sound and speech, and bequeathed to the world this model of excellence. One of Cicero's earliest admirers was Quintilian, the first professor of rhetoric, who also believed strongly in the psychological effects of music: "Give me," he writes, "the knowledge of the principles of music which have the power to excite or assuage the emotions of mankind." As an example he cites the case of the ancient Greek philosopher Chrysippus who selected special melodies for nurses to entice their babies to sleep. How the Greek Phrygian scale may induce madness is pointed out by Quintilian in connection with a fictitious theme employed in declamation, and he claims that only a speaker with a knowledge of music can treat such a theme effectively. Therefore our future orator should study music and read the poets.

The philosopher Seneca, Rome's most illustrious Stoic, perpetuated the unity of soul and body even to the extent that his doctrines were in part acceptable to the later churchmen. "The care of the soul is man's most important duty, because from the soul issue our thoughts, from the soul our words, from the soul develop our dispositions, our expressions, and indeed our very gait." He gave music a high rating when he stated: "Whoever has no knowledge of music, knows other things to no purpose." He then makes this significant comparison: "You, my good friend, are teaching me how the treble
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and the bass harmonize with each other, and how, although the strings produce different notes, the result is harmony; rather bring my soul into harmony with itself, and let not my purposes be discordant. You are showing me what the doleful keys are; rather show me how in the midst of adversity I may keep from sounding a doleful tone.” 114

The brilliant Galen, medical scientist and physician, philosopher, philologist, rhetorician, littérature, and mathematician, previously mentioned, dignified the intellect of man as not even Hippocrates had done. For this genius not only became the paragon of medical excellence through his scientific achievements, but assimilated all of the arts of the Muses, constantly quoting their eminent exponents and recommending their knowledge to others. Among divine ministers and ambassadors he counted Socrates, Hippocrates, Homer, Pindar, Plato, and all of their successors. He held that studies which are based on the reasoning processes, such as medicine and music, are truly liberal and honorable, and should be chosen to train young men who have the intellectual capacity for such arts. Medicine, however, he regards as the most noble.115 His belief in a divine intelligence impels him to worship the goodness of the creator with hymns of praise.116

How deeply the principles of music had penetrated into the medical practice of the ancients is strikingly illustrated by a reference to Herophilus, the famed Alexandrian physician, who is reported to have regulated the arterial pulsation according to the musical scale correspondingly with the age of the patient.117

Cassiodorus comments on the spiritual benefit of musical training. He holds that it is operative in every act of our life, both physically and morally. Our speech is regulated by musical rhythm, and similarly our pulse; and this in turn, through harmonious symmetry, is associated with our character. When
we practice iniquity, we do not have music in us. For music implies an harmonious relation with the Creator. His reflections on the curative influence of music as it affects the soul lead to the following characterizations of Greek modes: The Dorian influences to modesty and purity; the Phrygian stimulates to fierce combat; the Aeolian composes mental disturbances and induces sleep; the Ionian whets dull intellects and kindles a desire for heavenly things; the Lydian soothes the soul when oppressed with excessive cares.  

Again, Boethius approves of Plato’s statement that the anima mundi (the soul of the universe) is conjoined with musical harmony; and all ages of mankind respond to its soothing strains. He believes with Plato that when the scales are carefully chosen, their music will inculcate the proper morals on heart and mind. Music of this kind is a great asset to the state. 

Limitations of space forbid further discussion of such Roman poets as Catullus, Virgil, Ovid, Horace, Propertius, and Tibullus, who, as ministers of Apollo and his Muses, through music and song, playing on the heartstrings of their readers, pointed out the way of life to young and old alike. This was not a matter of mere entertainment:

Their music reached the innermost recesses of the soul, and on that account Plato, and still earlier, the Pythagoreans called music philosophy; and men say that the universe is composed in accordance with harmony, supposing that every form of music is the work of the gods. And thus the Muses also are goddesses, and Apollo is leader of the Muses, and all poetry is laudatory of them. In like manner they attribute to music the preparation of morals, as believing that everything which is corrective of the mind is akin to the gods.

This brief glimpse into the music philosophy of the Greeks and Romans explains in part why the Greeks sang the Iliad and the Odyssey at their festivals, and by the tens of thousands sat spellbound as they listened to the dramas, i.e., the music, of Aeschylus, Sophocles, and Euripides, and why the Roman
populace was moved by the art of oratory, by the cadences and musical rhythm of a Cicero.\textsuperscript{121}

\textbf{Musico-Therapy}

\textit{Music as a Psycho-iatric Agent}

A nation which had adopted music as one of the primary elements of its education, and through its foremost intellects had rejected the introduction of new scales as fraught with national peril, which could perceive the rhythmic cadences of exalted speech, and which had drawn sharp distinctions in measuring the educative value even of various musical instruments, would hardly be at a loss to discover therapeutic virtues for its favorite art. Hence the power of pure harmony to unify discordant elements and by sweet concords to restore tranquility to a soul rent asunder by different psychoses and phobias is symbolized as early as pre-Homeric times by such well-known demigods as Amphion and Orpheus. Their entrancing tunes becalmed the surging rage of wild beasts and caused rocks and stones, mountains and forests, to bow to their will.\textsuperscript{122}

In Homer Achilles gives a practical demonstration of the psychotherapeutic power of music when he calms his fury toward Agamemnon by resorting to melody which he had learned from Chiron; for his comrades found him,

\begin{quote}
Comforting his heart with sweet sounds of the lyre,  
Fairly and cunningly wrought, and adorned with a silver bar,  
Inspiring the dying in their invoked song they are;  
Cheering his soul, and singing the glories of men.\textsuperscript{123}
\end{quote}

Plutarch says that Homer introduced music at banquets to counteract the intemperance of wine, which weakens both body and mind; for music by its harmonious order and symmetry assuages and reduces these to their natural condition. Music
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gives the laws and limits of time and measure to all things, and
the Supreme God created all things harmoniously.\textsuperscript{124}  

Selected verses from Homer and Hesiod, as well as music,
were used by Pythagoras to dispel psychic traumata among his
disciples. Through the knowledge which he had acquired by his
investigation of musical intervals and scales, he thus prescribed
daily diatonic, chromatic, and harmonic melodies, so that on
the principle of \textit{contraria contrariis curantur} (opposites are
healed by opposites), he was able to banish their emotional dis-
turbances, and restore them to a normal condition, just as if the
music had been tempered by health-giving medicines.\textsuperscript{125} Indeed, it may not be amiss to point out that Pythagoras should
qualify as the "Father of Experimental Psychiatry" on the
strength of the following test: A Sicilian youth, who had be-
come intoxicated and had been inflamed besides by music
played in the Phrygian mode, was rushing to the home of his
mistress on a certain night with the avowed intention of destroy-
ing it by fire, because he had learned that she had received a
rival. Accordingly, as the music continued, he became more and
more enraged, when Pythagoras, who at that hour happened
to be engaged in astronomical investigations, realizing what
was happening, ordered the flute-player to cease playing in the
Phrygian mode and change his strain to the spondaic measure.
Immediately the youth became calm and returned home com-
pletely healed.\textsuperscript{126} Pythagoras employed music, poetry, and danc-
ing to insure a healthy emotional stability.

Empedocles, philosopher, physician, and poet, who may also
have been a pupil of Pythagoras,\textsuperscript{127} was hardly less a musicotherapist. When at one time he was entertaining Anchitus, a
judge, and the son of the man whom he had recently con-
demned to death was also a guest, the youth, disturbed with
anger and grief, looking upon the judge as a murderer, drew his
sword and determined to slay him. Then Empedocles imme-
diately changed the mode of his song, and began the passage from
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Homer’s Odyssey which describes the drug (opium) Helen put into the wine, “banishing pain and anger, and causing forgetfulness of all ills,” and straightway the youth came to his senses. Subsequently he became one of Empedocles’ most illustrious disciples.

The Pythagorean Cleinias, famous for his exemplary conduct and character, achieved this distinction largely by playing on the lyre whenever he became exasperated to the point of anger; and when his friends inquired the reason for his music, he would answer, “I am calming myself down.”

The remarkable influence which the music of Antigenides had over the mind of Alexander the Great is generally known from Plutarch’s account. Alexander was an ardent admirer of music, for he believed that it created true men, and that it filled them with inspiration and energy. At one time when Antigenides was playing a martial air on his flute, Alexander became so transported and so inflamed in his soul that he darted forward and seized the weapons that lay near. On another occasion the lyre of Timotheus so aroused him that he drew his saber and slew one of his guests; then the musician changed the strain from the Phrygian to a softer mode with the result that he calmed his fury and passions and inspired in him the tenderest feelings of grief and regret for his deed.

That “music hath charms to soothe the savage breast” may be further recognized from an ancient custom of the Spartans, who were wont to use the music of flutes to remove the spirit of anger from their fighting men; and they sacrificed to the Muses before a battle in order that their reason might remain constant. When they had routed the enemy, they did not pursue them, but sounded the recall to their high spirits which “like small daggers are manageable, and can easily be withdrawn.”

Another curious practice whereby music was applied as a palliative agent is mentioned by Plutarch on the authority of Aristotle, who refers to a method of musical flogging for slaves...
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in Etruria. To alleviate the rigor of the punishment they were scourged to the music of flutes. It would have been more humane not to strike them at all, but nevertheless one may see an element of humanity in the Etrurians’ course of conduct.

On further inquiry we learn that the ancients allayed even sedition among rebellious mobs by the power of music. Terpander, the Father of Music and inventor of the seven-stringed lyre, appeased treasonable conduct among the Lacedaemonians as early as the seventh century before Christ. For when this people became embroiled in civil strife, an oracle stated that they would again be reconciled if Terpander of Methymna should sing to them to the accompaniment of the cithara. Accordingly, he did in fact so sing to them with an artist’s skill, and by his harmonious lay so played on their emotions that he brought harmony again into their midst. In fact they were completely changed, embracing and tearfully kissing one another. Another striking illustration demonstrating the stimulating and stabilizing power of music when the national morale of a whole people is at a low ebb is portrayed in the story of Tyrtaeus. For this so-called lame schoolmaster of lowly birth revitalized the Spartans during their struggle with the Messenians thus: In accordance with an oracle the Spartans applied to the Athenians for helpful leadership, but they in turn, wishing to limit the power of the Spartans, sent them Tyrtaeus with the hope that on account of his physical disability he would prove an inefficient leader. Tyrtaeus, however, by his song and music engendered a sort of psychic contagion in their midst through his irresistible elegy entitled Ἐὐνομία, meaning “Obedience to Good Laws,” and as a result he quieted their civil dissensions. Then by powerful marching-songs accompanied by the flute he so inspired them for battle that they won a signal victory over their troublesome enemies. In the same way Plato taught that obedience to good laws could be secured through music: Ἐὐνομίαν διὰ τῆς μουσικῆς (good laws well obeyed through mu-
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sic). It was for this reason that many laws and public decrees of Greek cities were read aloud to the music of the lyre.

Some centuries later Asclepiades, famed physician and friend of Cicero, a source frequently cited by Celsus, Galen, and others, quelled seditious mobs in Rome and elsewhere when they began, all too often, to rage against the constituted authority of the senators. In like manner the Athenian musician Damon prescribed and used impressive melodies to subdue drunken young men when they behaved wantonly, as for example, when he ordered the flute-player to play spondaic measures on a certain occasion to dispel irrational conduct incited by mental confusion resulting from intoxication. He believed profoundly that the laws of music have a very intimate connection with moral conduct and the development of human nature.

But it was especially in cases of mental and nervous afflictions that Harmonia played a major role. Maecenas, Augustus' famous vicegerent and patron of literature, seems to have labored under a continual fever, caused no doubt by malaria. Anxiety, sleeplessness, and other troubles accentuated a naturally nervous temperament till eventually he became a psychoneurotic and a confirmed hypochondriac. His fear of death caused a veritable psychosis, which is well depicted in the following specimen of his verse, preserved by Seneca:

Debilem facito manu,
Debilem pede, coxa;
Tuber adstrue gibberum,
Lubricos quate dentes;
Vita dum superest, bene est.
Hanc mihi, vel acuta
Si sedeam cruce, sustine.

Give me a crippled hand,
A crippled foot and hip;
Add a hunch-backed hump,
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Shake and loosen my teeth;
While life remains, 'tis well.
Though I sit on a pointed cross,
Save this life for me.

Seneca calls it base and effeminate verse, and chides him for making terms with a phobia.\(^{141}\) Be this as it may, Maecenas finally sought to cure an insomnia of three years' standing by listening to harmonious strains of music played at a distance.\(^{142}\) Psychiatric cases of various types were treated by song, both among the Greeks and Romans; indeed, Harmonia with her own lips boasts that she has restored persons suffering from violent insanity by the therapeutics of musical harmony. So, according to Cassiodorus, Asclepiades also treated insanity through the medium of harmonious sounds.\(^{143}\) Xenocrates used the music of the organ with like results.\(^{144}\) And the Roman Celsus, artifex medicinae (a master artist in medicine), in his admirable discussion of insanity, recommends music, cymbals, and sounds to dispel the melancholy thoughts symptomatic of certain types of mental derangement.\(^{145}\) In his therapeutics for the insane, Caelius Aurelianus includes the music of the double-flute in the Phrygian key, recommended for such as are dejected at one time, and in a rage at another, since it is both pleasing and stimulating. The Dorian key, on the other hand, should be played to inject firmness and stability into the minds of those who are affected with laughing and childish giggling.\(^{146}\) The latter scale, however, may inflame them with a religious frenzy so that they rant like a person in a trance who is under the influence of a god.\(^{147}\) Caelius Aurelianus also recommends vocal exercises, composed with the advice of a singing teacher, for patients who are chronically insane.\(^{148}\)

Similarly Boethius emphatically reaffirms his belief in the harmonious symmetry of soul and body. This quality has been ingrafted in man by nature, and may readily be discerned by the manner in which infants react to music. A sweet lullaby charms
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them, an excessively harsh and shrill melody breaks the spell. So completely is man's entire psychic and physical structure rhythmically conjoined by the concord of music.\textsuperscript{149}

A very important link in the historical chain of musico-therapeutics is Aristides Quintilianus.\textsuperscript{150} A weighty authority on music, he lived circa A.D. 300, and his compact work not only comprises a delineation of the technical side, but also epitomizes the ancient concept of the art and science of music. His philosophic insight into its real function is truly amazing, and he expounds an educational psychology that is universally applicable. Although his ideas coincide closely with those of Plato and Aristotle, his judgments reveal the conclusions of an experienced investigator. Aristides maintains that the divine Governor of the universe implanted soul in man in order that he might have the proper guidance in attaining a certain measured motion (\textit{μήτρη}) in time and a proper adjustment in space, and that soul was designed as the body's commander, as it were. Now to achieve its purpose soul has been endowed with a dual nature: a rational one based on reason (\textit{λογος}), being a divine element; the other an irrational one (\textit{αλογος}), concerning itself with the physical body through sensuous desire and similar experiences. Consequently two educative processes have come into existence: the one aiming to support and preserve the rational sphere of the soul in its natural unadulterated state, the other healing and bridling the irrational domain through disciplinary training. Philosophy is the guide of the first, but music, which shapes and fashions man's moral ideas through harmonious experiences, and renders the body more harmonious through rhythm, rules the latter. Music, as a pedagogical element, is ideally adaptable to all periods of life and to all of life's conditions. In fact, no activities in human affairs are consummated without music.

Religious songs and divine worship are enhanced by music; special festivals and celebrations, even wars and military expedi-
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tions, are stimulated and regulated thereby; seafaring activities involving the toil of rowing and other exacting duties are alleviated by music; some nations employ this art at funerals to assuage mental perturbation by melody. Since in the early period of life the rational soul still lies dormant and the irrational soul is readily susceptible to a system of training when that affords delight and pleasure, nature herself has provided music to instill the proper ends through the medium of precept and example, attractively administered. For as we observe children, we find them ever ready to express themselves in song and in joyous physical activities, such as dancing. All children are stirred by the inherently psychical charm of music, some instantaneously, others in due time, but its power is always felt eventually. Just as one and the same medicament when applied to one and the same disease may operate variously in several bodies owing to a divergence of constitutions, and may cure some more quickly, others more slowly, so music affects us relatively, according as we are more or less talented and naturally prone to its influence. The graphic and plastic arts stir and stimulate the soul primarily through the visual faculty, i.e., through form and color; but music effects a process of imitation (μιμησις), not through a single sense but through several senses, and exhibits images from life through the medium of both words and deeds. And its persuasive powers are most efficacious, for it teaches imitation by those selfsame means by which our actions are carried out in real life. The will leads the way in our undertakings, then follows deliberation based on the reasoning faculty, and afterwards comes the execution; thus music by imitation expresses and impresses moral ideals and communicates the emotional impulses of the soul by mental concepts, projected through the agency of harmonies and tonal effects, and lastly it represents the outward act through rhythm and physical movement. Thus there are four constituent parts of music which make it such an effective pedagogical instrument:
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its appropriate imaginative concepts (ἔννοια προεποίησα), its diction (in poetry and song), its harmony, its rhythm.

Aristides formulated a noteworthy theory of psycho-therapeutics which followed logically upon his pedagogic psychology, and he states it as follows:

And assuredly it is not from one cause alone, as the ancients realized, that we are attracted to singing and playing, but some from pleasure when in a joyous mood, others from grief when in a melancholy mood; still others from a divine impulse when inspired by religious ecstasy, or even when these are mutually intermingled according to individual cases and circumstances, when either young people on account of their age, or when even those more advanced in age on account of a naturally weak constitution become susceptible. Although of course not all are equally thus moved, as for example the wise, and although not all types of emotion incite them to song, as for example in the case of unbridled temperaments, nevertheless men have agreed that medical treatment should be applied to these experiences as also to those persons who experience them if they are to become honorable citizens who would be useful to the state in a crisis; for it is entirely impossible for those who are beset by psychoses to obtain a remedy that originates from reasoned speech. For there is general agreement that delight is a most powerful stimulant, whereby even irrational creatures are beguiled, just as the Panpipes of shepherds and the reed pipes of goatsherds show; and again that a sorrowful mood can plunge many into incurable diseases if relief be not applied; likewise that religious impulses do not turn out in a normal manner, should they fail to remain moderate, but that they excite superstitions and senseless phobias. Then too these moods are observed as being psychical in their origin; for in the soul's domain of concupiscence men noticed an excess of desire: in its domain of passion they observed melancholy and her offspring, rage: in the rational soul they beheld religious enthusiasm. Now to each of these emotions music applies the proper therapeutics, and by degrees, through an unconscious purging, restores them to a normal state. For every single person practices music gladly at his own instigation only if he is but moderately in the grasp of some one of these moods; but if an extreme psychosis has befallen him, he may be trained by merely listening. And indeed it is not possible to assist a soul suffer-
ing from an excessive confusion by any other moods than those which it experiences with due moderation under normal conditions. In any event there are some special aptitudes, depending on sex and age, for certain types of singing and playing, as are those of children who are stimulated to sing on account of delight, those of women very often on account of melancholy, those of old men on account of religious ecstasy, as namely on account of rapture on festal occasions.

Aristides further asserts that in consequence of these observations the ancients made music a required study, which began with childhood and continued through the whole of life. They employed only approved melodies, rhythms, and dances for their purpose at both private and public gatherings, and these accepted songs they entitled "laws" (νόμοι), whereby they sought to allay any immoderate desires and emotional impulses, and to transfer them to a pleasing psychical mood introduced through the auditory and visual faculty. And for this reason they used most of the time such melodies as had educative value, though they did not neglect song and dance for purposes of relaxation and recreation. Varying psychological factors as they inhere in the masculine and feminine soul must be carefully adjudged, for it is from the propensity towards the masculine or towards the feminine temperament or towards both that the corresponding emotions arise. Accordingly, the feminine character is very softly relaxed and unrestrained, and with this the concupiscent element of the soul harmonizes; the masculine disposition on the other hand is spontaneous and aggressive, and akin to this is the volitional element of the soul; consequently mankind may evince excessive sorrow or joy, conforming to the feminine psychical type; or ill-temper and fury, as well as undaunted courage if the masculine type is in the ascendancy. Then again there may be various combinations of these psychological types: sad moods may be coupled with joyous ones, angry passions with a bold behavior, bold actions with pleasure and grief, and rage with both of these; an admixture
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of one with the other or with several others may also occur. Concepts, notions, thoughts, and ideas naturally conform to the psychological nature of a person; the metaphysical problem of music consists in harmonizing human practices and aspirations, and in directing them according to the masculine and feminine temperaments. Music is essentially a form of psychotherapy, but its function is not only curative; like medicine, it is preventative as well:

For medicine should not be summoned for aid only when a person happens to become ill; for when he is restored to health, he is apt to be ungrateful to her. But rather we should give her thanks for our health and make her the guardian of the rest of our life, in order that through carelessness and dissipation we may not suffer a relapse. Indeed, it is the function of this art to provide a strong constitution for the body when this does not exist, and to preserve and improve it when it does exist. This same statement can be applied to music: We should feel grateful to her since she unites not only the individual in friendship with herself, but also promotes a mutual friendship among others. And therefore we should take care to be mindful of this mutual harmony, and we should strive for it not only publicly, but also privately. For just as health is shared by both the community and the individual, so also there is a concord of sound (συμφωνία) common to a whole community as well as to a single soul with reference to its parts.

Musico-Therapy

Music as a Physico-iatriic Agent

That the art of the Muses was accepted as a therapeutic agent not only for the soul but also for the body may be verified by the evidence found in both medical and non-medical authors of the Greeks and Romans. The romantic tale of Eurydice’s unsuccessful recall from the gates of Hades by the enchanting strains of her husband’s lyre may well be but a fanciful attempt to explain the therapeutic virtue of music as an antidote against
snakebite, from which she reputedly had died. If Orpheus excelled his predecessors in means of healing diseases, as Pausanias states, it is not at all unlikely that he should have resorted to his musico-therapy in preventing her death or in restoring her to life. In fact Democritus, the iatro-philosopher, is credited with having written a medical work On Deadly Infections, in which he stated that “snakebites are cured by the music of the flute when played skillfully and melodiously.” Presumably so skilled an artist as Orpheus could effect the same miracle with his lyre. Aulus Gellius, who reports the above information regarding Democritus, was greatly impressed with the iatric powers of flute-music, for he adds the comment that “so very close is the connection between the bodies and minds of men, and therefore between the physical and mental ailments and their cures.”

Among other accomplishments Orpheus was believed to have discovered mystic rites, purification from unholy deeds, and also means of averting divine wrath. We may readily assume that the therapeutic powers ascribed to Orpheus and similar personages were closely linked with those of purification.

To quote Homer once again, he tells “how the Grecians stopped the fury of another noisome pestilence by the power and charm of music.” And the ancients, both Greeks and Romans, often invoked the therapeutic virtue of music to dispel direful diseases and plagues from their people. Thus Thaletas of Crete, poet and musician, Tyrtaeus, who combined his elegies with the music of the flute, as well as Terpander of Lesbos and Aleman, a flutist and the supposed inventor of erotic poetry, all were summoned by the Lacedaemonians from foreign states, whenever they were smitten by diseases and pestilence, to allay the divine scourge by their several musical arts in accordance with Apollo’s oracle. It was an accepted opinion that the Lacedaemonians were not sufficiently well versed in the arts of the Muses to appease the gods. In like manner Arion, a celebrated cithara player from Methymna in Lesbos, and
Terpander also rescued the Lesbians and Ionians from grievous diseases with the aid of their music. Among both the Greeks and Romans songs and paeans, sung to the accompaniment of the lyre and the flute, were a necessary part of the ritual at the religious feasts and festivals which were divinely prescribed in times of great national crises, and especially when a great pestilence had broken out. The ancients realized that a downcast spirit with the resulting fatigue may predispose the body to the devastating onrush of pestilence, whereas a relaxed, joyful frame of mind may strengthen its resistance. Therefore fear and panic should be dispelled by feasts and festivals wherein music acted as a prophylactic.

On such occasions the Roman officials consulted the Sibylline Books to learn by what means the plague might be averted. Often lectisternia with accompanying supplicationes (public prayers) were ordained, and in these music sung to the accompaniment of the lyre by choirs of boys and girls played a prominent role. In the year 364 B.C., when Rome was visited by a terrible pestilence which lasted two years, a lectisternium or feast of the gods was instituted. But neither the wisdom of man nor the help of heaven could effect a mitigation of the scourge. Accordingly, the people yielded to superstitious fears, and sought to disarm the wrath of the gods by resorting to stage plays. These at first consisted of dances accompanied by the flute; then improvised verses were added to dancing and music; next musical medleys were composed, accompanied by the flute and appropriate dancing; then a play with a plot was evolved and special musicians and singers were employed; eventually an after-play was added. This is without doubt the most elaborate and extensive application of the principle of iatromantic medicine to the arts of the Muses, but, as Livy reports it, neither were men's minds freed from religious fears nor their bodies from disease.

Martianus Capella asserts that the ancients healed fevers and
wounds also with music.\textsuperscript{160} He may possibly have had the case of Ulysses in mind as an example of one of these afflictions, for Homer artfully tells\textsuperscript{161} how when that hero had been severely wounded in the thigh by a wild boar, the sons of Autolycus stayed the hemorrhage by applying a skillful bandage and by a song of healing. We may well agree, however, that the bandage was the more efficacious of the two remedies. As for fever, even the credulous Serenus Sammonicus speaks disparagingly of worried parents who believe that this disease can be banished by a song.\textsuperscript{162} But Pliny does not thus commit himself when he reports that Cato has preserved an incantation for the cure of sprains, and Varro another for that of gout.\textsuperscript{163} Indeed, Alexander of Tralles quite seriously recommends Homeric song as a specific against gout with the following verse as a prophylactic formula:

\begin{quote}
The market was in an uproar and underneath the earth groaned.\textsuperscript{164}
\end{quote}

Asclepiades is reported to have healed patients suffering from extreme deafness by the use of the trumpet. This must mean that he inserted a kind of trumpet in the ear in order to focus the sound and also to magnify the tonal reverberation. This was only one of numerous innovations which the unorthodox physician made in the field of therapeutics, for, as Celsus states,\textsuperscript{165} Asclepiades held that the function of the physician was to heal safely, quickly, and pleasantly. Such a man would hardly fail to explore the possibilities of musico-therapy, which was universally regarded as a remedial agent in physical ailments.\textsuperscript{166} This applies even more to Pythagoras, who not only had composed special melodies to treat psychopathic cases, but also had restored to their former health friends and others suffering from physical ailments.\textsuperscript{167}

But it is especially for ischialgia that both medical and non-medical writers recommend musico-therapy. This physical malady was very common among both Greeks and Romans.
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Theophrastus, whom Aristotle personally appointed as his successor, has recorded in his work On Inspiration that persons subject to sciatica would always be free from its attacks if one played the ancient flute in the Phrygian mode over the part affected. Aulus Gellius mentions the same treatment as follows:

Very recently I came across a statement in the work of Theophrastus On Inspiration that many persons have believed and have recorded their belief, that when gouty pains in the hips are most severe, they are relieved if a flute-player plays soothing strains in the Phrygian mode.

For chronic cases of insanity and for various phobias Theophrastus strongly recommends music as an effective therapeutic agent; indeed it is his belief that even epilepsy may be relieved by the music of the flute. Ismenias also, the Theban, is said to have dissipated the tortures of ischiadic pain among the Boeotians by his harmonies. Caelius Aurelianus, in enumerating various successful therapeutics for those who suffer from sciatica or lumbago, includes musico-therapy, and cites authorities who have recommended songs as helpful. He recounts that on one occasion a piper charmed the afflicted parts, so that his music caused them to palpitate and tremble, thereby dispelling the disease. Some believe, he says, that Pythagoras invented this type of treatment, but Caelius himself seems to be somewhat skeptical regarding its efficacy; for he quotes the opinion of Soranus to the effect that those who believe that the force of a physical affection can be thrust out by musical modes and melodies are harboring a delusion. But, as we have already seen, Caelius Aurelianus favored musico-therapy as a useful treatment in certain cases of insanity.

Our inquiry would hardly seem complete without a further brief reference to those two intellectual giants of Greece, Plato and Aristotle. Neither the one nor the other contributes any positive opinion on the value of music as a physico-iatric agent.
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This is not surprising, since their concern with music was primarily as an instrument of education, as has already been pointed out. But both philosophers aimed to reach the body through the soul, for the soul rules the body.\textsuperscript{172} Since man is an integrated unity of body and soul through their mutual interdependence, the body must be so fittingly trained by gymnastics, and the soul equally so by music, that the result will be an harmonious adjustment of these two elements by the proper degree of tension and relaxation of each.\textsuperscript{173} True musical culture will impart health to the soul, for the end of such culture is the love of the beautiful. And since it is the excellence of the soul that renders the body sound, we may safely intrust to it the details of physical health.\textsuperscript{174}

\textit{In Summa}

And so it has been the purpose of our inquiry to demonstrate, not what the ancient Greeks and Romans ought to have thought and taught concerning music and medicine in their various relationships, but what they actually did believe. To achieve this end we have tried to reconstruct the ancient world of thought briefly insofar as it relates to the broader aspect of musico-iatrics. The religious phases have been discussed under iatromantics, with Apollo and Aesculapius as the chief representatives. Then we have sketched the iatro-philosophical concept of the ancient thinkers to define their theory of the art of life and to trace its connection with music. In this way we were able to understand the psychosomatic effects of music, which eventually resolved themselves into the ancient musico-therapy, both psychically and physically.

This rediscovery of the therapeutic function of music among the Greeks and Romans may serve to prove what an important role this great art has played in their religious, ethical, social, political, and medical life; in short, in the very civilization of the
two peoples who have bequeathed their priceless heritage to the Western world. And modern research is again verifying these profound effects of music on the physiological and psychological faculties of man.\textsuperscript{175}

\begin{center}
\textbf{A Healthy Happiness (γυνεις ολυς) Through Pindar's Golden Lyre}
\end{center}

As a fitting culmination of our investigation we are now presenting an actual specimen of ancient Greek music which has fortunately been transmitted to us. It conforms to the rhythmic and melodic character of the Dorian mode, which, as the reader may recall, has been demonstrated as a therapeutic agent in various connections. It was this mode especially which represented to the ancients the qualities of repose and tranquillity, manly feeling and courage, instilling obedience to law and those basic ethical ideals which are to be found in a sound educational system. This melody is a fragment of the First Pythian Ode of Pindar, written to commemorate a victory of Hiero, tyrant of Syracuse, in the chariot race at the Pythian games in 474 B.C. It was preserved to us by Athanasius Kircher, who states\textsuperscript{176} that he discovered the manuscript in the monastic library of St. Salvator near Messina, Sicily.\textsuperscript{177} It may therefore be regarded as the oldest piece of Greek music extant.

We have mentioned Pindar elsewhere, but we should add here that his epinician odes, sung to the accompaniment of the flute and the lyre, sought to inculcate a “healthy happiness” (γυνεις ολυς) as a national asset for man’s daily wants. He combines the qualities of music and song, as well as dancing, to impart a high moral tone to athletic prowess, and by attributing to the great national games of Greece a deep religious, ethical, and artistic significance, he sang triumphal music for both body and soul. Just how much he knew about Pythago-
reanism and to what extent his eschatology may rest upon that of Pythagoras it is difficult to say. But Clemens Alexandrinus does not hesitate to refer to Pindar as a Pythagorean. However that may be, the fame of the slightly older Pythagoras must certainly have reached the ears of the Theban poet-musician, for both were deeply concerned with a regimen of life and living based on the purest harmony of the soul as attained through music, song, and dancing.

Greek and Roman music was characterized by melodic outline and terse rhythm, but the terms “harmony” and “harmonious” may be misleading if the modern reader assumes under this head the modern progression and modulation of full chords. To the Greek ear this would have been confusion; rather, harmony signified a concord or accord of two sounds, whether instrumental or vocal, such as the octave, the fourth, and the fifth. The third was regarded as a dissonance.

Accordingly we have transcribed and harmonized this fine fragment of Greek music to give the reader some idea of the lofty character of ancient melody and song. Our harmonization is based on the structure of a Bach choral, and is suitable for the organ or piano. The melody itself may be sung or played effectively on the G string of the violin. A contralto or baritone should sing it as written; a soprano or tenor should sing it one octave higher. If the Greek text of Pindar is used, the melody is the same for both the first strophe and the first antistrophe.
The Golden Lyre of Apollo

Fragment of First Pythian Ode of Pindar

Moderato maestoso

Choralariig

Transcribed, Harmonized
Arranged, with an English Version by
BRUNO MEINECKE

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Thee the foot-step hear-eth, begin-ning its

dance. with joy;

Thy notes sing-ers fol-low when on quiv-ring.
strings thou prepar'est thy strain, The prelude.

thou dost sound with choir-leading overture,

Thou dost quench the pointed bolt of deathless fire.

**NOTES**

1 Hipp. Jusj.
2 Cic. Tusc. III, 1, 1; Galen, XIV, 674 (Kuchn).
3 Aesch. Supp. 263; Eum. 62; Ag. 1623. Aristoph. Pl. 11.
4 Aristoph. Av. 584; Lyce. 1207; C.I. (add.) 2134 a.
6 Liv. IV, 25, 29.
7 Liv. XL, 51.
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9 Suet. Aug. 31, 52.
10 Aristoph. Ran. 1032; Plato, Protag. 315 a; Eurip. Rhes. 944; Med. 543.
11 Paus. IX, 30, 4.
12 Ran. 1031.
13 Xen. Cyneget. 1; Philostr. Her. 9, Icon. II, 2; Pind. Pyth. IX, 65; Galen, XIV, 674 (Kuehn).
14 Pauly-Wissowa: “The god of the pain-assuaging, artful hand.”
15 Il. IV, 219; Ov. M. 2, 630 et seq.; Pind. Pyth. III, 47; Galen, l. c.
16 Il. II, 731, IV, 194, XI, 518.
18 Ion, 530 A.
19 Paus. II, 27, 7; Cava dias, Fouilles d’Epidaure, Bd. I; Paus. VII, 26, 7; CIG 2864; IGIns. 736.
21 Pind. Pyth. III, 47 et seq.
25 Shelley, Essays, I, 51.
28 See pp. 56 and 71.
29 Diog. Laert. IX, 44.
30 Diog. Laert. IX, 37.
31 See pp. 57 et seq.

33 L.c.: “Hippocrates Cos,—a studio sapientiae disciplinam hanc separatit” (Hippocrates of Cos separated this science from the study of philosophy). But this does not mean that he discarded philosophy; on the contrary, its principles were constantly employed by him in his thinking, for in the absence of the laboratory sciences of modern times philosophy, so to speak, provided a necessary laboratory for the intellect. The statement of Celsus, however, does mean that Hippocrates freed medicine from the philosophical system of instruction, and treated the healing art as a branch of study apart by itself. The reader must remember that the Greeks and Romans always preserved the unity of learning, and never completely divided it into unrelated subject-matter. We may accept even iatromantic medicine as the precursor of Hippocratic prognosis.

34 Galen, I, p. 2 et seq. (Kuehn).
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38 Juv. X, 356.
39 Od. VIII, 479 et seq.
40 Od. 150 et seq. VIII, 479.
41 Od. 152.
42 Od. 337.
43 Od. XXII, 33 et seq.; III, 267; Strabo, Geog. I, 2, 3, 4 16.
44 Diog. Laert. VIII, 32-33.
45 L.c. 12; Plut. De Musica, 30.
48 Laws, III, 700 D and E; Rep. IV, 424 B and C.
50 Laws, II, 664 B and C; X 903, D et passim.
51 Tim. 47, D.
52 Op. cit. 86 B.
53 Rep. III, 402 D.
54 Phil. 34.
55 Laws II, 664 B.
57 Tim. 87 D.
58 Physiog. IV.
59 Pol. VIII, 1341 b, 4-6; 1342 a, 5-7; Plat. Rep. 560 D. The reader may find the illuminating remarks of Dr. Franz Suscmihl, Aristoteles' Politik, Vol. 2, pp. 245-257, valuable for further study of Aristotle's theory of "catharsis."
60 Rep. 1334 b, 22 and 23; 1339 a, 4.
63 This was the doctrine of Pythagoras.
64 Plat. Phaedo 93; Aristot. Pol. 1340 b 10.
65 Aristot. Pol. 1254 a, 10 and 11.
68 Polyb. IV, 20-22.
69 Strabo, Geog. X, 3, 9.
70 Aelian, V.H. II, 44.
71 Plut. De Musica, c. 41.
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74 Plut. Non Posse Suaviter Vivi Sec. Epic. XIII, 7; De Virtute Morali, 443 A.
75 Deip. XIV, 632 b.
77 Deip. XIV, 626 f; 627 d; Herod. I, 17.
78 Deip. XIV, 627 d.
80 Mart. Cap. IX, 925.
81 Tac. Germ. 3.
82 Paus. Geog. XXVII, 7. The two eminent Greek musicians represent the highest excellence, as we might say, "Beethoven and Brahms."
84 Aristot. Pol. 1341 a 8; Plat. Pol. 268 B; Rep. 620 A.
85 Mart. Cap. IX, 927-928; Cassiod. Inst. II, 8; Athen. Deip. 328 et seq.
86 Cf. Strabo, Geog. I, 2; X, 3, 10; Isocr. 224 B.
87 Liv. XXVIII, 37, 7 et seq.; XXXI, 12, 9; XXXVII, 3, 6; Macrobi. I, 6, 14.
88 Macrobi. III, 14, 10; Quint. I, 10, 6; Martial. II, 7; Gell. XIX, 9;
89 Ov. Am. II, 4, 25 et seq.
90 Oribas. III, p. 85 (Daremb.).
91 Suet. Tit. 3, 2; Hist. Aug. I, 14, 9; op. cit. IV, 2, 2; op. cit. VIII, 1, 8.
94 Lucr. III, 325.
96 Cf. p. 82.
100 Cic. De Orat. III, 51.
104 Tusc. XXXVIII, 111.
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112 Sen. Ep. CXVII, 12; CXIV, 22.
116 l. c. De Usu Part. III, p. 238.
117 Plin. N. H. XXIX, c. 5; Mart. Cap. IX, 926.
118 Cassiod. Inst. Div. Litt. II, 5, 2; Var. II, 38 C.
120 Strabo, Geog. X, 3, 10.
122 See p. 53.
123 Hom. Il. IX, 186-189; Ael. V. H. XIV, 23.
124 Plut. De Mus. c, 43.
125 Iambl. De Vit. Pyth. 64, 65, 224.
127 Diog. Laert. VIII, 54-59.
128 Od. IV., 226 et seq.
130 Athen. Deip. XIV, 623; Aelian, V. H. XIV, 23.
131 Suid. under 'Αλέξανδρος, Τιμόθεος, 'Ορθιασμάτων; Plut. De Alex. Fort. 335.
135 Cic. De Or. 1, 14.
136 Mart. Cap. IX, 926.
137 Ib.
138 Plat. Lach. 197 d; Rep. IV., 424 c.
140 Hor. C. II, 17.
144 Ib.
145 De Med. III, 18, 10.
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150 Marcus Meibomius, Antiquae Musicae Auctores Septem, Li. II; see also Rudolf Schaefke, Aristeides Quintilianus (Berlin, 1937).
151 XXX, 4.
152 IV, 13.
153 Paus. IX, 30, 4.
154 II. I, 472; Plut. De Mus. c. 42.
156 Ib.
158 Liv. XXVIII, 37, 7; XXXI, 12, 9; XXXVII 3, 6; V, 13, 4-6; XXII, 1.
159 Liv. VII, 2 and 3.
160 IX, 926.
161 Od. XIX, 457.
162 LI. 938.
163 H.N. XXVIII, 2, 21.
164 XII, Vol. 2, p. 580 (Puschmann); Hom. II. II, 95.
165 De Med. III, 4.
168 Athen. Deipn. 624; Plin. H.N. XXXVIII, 2, 21.
171 Chron. V, 1, 23.
172 Aristot. Pol. 1254 b; Plat. Phaed. 80 A.
174 Plat. Rep. 403 C and D; Aristot. Pol. 1341 b et seq.
175 Alec Washco, The Effects of Music upon Pulse Rate, Blood-Pressure and Mental Imagery, Phil. 1933.
176 Musurgia Universalis, I, p. 541.
177 Such eminent scholars as Boeckh, Riemann, Westphal, Naumann, and others accept this fragment as genuine, and the writer unhesitatingly concurs with them. Even if it could be proven that Athanasius Kircher forged the fragment, the melody would still conform to the principles of ancient Greek music as we know it. For a divergent view, see Classical Philology XXXI, 120.
Chapter Four

The Story of Tarantism*

HENRY E. SIGERIST

Musical therapy, once popular in antiquity, continued to be applied in the Middle Ages, when music played such an important part in the cult, and religious medicine was so much in the foreground. The famous hymn to the Nativity of St. John the Baptist attributed to Petrus Diaconus was believed to have a healing effect on colds, probably on account of its text:

Ut queant laxis resonare fibris
Mira gestorum famuli tuorum
Solve polluti labii reatum
Sancte Joannes.

When people of high standing were sick, their court musicians wrote special compositions, if not to cure them, then at least to cheer them up. Once it happened that Pope Boniface VIII had to take a purgative and was to be phlebotomized. His learned court musician and poet, Bonaiutus de Casentino, commemorated the event by writing two compositions. He sent

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them to the Pope’s physician-in-ordinary Magister Accursinus with a letter in which he asked him to show them to the Holy Father, “for I believe that he will praise the writer’s devotion or—what is more likely to happen—will laugh at his fancy.” The compositions are preserved in a manuscript of the Vatican from which they have been published recently. The first, a kind of ballad, has a long text in which medical and spiritual matters are intermingled freely:

Sic laventur intestina
Quid se purget et sentina
Mentis omni crimin.
Tunec est digna cura cutis,
Quando mmus fér salutis
In utroque homine.
Cum servatur sensitiva
Virtus et intellectiva
Viget spes solatii.4

The second is a hymn on the Pope’s venesection, beginning:

Sanguis demptus et redemptus
Nos servet in letitia.
Qua optetur et prestetur
Eterna celi gloria.5

Pope Boniface VIII was not necessarily sick, because in the Middle Ages people used to take purgatives and were bled periodically, particularly in the spring, as a measure of hygiene. The case was different with the Marchese Francesco Gonzaga of Mantua, who was the husband of Isabella d’Este, and whose court was one of the most brilliant of the Italian Renaissance. But the Marchese was a very sick man. He suffered for many years from syphilis, which the Italians at that time called the morbo gallico, the French disease, while the French retaliated by calling it the disease of Naples. Francesco Gonzaga died in 1519, but two years before, in 1517, his musician and friend Marchetto Cara composed a frottola for four voices on his mas-
Music was, of course, also used in the cult of the saints who protected mankind against illness. I once found in a junk store an interesting book with music by an anonymous composer written in praise of St. Sebastian. It had the cumbersome title:


The text contains the Sebastian legend, from his birth to his martyrdom, in Latin and German verse. The music shows Italian influence. I once had it performed at the Johns Hopkins Institute of the History of Medicine.

What I particularly wish to discuss in this chapter is the history of a strange disease for which the only cure was music, namely, tarantism.

This malady occurred in Apulia where it seems to have been localized for centuries. It was frequently mentioned in medical literature, but mostly by people who knew it only from hear-
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VITA, ET GESTA
GLORIOSISSIMI MARTYRIS
SANCTI
SEBASTIANI,
SINGULARIS
CONTRA PESTEM
PATRONI.
ICONIBUS & ELOGIIS LATINO-GERMANICIS.
ILLUSTRATA.

Das ist:
Leben und Taten
des
Heiligen und würdigen Martyrers
Sebastiani/
Sonberbaren
Patronen wider die Pest.

In Kupfer-Stichen mit Latein- und Deutschen Lob-Sprüchen
öffentlich vorgestellt,
Denen am Ende nach der ordentlichen Zahl der Kupfer die
Musikalischen Arbeiten mit ihren Partituren begleitet sind.
SUPERIORUM PERMISSU.

Title page of a book on St. Sebastian, protector of men from the plague,
containing music in his honor

say. We are fortunate, however, in having reports from two
reliable physicians who lived in Apulia, saw cases with their
own eyes, and wrote detailed descriptions with case histories.
One of them, Epiphanius Ferdinandus, practiced medicine in
Hymn in praise of St. Sebastian (from *Vita et gesta Sancti Sebastiani*, Augsburg, 1702)
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Apulia for over twenty years before he published a collection of medical observations. The other was Giorgio Baglivi, the leading iatromechanist of the 17th century. Born in Ragusa, he was adopted by an Apulian physician and spent part of his life in that region. At the request of the Swiss physician J. J. Manget, he wrote a short report on tarantism for the Bibliotheca Medico-Practica, but finding it unsatisfactory he wrote a dissertation on the subject in 1695. Like Ferdinandus’s book, it contains a number of very interesting case histories.

A third and important source on the subject is the work of the learned Jesuit father Athanasius Kircher, Magnes sive de Arte Magnetica Opus Tripartitum, first published in Rome in 1641. In this book dealing with all forms of magnetism, one section is devoted to The Powerful Magnetism of Music (De Potenti Musicae Magnetismo) in which by far the longest chapter is On Tarantism or the Apulian Spider Tarantula, Its Magnetism and Strange Sympathy with Music. Kircher had gathered information on the subject from all sources available and particularly from the personal reports sent to him by two Apulian clerics, Pater Nicolellus and Pater Gallibertus, who were both very familiar with the disease. The chief significance of Kircher’s book lies in the fact that he collected the music played in the treatment of tarantism and published it so that it has come down to us.

Although individual cases of the disease seem to have occurred in other sections of Italy and in Spain, it was otherwise localized in Apulia, a very hot region in the heel of the Italian boot. Baglivi describes it in the following words:

The above-mentioned Apulia lies eastward and stands exposed to the eastern and northerly winds. In summer its showers are very infrequent, and in a word, Apulia is exposed to the scorching beams of the sun, by virtue both of the dryness of the soil, and of its vicinity to the east; and the inhabitants breathe in an air that feels as if it came from a burning oven. . . . This temperament of the climate
Tarantula (from Giorgio Baglivi, *Opera omnia*, Nuremberg, 1751)
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is matched by that of the inhabitants; for generally speaking they are of a hot, scorched constitution, with black hair and a brownish or palish skin, meagre, impatient, peevish, watchful, very quick in their way of apprehension, nimble in reasoning and extremely active. They are very subject to ardent fevers, frenzies, pleurisies, madness and other inflammatory diseases. Nay, the heat is so excessive in that country, that I have seen several of the inhabitants urged by it to the last degree of impatience and madness.\textsuperscript{11}

Baglivi emphasizes in another passage

that there is a greater frequency of melancholic and mad people in Apulia than in any other country of Italy... A further confirmation may be taken from the great frequency of mad dogs, whose madness is justly attributed to the scorching heat of the air. But such is the Divine Bounty that those who are bitten by mad dogs are speedily cured by repairing to the Tomb of St. Viti, about 40 miles from Lecce, where the intercession of the Saint procures them a favourable return from the Almighty.\textsuperscript{12}

The coast line was colonized by the Greeks and was part of Magna Graecia. Inland the population developed very slowly and has remained primitive to this very day; Apulian peasants can still be found living in round huts of the pre-Roman type. The chief city was Taranto, the Greek Taras, the Roman Tarrentum. The folk dance that developed in Taranto was the tarantella and the spider found in that region was the tarantula. The disease was attributed to the sting of the spider and was therefore called tarantismo. The people suffering from it were tarantati, or they were called in a more general way spezzati, schanttati, minuzzati, rotti, or tramazzati.\textsuperscript{13} The tarantula occurs all over Italy and in other countries of southern Europe where it is considered a perfectly harmless spider. Baglivi, therefore, points out that the tarantula is venomous in Apulia only and nowhere else.\textsuperscript{14}

The disease occurred at the height of the summer heat, in July and August, and particularly during the dog days. People, asleep or awake, would suddenly jump up, feeling an acute pain
Magnetismus Musice. 76e

Quæ identidem repetunt. Iterum ijs, qui viridi colore afficiuntur, verbis iucundis, hortos floridos, campos, sylvasque amenas respi-
cientibus præcinunt; ijs verò, qui rubris, aut armorum fulgores affi-
ciuntur, modulationes martiales, iambicos, bacchicos, & dithyram-
bios variè divisos; ijs verò qui aquis gaudent, cantionis amorosis, 
flumina, fontes, catarractas respiicientes, atque hisce & similibus non
passio duntaxat Tarantismo affectorum; sed & melancholic, amo-
ris, irae, vindictâque affectus mirum est, quam sedetur. Verum ne
quicquam in hac arte nostra magnetica curiosarum rerum omisisse
videamur, istiusmodi antidotaria Musice spectem à duobus eximius
musicis Tarentino & Lupicnli choro praefectis in suas voces vna
cum vltibus, & singularum vocum diminutionibus, prout instrumentis
concinis solent, digestam, compositamque hoc loco praesentare
visum est.

Clausula Harmonica, quas Cytharadi & Anladis, in cura eorum, qui
Tarantula intoxicati sunt, addibere solens.

Primus modus Tarentella.

Secundus modus.

Si replica più volte.

Si replica più volte.

Dddddd Tertius

Tarantella (from Athanasius Kircher, De arte magnetica, 2nd edition,
Cologne, 1643)
A Llu Mari mi portati, 
Se voleti che mi fanati.
Allu mari, alla via:
Cost m’ama la Donna mia.
Allu mari, allu mari;
Mentre campo, l’aggio amari.

Hoc est.

A D Mare me porteris. 
Si volitis me sanetis. 
Ad Mare fessines: 
Sic me amas Amata mea. 
Ad Mare, ad Mare; 
Dum viuam debeo te amare.

Tarenti vero certis quibusdam modulis utuntur, quam Tarantellam idem vocant, quod Tarantismo affectis maxime arrideat, cui conuenit serenilia, quam in figura hic adiuncta est incisam imprefam videat.

Tarantella.

Si replica più volte.

Ritornello.

Tarantella (from Athanasius Kircher, De arte magnetica, 2nd edition, Cologne, 1643)
like the sting of a bee. Some saw the spider, others did not, but they knew that it must be the tarantula. They ran out of the house into the street, to the market place, dancing in great excitement. Soon they were joined by others who like them had just been bitten, or by people who had been stung in previous years, for the disease was never quite cured. The poison remained in the body and was reactivated every year by the heat of summer. People were known to have relapsed every summer for thirty years. All ages were affected; a boy of five and a man of ninety-four years had once been bitten, but most tarantati were young people. The disease attacked both sexes, but more women than men. Most patients were “hominis rustici similes femelle,” peasant people, but ladies and gentlemen, and even monks and nuns were not spared. All races were attacked. Ferdinandus knew of an Albanian, a gypsy girl, and a Negro who had been bitten and danced.

Thus groups of patients would gather, dancing wildly in the queerest attire. “Sometimes their fancy leads them to rich clothes, curious vests and necklaces and suchlike ornaments . . . . They are most delighted with clothes of a gay color, for the most part red, green, and yellow. On the other hand they cannot endure black; the very sight of it sets them a sighing; and if any of those that stand about them are clad in that color, they are ready to beat them, and bid them be gone.” Others would tear their clothes and show their nakedness, losing all sense of modesty. Almost all would hold pieces of red cloth in their hands, waving them, delighted with the sight. “There are some of them that, during the exercise of dancing, are mightily pleased with the green boughs of vines or reeds and wave them about in their hands in the air, or dip them in the water, or bind them about their face and neck.” Some called for swords and acted like fencers, others for whips and beat each other. Women called for mirrors, sighed, and howled, making indecent motions. Some of them had still stranger fancies, liked
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to be tossed in the air, dug holes in the ground, and rolled themselves in the dirt like swine. They all drank wine plentifully and sang and talked like drunken people. And all the while they danced and danced madly to the sound of music.

Music and dancing were the only effective remedies, and people were known to have died within an hour or in a few days because music was not available. A member of Dr. Ferdinandus's own family, his cousin Francesco Franco, died thus within twenty-four hours because no musician could be found after he had been stung. As a rule, however, musicians were at hand. It seems, as a matter of fact, that the spiders were particularly aggressive when the musicians were around, and that music more than the summer heat was responsible for reviving the old poison in the system of former patients. Bands of musicians roamed the country during the summer months with violins, various kinds of pipes, citherns, harps, timbrels, small drums. They played the tarantella, repeating a melody endless times, playing fast. As Baglivi said: “However, this must be taken for a truth, that how much so ever they vary in their particular tunes, yet they all agree in this, to have the notes run over with the greatest quickness imaginable (which quickness of sound is commonly called tarantella).” The musicians stayed in a place for a few days, sometimes for a week, and then went on to the next village. They made good money during the season.

The music was not only instrumental but also vocal, and Kircher has preserved some of the songs. They are love songs, written in Italian dialects, like the following:

Allu Mari mi portati
Se voleti che mi sanati.
Allu Mari, alla via:
Cosi m'ama la Donna Mia.
Allu Mari, allu Mari;
Mentre campo, t'aggio amari.

or like the following:
Non fù Taranta, nè fù la Tarantella,
Ma fù lo vino della garratella.
Dove te mozicò dill’amata dove fù,
Ohime si fusse gamma, ohime mamma, ohime.24

And others sang, repeating the verses endlessly:

Deu ti mussicau la Tarantella?
Sotto la Pudia della vanella.25

I am quoting these songs in order to illustrate still further what has already become apparent, namely, the sexual character of the disease.

To the tunes of the music the tarantati danced and acted wildly for days on end. It was common for people to go on for four days, sometimes even six days. Ferdinandus even knew of people who had danced for two weeks, and several times a year, but this was unusual.

“They frequently begin to dance about sun rising,” to quote Baglivi again,

and some continue in it without intermission till towards eleven in the forenoon. There are, however, some stops made; not from any weariness, but because they observe the musical instruments to be out of tune; upon the discovery of which, one would not believe what vehement sighings and anguish at heart they are seized with and in this case they continue till the instrument is got into tune again, and the dance renewed. . . . About noon the exercise ceases, and they are covered up in a bed to force out the sweat: When this is done, and the sweat wiped off, they are refreshed with broth, or some such light food; for their extraordinary want of appetite will not allow them to feed higher. About one o’clock after noon, or two at farthest, they renew the exercise as before, and continue it in the manner above mentioned till the evening; then to bed they go again for another sweat: When that is over, and they have got a little refreshment, they lay themselves to sleep.26

After having thus danced for a number of days, the people were exhausted—and cured, at least for the time being. But they knew that the poison was in them and that every summer
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the tunes of the tarantella would revive their frenzy. Many of them, particularly women, did not mind, but liked it. Some were known to have simulated the disease in order to participate in the dances, women in love or those who felt lonely. Many purposely abstained from sexual intercourse in order to have more deliramenta, to be more passionate when the time of dancing came. The whole performance was sometimes laughingly called Il Carnevaletto delle Donne, the women’s little carnival.

The physicians were obviously interested in this strange disease. They accepted the popular theory that attributed it to the sting of the tarantula, but there were difficulties which called for explanation. The spider was venomous in Apulia only. The same tarantula shipped to other parts of the country seemed to lose most of its venom, and what remained acted differently. Baglivi had a rabbit bitten in Naples by an Apulian tarantula. The rabbit died the fifth day but did not dance, although musicians were called and played a great variety of tunes. This was strange because in Apulia a wasp and a rooster had been seen dancing after they had been bitten. And the tarantula herself danced whenever she heard the music. A skeptical physician in Naples had himself bitten in the left arm by two Apulian tarantulae in August 1693 before six witnesses and a public notary. He felt a prick and the arm was somewhat swollen, but otherwise he felt no evil effects. It seemed, therefore, that it was the scorching heat of Apulia that activated the virus and gave it its specific effect. But then, there were other countries just as hot as Apulia where the same tarantula occurred, and yet there was no such thing as tarantism. All this was very mysterious.

Another difficulty that had to be explained was presented by the fact that the poison remained sometimes for decades in the victim’s organism without presenting any symptoms except for a short period in the summer. This could be explained, how-
ever, in analogy with the syphilis virus. A man could seemingly be cured of syphilis, yet the disease would break out again after many years, which meant that the poison was still in the system. In the case of tarantism the virus was in the body, and what activated it periodically was the heat as well as the music.

The physicians examined a good many patients, but the symptoms they found were very indefinite. Where a bite had actually occurred there was a local wound surrounded by a livid or yellowish circle with some swelling not very different from that caused by other insect bites. Otherwise patients complained about headaches, difficulty of breathing, heart pains, faintings, thirst, lack of appetite, pains in the bones. They frequently said that they felt as if their bones had been broken. Since they all danced, the violent exercise was enough to explain the symptoms.

The physicians also experimented with a variety of treatments. They recommended that the wound be treated like those caused by other venomous animals, by scarifying it with the lancet, or by applying a cupping glass in order to extract the poison. Baglivi suggested cauterization of the wound with a red-hot iron, but never had an opportunity to test it. Internally they gave alexipharmaca, antidotes such as treacle or brandy.

The results were not encouraging, and besides, the great majority of all patients had no wound. They had been bitten, but in the past. When the tarantati danced at the height of summer, they naturally sweated tremendously, and the physicians thought that this profuse perspiration effected the cure by driving out the poison. And so they made patients sweat without dancing by giving them diaphoretic remedies, but without any result. The doctors, finally, had to admit that music was the only cure, not music at large but the tunes played in Apulia for centuries in the treatment of tarantism. The music, the dances it caused, and the resulting perspiration cured the patients, if not permanently, at least temporarily for the season.
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As a good iatromechanist, Baglivi had no difficulty in explaining the pathogenesis of the disease and the mechanism of the cure:

This venom [he wrote] in respect of itself must consist in the highest degree of exaltation; but with respect to the diversity of the constitutions of men, it produces various effects. Among which the principal are condensation and coagulation, and an oppression of the spirits. . . . And though the poison of the Tarantula, by activity of its virulent substance does almost dispose the humors to coagulation; yet by virtue of the brisk and lively motion of its constituent parts, it hinders, in some measure, the total coagulation of the humors, and by giving a fillip to the spirits and humors, prevents their final sinking. Nay, sometimes such is the agitation of the spirits, that they degenerate into involuntary and purely spasmodic motions. 32

On the basis of such a theory it was easy to explain the effect of the music:

It being manifest . . . that music ravishes healthy persons into such actions as imitate the harmony they hear, we easily adjust our opinion of the effects of music in the cure of persons stung by a tarantula. It is probable, that the very swift motion impressed upon the air by musical instruments, and communicated by the air to the skin, and so to the spirits and blood, does, in some measure, dissolve and dispel their growing coagulation; and that the effects of the dissolution increase as the sound itself increases, till, at last, the humors retrieve their primitive fluid state, by virtue of these repeated shakings and vibrations; upon which the patient revives gradually, moves his limbs, gets upon his legs, groans, jumps about with violence, till the sweat breaks and carries off the seeds of the poison.

It seems that tarantism gradually died out during the 18th century. Cases were still reported, particularly after Baglivi's dissertation had drawn the attention of the entire medical world to the subject. His name carried great weight, and doctors and laymen began to look around wondering whether this strange disease did not occur in their country also. The Gentlemen's Magazine published in its September number of 1753 the letter
of an Italian music student Stephan Starace who had seen a case in Torre della Annunziata and had played the tarantella for the patient. He wrote the music down and added it to his letter. Other incidental reports came from other countries, but by and large the disease died out. It was found, in addition, that the Apulian tarantula was in no way different from that of other countries and that the symptoms caused by its sting were perfectly harmless. Tarantism was discarded as a myth. Yet it had undoubtedly been a very real disease which for centuries had affected many people. If it was not caused by the venom of a spider, what was its nature?
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Ferdinandus gives us a clue. He said that according to some people tarantism was not a disease at all, a view that he refuted immediately with the argument that if tarantism were a mere fiction, there would not be so many poor people, and particularly poor women, spending nearly all their money on the music. They did so because they knew that without the music and the dancing they would be in a very bad condition. Ferdinandus then added that some people considered tarantism *melancholiae seu amentiae quaedam* species, some kind of melancholy or insanity. And this undoubtedly was the correct interpretation. Tarantism was a disease, but it was not caused by the sting of the tarantula. It was a nervous disorder, a strange neurosis.

But now we must try to explain why people connected this neurosis with the tarantula and why it manifested itself through such queer symptoms. Here again Ferdinandus unwittingly gives us a clue. Discussing the musical treatment of tarantism, he said that its origin was unknown, but then he added that the Greek traditions had always been very strong in Apulia. It once had been a part of Magna Graecia and in this very region the two great Greeks Pythagoras and Archytas had been teaching.

Without being aware of it Ferdinandus put his finger on the right spot. We have seen the great part played by music in the School of Pythagoras. In the same region ancient deities such as Dionysos, Cybele, Demeter, and others were worshiped, and in many of these cults—particularly that of Dionysos—orgiastic rites of a decidedly erotic character were performed. People danced madly to the sound of music, dressed in bright clothes with garlands of vine leaves, waving the thyrsus, uttering obscene words, tearing their clothes, whipping each other, drinking wine. The analogy between these rites and the symptoms of tarantism is striking. What is the connection?

Christianity came late to Apulia and found a primitive and conservative population in which ancient beliefs and customs were deeply rooted. In competition with paganism Christianity
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had to adjust itself in many ways in order to win over the population. Ancient holidays were preserved and made to commemorate Christian events. Churches were erected on ancient sites of worship among the ruins of temples. Saints took over functions and attributes of pagan deities. Elements of ancient cults such as processions were taken over in Christianized form. There were limits, however, that the Church could not well overstep. It could not assimilate the orgiastic rites of the cult of Dionysos but had to fight them. And yet these very rites that appealed to the most elementary instincts were the most deeply rooted. They persisted, and we can well imagine that people gathered secretly to perform the old dances and all that went with them. In doing so they sinned, until one day—we do not know when but it must have been during the Middle Ages—the meaning of the dances had changed. The old rites appeared as symptoms of a disease. The music, the dances, all that wild orgiastic behavior were legitimized. The people who indulged in these exercises were no longer sinners but the poor victims of the tarantula.

According to all medical testimonies, Apulia with its inbred population had a high incidence of mental diseases, and there can be no doubt that the great majority of all tarantati were neurotics. Tarantism was a neurosis peculiar to that region. It is at the same time one more example of the survival of pagan institutions in the Christian world and a particularly interesting one on account of its medical and musical implications.

NOTES

1 Liber usualis missae et officii, Festa Junii 24.
2 “In order that thy servants may sing with relaxed fibers the marvels of thy deeds, absolve, oh St. John, the guilt of the polluted lip.”
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indebted to Mr. L. Ellinwood of the Music Department of Michigan State College for drawing my attention to this piece.

4 "May the bowels thus be washed and the cesspool of the mind purge itself of every evil. Care of the skin is worthy when it brings the gift of health to both aspects of man. When the sensitive and intellectual faculties are preserved there is good hope for consolation."

5 "Blood taken and redeemed may keep us joyful. May the eternal glory of the heavens thereby be wished for and granted."

6 First published in a collection entitled Frottola libro tertio, a copy of which is preserved in the Biblioteca Marucelliana in Florence. See Emil Vogel, Bibliothek der gedruckten weltlichen Vocalmusik Italiens, aus den Jahren 1500-1700 (1892) II, 374ff. The text of the frottola was reprinted by L. Joseph, Schweizerische medizinische Wochnschrift (1937) 1004.

7 "What violence and rage of so great a disease, what plague, what force harasses the mind, what evil creeps, sweet poison devours the marrow."

8 Epiphanius Ferdinandus, Centum historiae seu observationes et casus medicai (Venice, 1621), 248-268: Historia LXXXI, seu casus octuagesimus primus, "De morso tarantulae."


10 The edition I have been using is the Editio secunda post Romanam multo correction (Cologne, 1643).

11 Baglivi, op. cit. 317.

12 Ibid. 365.

13 Ferdinandus, op. cit. 258.

14 Baglivi, op. cit. 335.

15 Ferdinandus, ibid.

16 Ibid. 264.

17 Ibid. 261-262.

18 Baglivi, op. cit. 347.

19 Ibid. 346.

20 Ibid. 331, 346.

21 The instruments are described in Kircher, Magnes sive de arte magnetica opus tripartitum (Cologne, 1643) 765.

22 Baglivi, op. cit. 348.

23 "Carry me to the sea if you wish to cure me. To the sea, to the sea,
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thus my beloved loves me. To the sea, to the sea, as long as I live I shall love thee.” Kircher, op. cit. 763.

24 “It was neither a big nor a small tarantula; it was the wine from the flask. Where did it bite you, tell me, beloved, where it was. Oh, if it was your leg, oh mammal” Ibid. 760.

25 “Where did the tarantula bite you? Under the fringe of the skirt.” Ibid.

26 Baglivi, op. cit. 344.
27 Ferdinandus, op. cit. 260.
28 Baglivi, op. cit. 335.
29 Ibid. 350.
30 Ferdinandus, op. cit. 261.
31 Baglivi, op. cit. 361.
32 See ibid. 366-373.

33 A German translation of the letter was published in Hamburgisches Magazin, oder gesammelte Schriften, aus der Naturforschung und den angenehm Wissenschaften überhaupt, Des dreizehnten Bandes erstes Stück (Hamburg and Leipzig, 1754) 3-8.

34 Ferdinandus, op. cit. 254.
35 Ibid. 266: “cum enim nos semper grecissemus, nam haec nostra Regio dicebatur Magna Graecia, in qua olim Pythagoras et Archytas, praestantissimi Graecorum, summa ac admirabili auditorum frequentia docuerunt.”
Chapter Five

Music and Medicine in the Renaissance

and in the 17th and 18th Centuries

ARMEN CARAPETYAN

The conception of medical history as a part of the history of civilization in general has been happily advanced by such contemporaries as Sigerist and Castiglioni. And if we view musical history, as we surely must, in the context of the history of general culture, we find that the Renaissance, better than any other epoch, fulfills the conditions for such a view. In this epoch the most divergent fields of human activity are very often brought together upon common grounds. Science, literature, philosophy, music, and the other fine arts repeatedly meet and intertwine. And we see, not exceptionally, one mind encompassing them all. The Renaissance was the age of an intellectual species peculiar to itself, unknown in quite the same sense before or since, the homo universalis. He was the product of an age that tried to integrate all knowledge and all the arts (including the art of living), and, inevitably, he himself further advanced the culture of his time and that conception of a cultivated man which characterizes the Renaissance. In accord-
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ance with that conception an artist could be and often was a man of science, and the man of science usually a man of letters and arts. In fact, in the typically Renaissance state of things, the force of gravity acted more with the arts and letters as its center than otherwise.¹ This means that the movement was around the artistic humanistic culture, which drew to itself all sorts of disciplines and professions that today would be considered purely scientific or technical, and, strictly speaking, non-cultural. In this movement medicine did not stand as an exception, and in the society of the homo universalis the men of medicine did not remain outsiders.

In ancient times and during the Middle Ages medicine was often linked with religion, cult, and magic. The Renaissance, it has often been pointed out, inaugurated the modern age; its fundamental characteristics—individualism, naturalism, intense interest in the best of man's past achievements, and the like—effected a new point of view and a new method of approach in the sciences as well as in the arts. What had once been medicine in a higher sense of the word with an Hippocrates or a Galen and had later become a mixture of magic, supernaturalism, astrology, and empiricism gradually arose in the Renaissance to the dignity of a science. But this evolution was due nearly as much to the humanistic trends of the epoch, and, specifically, to the artistic developments so far as anatomy is concerned, as to the growth of the science on its own account. The influence becomes more marked when we remember that anatomy holds a central position in the medical history of the Renaissance.

It is therefore not surprising to see the remarkable change in intellectual type presented by the physician of the Renaissance. He now becomes a learned man, quite often a man of refined taste and ability in the arts or in literature, or in both. Thus we meet with a Fracastoro who could write Latin poetry worthy of the "Golden Age" and was "an exquisite musician," ² at the
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same time a mathematician and biologist, and destined to become a prominent figure in the history of medicine. It is worth noting that Fracastoro dedicated his famous poem Syphilis, written on the model of Virgil's Georgics, to Bembo, a celebrated and influential literary figure, leader of the neo-Petrarchist movement in the 16th century. We see Vesalius who, after carrying on his epoch-making anatomical investigations, writes Ciceronian Latin in presenting the results (thereby sharing the humanistic attitude towards stylistic questions in Latin usage) and shows such artistic judgment in the illustrations as to make his Fabrica equally satisfying to the artist and instructive to the student of anatomy. We read of the "philosopher-physician" and find Antonio Benivieni (d.1502), a practicing physician of special interest to the medical historian on account of his collection (De abditis morborum causis) of post mortem examination records, but also a friend of Poliziano and Ficino, two of the most celebrated humanist philosophers of the Italian Renaissance; or later, among many others, Girolamo Cardano, for a time Rector of the University of Padua, and Andrea Cesalpino, who was equally known as a philosopher, especially in the North, and as a physician. Again we meet Conrad Gesner, whose intellectual activity took various forms. Besides writing as an eminent natural scientist, especially as botanist and zoologist, and editing and translating Greek and Latin works, he has the distinction of being the author of an early universal bibliography in which he listed all the Greek, Latin, and Hebrew books that he knew. (Gesner was also an enthusiastic mountain climber and even wrote a work on the subject.) We find Paolo Giovio, physician to Leo X but also a humanist, man of letters, and biographer of famous men. We see an interesting character like Cornelius Agrippa, by popular reputation a magician but actually a soldier, doctor, lawyer, philosopher, and theologian. And there are many other remarkable
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figures, some of whom, with specific musical interests, we shall have occasion to consider later.

It is clear that in the Renaissance the general mood for the cultivation of the arts and letters and the overmastering urge to study antique culture colored the intellect of the men of medicine and often had a predominant role in their activities. But this was no less true with the musicians of the Renaissance. They too participated in the spirit of the age, and they earnestly pursued the task of understanding Greek musical culture, harmonizing their theories with it, and, in some cases, even attempting a restoration of the Greek musical drama. Among the latter Galilei (1533-1591), father of Galileo, was a prominent figure. He was a forceful and enthusiastic prophet of ancient Greek musical culture, he published works in which he discussed the subject at length, and he took part in the activities of the so-called “Camerata” which met at the palace of Count Bardi in Florence to create musical dramas in accordance with Greek ideals. The result, curiously or ironically, but at any rate inevitably, was the beginning of the modern opera. Earlier, Vicentino (1511-1572), a pupil of the famous musical director of St. Mark’s in Venice, Adriano Willaert (d.1562), had written a work on ancient music reduced to modern practice. And all the theoretical writers of the Renaissance engaged in discussions of ancient music—most often as protagonists, only rarely as antagonists, and sometimes, as in the case of Gioseffo Zarlino (1517-1590), as moderates taking a middle position. Zarlino shows a serious admiration for the Greeks but also a vivid appreciation of the music of his own time.

These common influences in the general cultural trends and the humanistic tendencies of the time constitute the grounds upon which music and medicine meet in the Renaissance. On the one hand the connection is accomplished by virtue of the human aspect and prevalent cultural conditions, on the other by some specific intellectual problems and time-honored
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Theories influential at the time, whether valid or not from our own standpoint. Among the latter is one hypothesis handed down by the Greeks that becomes a point of direct contact between music and medicine, functioning in both medical and musical theory. The application of the theory to medicine was of ancient origin; it was continued during the Renaissance and, though now discarded, is still known to the medical historian. The application to music, however, was the work of the Renaissance and today is hardly known. Let us consider how on the basis of this common ancient theory music and medicine were related in the intellectual thought of the Renaissance.

The theory of the four humors, the corresponding four qualities of matter, and the resultant humoral pathology is well known to the student of medical history, since it began with Hippocrates and prevailed for over two thousand years. It was based on the Pythagorean stress on the number four, consisting of two pairs of opposites, and on the cosmogony of Empedocles which was established soon after and which is equally well known to the student of ancient philosophy. The Empedoclean theory ascribed all material existence, animate and inanimate, to the various mixtures of the four elements—earth, water, air, fire. To these four elements corresponded, in medical theory, the four humors in the human body—blood, phlegm, yellow bile, and black bile (Foure Humours raigne within our bodies wholly / And these compared to foure elements), and these in turn corresponded to heat, cold, dryness, and moisture. Out of all this came the four temperaments—sanguine, phlegmatic, choleric, melancholic. The theory came into a new vigor in the Renaissance, stimulated perhaps by the new interest in the ideas of antiquity. It was attacked by Paracelsus, but one still meets with the ideas and terminology long after his time.

Now this theory has an exact counterpart in the theory of music of the 16th century. Driven by the humanistic tide, musical theorists had become acquainted with Greek views and had
developed a keen interest in integrating them. Those who were learned, as for example Zarlino, must have arrived at their knowledge of Greek thought by direct approach, but it is worth suggesting that less learned musicians may have approached the theory in question through the popular humoral theory of medicine.

Just as medicine derived the four elements or humors of the body (microcosm) from the four elements of Empedocles that constituted the world (macrocosm), so did the theory of music set forth four component musical elements and relate them to the four cosmic elements. These musical elements were the four well-known parts forming a complete harmony and, in performance, a complete sonority, namely, the bass, tenor, alto, soprano. (It must be noted that music in the Renaissance was primarily choral music.) The bass was compared with the earth, the tenor with water, the alto with air, and the soprano with fire. This comparison, whimsical as it may seem, received serious consideration, and efforts were made to show that the four musical elements had very much the same qualities and functions in a musical microcosm as did their corresponding elements in the macrocosm. At any rate, the derivation in music was no more whimsical, no less suggestive, and certainly more innocuous than that in medicine. Zarlino offers an interesting discussion of the subject in the third book of his Istitutioni, and from it we learn some interesting points about 16th century aesthetics and methods of composition. As with the counterpart in medicine we have in music a sort of humoral theory setting forth the four humors and their corresponding four qualities of musical matter. The analogy is completed when we find the four musical modes (scales) in use during the Renaissance compared with the four cosmic elements and with the four humors; here the four modes correspond to the four temperaments. Agrippa, for example, compares the Dorian mode with water and phlegm, constituents of the phlegmatic temperament, the Phrygian with
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fire and yellow bile (choleric), the Lydian with air and blood (sanguine), and the Mixolydian with earth and bile (melancholic).

We cite this comparison from a non-musical work written by a man who was not a musician with the distinct purpose of suggesting that the relation of the theory of the four elements and the four humors to music was not a matter of esoteric musical theory but was apparently well known to scientific thought. On the other hand, musical theorists were undoubtedly quite familiar with the whole tradition of the Empedoclean theory and with the Pythagorean views; the latter, in fact, occupied a prominent place in the musical thought of the Renaissance as well as of the Middle Ages. The concept of numeros and its connotations of proportion, rhythmic relations, harmonic ratios, and harmonious relations figure large in the musical theory of the time.

Medicine itself restored in the Renaissance the Greek view that disease was merely the temporary disruption of a harmonious state in the body, in contrast to the medieval view that it was punishment for sins. In terms of the humoral theory this harmony meant the right balance between the four humors, which, if disturbed, resulted in disease. It may be said that while medicine utilized a concept more commonly known in music, musical theory in turn borrowed from medicine by defining harmony in music in exactly the same terms by which medical theory defined the harmony that was health. That is, harmony consisted of the right relationship between the four musical elements already mentioned, with emphasis on the fact that the word harmony would be meaningless if it did not signify a bringing together of elements totally different from one another, whether in the cosmos, in the human body, or in music. This emphasis, let us note in passing, articulated also the theory of unity and diversity. We must add that harmony in Renaissance musical theory was not confined to our definition of it as a musical chord but referred as well to questions of melody and
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rhythm, into which proportion and balance likewise entered. This concept of harmony of diverse elements, in a special and a general sense, is an undercurrent of the whole Renaissance theory of music, which held that music does and must follow nature. The naturalism of the epoch had a distinct effect on musical thought and style, as well as on the arts and the sciences.¹³

Zarlino, who in his important Istitutioni will serve us in this discussion as the spokesman of 16th century musical theory, discusses the theory of humors, embryology, and the relation of mind and body under the title Della musica humana. He defines musica humana (the previous chapter is entitled Della musica mondana) as the order in which nature develops the human body from conception, and as the concord between the spiritual and corporeal, the rational and irrational parts of man.¹⁴ Elsewhere he speaks of the “musicale componimento dell’ Huomo” while referring to Aristotle (De anima, c. 3).¹⁵ In the same chapter we read about the indispensability of music to medicine. For without a knowledge of music, he asks, how could the physician produce in his medicaments the right proportion between the cold and warm, and how could he correctly judge the human pulse? Far-fetched or even puerile as this attitude may seem, it reflects the prominence of the question of proportion and the view, supported by the Pythagorean background, that music, more than any other art or science, was a factor in it. Further, it excusably suggests that without a sense of rhythm the regularity or irregularity of the rate of the heartbeat would be discerned with difficulty, and that after all music is the best training for a good sense of rhythm. Finally, since the passage is part of a longer one showing the contribution of musical knowledge to the various sciences and arts as well as to philosophy properly so called and to theology, it emphasizes the contemporary view of music, at least on the part of the musicians, as a universal science and art.

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We must not leave this chapter of Zarlino without referring to his statement that God created man similar to the universe, and to his mention of macrocosm and microcosm. This conception of man was distinctly a feature of the Renaissance and was the result of the humanistic point of view. If we speak in the strict terms of science, we must say that the Renaissance in the end did away with the geocentric view of the universe, but humanistically speaking, it had long before developed a vigorous sense of man’s importance and had already replaced the geocentric with a new anthropocentric view. Man was the central point, and the whole 15th century culture was affected by this new attitude. The change was a boon to medicine, for it stimulated anatomical studies and promoted other investigations pertinent to the science. Of course medicine was not alone in profiting by the humanistic emphasis upon man. Anatomical studies themselves were stimulated, at least in the beginning, as much by the impulse of beauty and by a desire for artistic representation of the human figure as by the urge for scientific understanding of the human body; of this Leonardo da Vinci is testimony. And there are other fruits of the humanistic accent on man which cannot, however, be discussed here. We must note only that, as suggested at the beginning of this discussion, the fundamental characteristics of the Renaissance, and humanism was one of them, acted as a common denominator to various fields of investigation and colored their discussions. Zarlino set forth the microcosmic view of man after having argued that if there was so much harmonious relationship in things terrestrial and celestial, if the world was so full of harmony, then surely man, a world in miniature, was in body and mind the result of harmony. Some three quarters of a century earlier a famous exponent of humanism, Pico della Mirandola (1463-1494), challenged all comers in Rome to a debate on nine hundred philosophical problems and prepared an oration for the opening of the contest. This oration, which he did not have the
occasion to deliver because the debate was suppressed by the pontifical court, was on the dignity of man’s nature, and in it Pico wrote: “It is a commonplace of the schools that man is a little world, in which we may discern a body mingled of earthly elements, and ethereal breath, and vegetable life of plants, and the senses of the lower animals, and reason, and the intelligence of angels, and a likeness to God.” This is a simple statement, in terms of man, of the general Neo-Platonic philosophical thought of the time already discussed by philosophers like Nicolaus Cusanus and later treated in various ways by Bruno, Campanella, Boehme, and others, including also some philosopher-physicians as, for example, Cardano. On the physical side everything shared the characteristics of the universe by possessing all substances, but each thing had its own genius, its own individual spirit or vital principle. Paracelsus called this individual vital principle Archeus and regarded disease as a state in which Archeus was injured. Pico’s statement at any rate represents an impressive conception of man. It is a complete and perfect view of the physical man and an exalted view of the mind. Later the anatomist-humanist Vesalius, though as an anatomist avowedly interested in the human body, showed the same humanistic feeling for man as a whole. In the preface to his great work he declared the knowledge of man himself the best study out of all else in natural philosophy, and he explained this knowledge as that which is learned about the body and about the mind and about their harmony (symphonia), which he defined as divine power. Pico writes under the title De dignitate humana, Vesalius under De humana corporis fabrica, and Zarlino under Della musica humana. One is interested in humanism as such and in the reconciliation of Greek thought with Christianity, the second in the structure of the human body, and the third in music, but all three hold the same general outlook. Only their special interests, their focal points, vary. Zarlino, a musician, and Vesalius, an anatomist, both speak of the
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harmony of the mind, the harmony of the body, and the harmony of the interrelation of mind and body.

As to the comparisons founded upon the theory of four elements considered above, let us also note a typical and fundamental theory of the period that underlies all such comparisons. This is the theory of correspondence, acting as a pattern in various applications. The age was fond of finding correspondences, and drew upon all realms, scientific, occult, moral, artistic. Thus correspondence was found between microcosm and macrocosm, the terrestrial and the celestial, the individual and the universal. It was an intellectual habit which exercised itself at every chance, and was actually the result of the naturalistic outlook of the age. There was an urge to establish some correspondence between nature and everything else. This tendency penetrated into every phase of intellectual activity, including, by the way, the very important field of historical method, philosophy of history, and philosophy of law, or, in the language of the time, *ars historica*, in which the 16th century produced some important discussions.

The foregoing discussion has dealt with the relationship of music and medicine on theoretical and intellectual grounds. That such a relationship could exist, brought about by theoretical formulations, founded upon common sources from ancient thought, and colored with common ideals and intellectual outlook, is typical only of the Renaissance; and it was proper to take it up first in a discussion dealing with the epoch. But there were also other connections between music and medicine.

These may be discussed under various heads, as (1) the therapeutic effects of music on the body and on the mind, (2) special disease phenomena related to music, (3) music and physiology, (4) social phenomena that indirectly relate music and medicine insofar as each social phenomenon in question is a powerful factor in the existence and growth of the disease and insofar as music is a participating factor in that social phenomenon, (5)
The problem of the therapeutic qualities of music is included in the larger problem of the effects of music upon man. (The views of ancient and Renaissance writers on the effect of music also on animals, of which the medieval tale of the Pied Piper of Hamelin is an expression from folklore, will not concern us.) Almost every important musical work, and many a work on other subjects, discusses or at least mentions the various effects of music. The subject constitutes an important problem, irrelevant here, in musical theory proper, especially as regards the Renaissance view of the character of contemporary music and its affective power in comparison with the character and affective power of classical Greek music. All the discussions on the effects of music are based on ancient statements, and they include the therapeutic effects, usually by referring to stock sources and instances. We read about music which mitigates pain, restores hearing to the deaf, heals vermin bites, and cures the mad. Zarlino gives a long list of the effects of music in which, besides enumerating those just mentioned, he also credits music with the power of chasing pestilence and of curing the habit of drunkenness. Zarlino of course mentions in addition the moral effects of music. It is true that the Renaissance musicians could not claim all these effects for the music of their own time. This disparity they explained by pointing out differences in musical culture and its place in life between their time and antiquity and the fact that with the Greeks the word music had a much broader meaning. (And the zealous advocates of the superiority of ancient music over that of the Renaissance did not fail to make use of this very disparity in support of their arguments.) Then, too, the musicians wrote about the marvelous effects of music with the natural bias of their position. Zarlino himself gives his list in a chapter in praise of music
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(“Delle laudi di musica”), though it must be pointed out that he does so as one who merely gives an account of history. He writes his own serious discussion of music’s affective powers in the second book of the *Istitutioni*. But we find similar accounts, as far as the therapeutic effects are concerned, in literary, philosophical, and scientific writers. The great surgeon Paré writes of the cure of spider bites, mentions sciatica and gout, saying that “music gives ease to pain,” and discusses some ancient, including Biblical, cases of the various effects of music on man. The discussion is found in the chapter entitled (in the English translation), “Of certain wonderful and extravagant ways of curing Diseases.” It is not necessary to cite the various authors who write about the traditional effects of music and give the usual legends. It is better to consider those references to music which, though less spectacular, are of more substantial scientific interest.

The psychological power, the effect of music on the state of mind, was appreciated by the Renaissance writers. This too was of course due to ancient thought, and we have already alluded to the discussions by musicians of the moral effects of music. But the physicians used the idea in a way peculiar to their profession—as an aid to preventive medicine. They included music among the emotional factors which favored resistance to disease, a resistance which was threatened by the great epidemics of the time. These factors, classed under the “accidents of the soul,” are as valid today in the light of modern knowledge as they were then. On the positive side they can be beneficent, while on the negative side they can be harmful and even conducive to illness.

Already in 1348, during the Black Death, the faculty of the University of Paris discussed the matter in the report of a consultation ordered by Philippe de Valois on means of combating the plague. They advised that the accidents of the soul could frequently be the cause of infirmities of the body; that anger,
excessive sorrow, and worry must be shunned, good hope and sound imagination maintained, and peace made with God; that insofar as possible one must live in joy and pleasure, for even if pleasure at times wearies the body it comforts the mind and the heart. Later, in the *Fascicolo di medicina* of 1493, we read the following among the recommendations against pestilence and under the heading “accidents of the soul”: “We must guard against anger, sorrow, fear, worry and cogitation, and must make merry and enjoy ourselves with music, reading of stories and the like.” In his advice against the plague Tommaso del Garbo discusses the importance of a happy state of mind and mentions the desirability of listening to music.

This view of a healthy state of mind (to which music could contribute) supporting a healthy state of body obviously carries with it the problem of mind-body relation which very much engaged the philosophers of the era following the Renaissance, especially in the 17th century. From the modern point of view any question of mental effects upon the body falls into the realm of psycho-physical problems. The 16th century writers treated the problem of the effects of music in terms of the moral and spiritual effects, and of the effects on the body through the passions. The older accidents of the soul now become the passions and affections of the soul. With the theory of passions and affections goes also the theory of sympathy and antipathy, giving rise, as we shall note, to some curious notions.

Some very interesting chapters in the second book of Zarlino’s *Istitutioni* discuss the various aspects of the relation of music to the passions. The author opens the eighth chapter by admitting that to some it may seem strange that melody, harmony, and rhythm can have the power to affect the mind and induce various passions, but he reasserts that such is the case and goes on to explain how the power arises, thereby exhibiting psycho-physical views and views on the ethos of music which are as interesting as they are curious to us moderns.

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It will also be noted that this theory of passions is closely connected with the humoral theory. The passions of the soul are found in the appetitive, sensuous aspect of the human organism. Each passion consists of a certain proportion between hot and cold, humid and dry. A particular passion is generated by the predominance of particular qualities. Thus in anger, the hot and humid predominate; in fear, the cold and dry. Here we are dealing again with the four elemental qualities and with proportion. Zarlino tells us that harmony and rhythm are similar to the passions, since they consist of proportions, and he further tells us, in accordance with the Greek and especially Platonic views of ethos, that the modes have the nature of passions. For example, the Phrygian mode excites anger and is in general impassioned, the Mixolydian induces sadness, and the Dorian produces stability and temperance. On the basis of similarity or dissimilarity of proportions and sympathetic or antipathetic cause and effect relations, passions are aroused or abated by the hearing of music. This is the way in which music moves the soul, produces various affections, induces habits, and governs morals. Zarlino also takes into account the disposition of each temperament for the kind of music that corresponds to itself and with which it is sympathetic.

It must also be added that the particular musical culture of the Renaissance gave a special meaning to the whole question of the affective power of music. It has already been suggested that music then was primarily choral music. This means that the very important factor of words comes into account. Words not only produce emotional states and edify or corrupt the mind, but also affect, or should in any good composition, the mood of the music. Zarlino, together with other theorists, has much to say on this subject throughout his work, and the chapter immediately preceding the one just considered contains an important discussion of the subject.

Accordingly, Cornelius Agrippa's interesting discussion of
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Music and passions starts with the assertion that song has more power than the sound of instruments. Then he proceeds to say how it affects the passions. Through the “aerial spirit,” which is the link between the soul and the body, the passion of the singer excites that of the hearer. Fancy is touched by fancy and mind by mind. The heart is touched and the depths of thought penetrated, and thus gradually habits are affected. Moreover, music sets members in motion or stops them; so also with the humors of the body. It is thus, says Agrippa, that harmony has so much power to move passions. But, he adds, it is necessary that the harmony emanate from sources that are in concord, be they from strings, pipes, or voice. One cannot tune strings that are made of wolf’s guts with strings made from lamb’s guts because their origins are dissonant. Human voices harmonize because, no matter how different, they originate from the same species.  

Coming from a man who was, among other things, a physician, Agrippa’s discussion of the passions aroused by hearing music, according to the law of sympathy, is sound. But, in a way typical of the age in which insight and credulity often went hand in hand, he stretches the law of sympathy and antipathy and includes the notion that strings from antipathetic sources cannot be tuned together. This too relates music, though at a trivial point, with the medical theory of “numia,” or magnetic force, which was the basis of sympathetic cure of disease and which gave rise in the 17th century to the weapon salve, the sympathetic ointment, and the powder of sympathy. Van Helmont in his famous work entitled De magnetica vulnerum curatione speaks of the wolf and sheep in the same way, even though not in connection with music. He says: “. . . doth not the enemity conceived betwixt the Woolf and Sheep remain firmly impressed upon their pelts?” And later we learn from Descartes that two drums, one made of the skin of a sheep and the other of a wolf, will not sound in the same room. Similar views were
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held also by Mersenne and others. The whole subject of music's effects is not unconnected with the theory of animal magnetism, at least so far as presentation is concerned, for we often find discussions grouping the two subjects together.

The second topic in the division of the subject as outlined above presents disease phenomena related to music and more or less peculiar to the age. Extremely important is the phenomenon of tarantism, which is discussed by Sigerist elsewhere in this volume. Here it should perhaps be added that tarantism may have started earlier than the 15th century and did not end with the Renaissance but continued throughout the 17th century. We should add also that there are few works on music from the 16th century on that do not mention tarantism, not to speak of numerous works up to the 19th century about various other subjects which make some mention of the matter. There are also a considerable number of works devoted to tarantism itself, a partial list of which will be found in the notes. Strictly from the musical side the earlier St. Vitus's and St. John's dances in the North and tarantism in the South remain rather obscure. That is to say, it is not clear that music was anything more than purely incidental to complex sociologico-pathological phenomena, and hardly anything is known of the music used beyond the versions of the little tune in connection with tarantism given by Athanasius Kircher in his Magnes, sive de arte magnetica . . . , 1641, and reproduced from his second edition (1643) by Sigerist. The various types of tunes mentioned by Hecker (panno rosso, panno verde, cinque tempi, moresca, catena, spallata) are interesting and may be related to prevalent musical forms and to aesthetics of the 17th century.

Music and physiology come together in the field of singing, and the science of voice production attained prominence in that epoch of musical history which brought solo singing to the fore and during which vocal virtuosity became an objective in itself. This development began in the 17th century and con-
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tinues to this day, but the Renaissance did not entirely over-
look the problem of vocal physiology. Perhaps the first musical
physiologist was Giovanni Camillo Maffei of Solofra. He wrote
a treatise in the form of a very long letter to the Count of Alt-
avilla in which he discussed the physiological aspect of voice
production. Early in the discourse he says that no one in ancient
or modern times has ever written on the subject, and that in
order to do so one must be not only a musician but also a
learned physician ("... fa di mistiero che non solo Musico
sia, ma anchora dottissimo medico ... "). 31 The treatise was
printed in 1562 together with other letters collected by Valerio
de' Paoli and was dedicated to the Count of Altavilla. The fact
that the author was aware of the requisites for writing such a
treatise, namely, medical and musical knowledge together,
makes the work that much more interesting and valuable.32
Musical theorists did not neglect the subject of correct singing,
but neither did they write with the special point of view and
knowledge of physiologists.

Musical beat and rhythmic unit are related by the musicians
to the beats of the heart. Referring to Galen and Avicenna,
Zarlino discusses the heart's dual motion of dilation and con-
traction and parallels with it the rhythmic beat in music. He
also likens the rising and falling motion of the hand beating
musical time to the rising and falling motion of the heart in
its dilation and contraction. Medicine has, thus systole and
diastole, Zarlino says, and music thesis (systole) and arsis (diast-
tole). With this start in the discussion of musical beat as re-
lated to the human pulse, Zarlino continues into the discussion
of the poetical meters and their musical equivalents.33 The
Renaissance never tired of relating art to nature, especially that
part of nature that is the physical man. Since medicine, which
received a broad definition, was the science of man's body, and
since man was the center of all interest and investigation during
the Renaissance, it is not strange that medicine so often became
related to the arts and moved along a path more or less parallel to theirs.

Sigerist in his Disease and Civilization very suggestively discusses the characterization of epochs by diseases. He suggests that the collectivism of the Middle Ages had its corollary of diseases in leprosy, plague, and dancing mania, and the individualism of the Renaissance a like corollary in syphilis, a disease that is the fruit of an individual act. It is well known to the historian of medicine that syphilis came to the fore during the Renaissance. In Italy it caused considerable bewilderment; it was considered an importation from France and was accordingly known as the "French malady." Whatever the origin, the Renaissance society, especially in Italy, possessed the most favorable circumstances for the propagation of venereal diseases. Never before had prostitution been granted the freedom and social sanction which it enjoyed in the Renaissance. The women who had traditionally, except in the Periclean age, been considered reprehensible members of society were now not only tolerated but even glorified. The attitude of the 16th century toward the prostitute is characterized by the very name it gave her. She was formerly called peccatrice (sinner), now she is honored by the name of courtesan. The form of the name changed from religious vocabulary to that of the court and princely circles, where, after all, the Renaissance manifested itself at its fairest. But this glorification of the courtesans was not wholly unmerited as far as cultural accomplishments are concerned. The courtesans and all that is associated with them represent one of the remarkable social phenomena of the 16th century, colored by the general cultural tendencies, and, as far as music is concerned, presenting a field of astonishing activity and accomplishment.

We cannot enter into a discussion of the general accomplishments of the courtesans. Such names as Veronica Franco and Tullia d'Aragona have come down in the history of Italian lit-
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erature. There were others, for example, Lucrezia Porzia, Imperia, and Lucrezia Squarcia, who were known and characterized as readers of the classical authors and participants in literary, artistic, and musical discussions. We cannot consider even the musical accomplishments of the courtesans. We must note only that they did appreciate the artistic value of music as such and, what is more relevant to our discussion, the affective value of music as an adjunct to the art of their profession.

The courtesans strove to be accomplished women because they sought the patronage of courtiers, or at any rate of cultivated men. They therefore cultivated the literary and artistic tastes which were dear to their patrons, and they realized the important role that music played not only in the interests of the gentlemen they entertained in their houses but also in the stimulation of passion. Thus we read about the use of music in a vivid description by Garzoni of the methods by which the courtesans seduced men; how by means of music a young man’s passions were aroused, his morals destroyed, and sexual desire inflamed. Garzoni then enumerates the various types of music performed and describes how gradually music led to dance and this to further excitement of passion and sexual appetite.

Thus in the eyes of contemporaries music becomes an effective contributor to the stimulation of a practice in the Renaissance that advanced the disease celebrated by Fracastoro’s famous work. This role of music has of course been recognized in all ages and in later times was described and denounced by Tolstoi in his novel, The Kreutzer Sonata.

A few remarks may be in order on the connection between music and medicine, and mostly between musicians and physicians, a phase described in the outline above as incidental. It has already been suggested that the courtly circles were the center of Renaissance life at its highest levels. The aristocracy cultivated learning, art, and science, stimulated them, and patronized them. Thus we find that most of the outstanding men in the
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various fields were at some time or other in or around one or more of the numerous courts. This inevitably brought together musicians and physicians. We shall take the case of two men, each famous in his own field: Gombert and Vesalius. The former had been in the service of the Emperor Charles V since 1526, and Vesalius, whose father had been apothecary to the Emperor, was himself in the Emperor's service in 1546. It is not certain whether the terms of service of the famous musician and the famous surgeon overlapped, but at any rate their case suffices to suggest that again and again the courts intermingled artists, musicians, men of letters, and scientists. In Italy such important musical centers as Venice, Ferrara, and the papal court at Rome created all sorts of intellectual contacts. Ferrara, for example, where physicians like Savonarola, Cannani, and Fallopio served, was also a brilliant center of culture and maintained at court the services of outstanding musicians. Several of the greatest musicians of the Renaissance, including even Josquin, were at some time or other in Ferrara.

Another circle which undoubtedly brought musicians and men of medicine together was that of the so-called "accademie" and "ridotti," meetings of literary, artistic, and scientific men for learned discussions and musical and dramatic performances. These meetings are a salient feature of Renaissance society, and we have evidence of participation by men from all fields of serious activity. In view of the intellectual and theoretical problems which were common to the sciences and arts, and specifically to music and medicine as discussed in this study, and in view of the very remarkable appetite for discussing such problems, we can easily imagine exchanges of views between medical men and musicians. Musicians, furthermore, liked to refer to medicine in particular as an example of a discipline that, like music, had two parts, speculative and practical; they also pointed out that in music, as in medicine, theory without practice or practice without theory would always lead to errors.
Finally, we may consider the interest of medical men in music as such, which is in part suggested by the "accademie" and the "ridotti." Earlier in this discussion we mentioned the outstanding figure of Fracastoro and alluded to his musicianship. It is unfortunate that further information cannot be offered about the musical accomplishments and activities of a man so important and interesting in the field of medicine. The facilities available for this study did not permit the research necessary for such information, and there is nothing reliably available from well-known sources.

Music has always been a favorite avocation with physicians, and one may quite safely assume that in an age of widespread musical amateurism like the Renaissance physicians too were included in the class of musical amateurs. Such scenes as that described in Morley’s work, implying the custom in Elizabethan England of singing from part books around the table after dinner, undoubtedly included also physicians. But we need not stay entirely in the realm of conjecture, and since we are speaking of England, let us consider a physician who is known to us as an ardent apologist for music. John Case, Fellow of St. John’s, Oxford, published in 1586 The Praise of Musicke, and in 1588 Apologia musices tam vocalis quam instrumentalis et mixtae. The second work covered much the same ground as the first, but was intended for the readers of the learned tongue and thus for a wider public. Case discusses the effects of music on mind and body and sings the usual song in praise of music. But his purpose was earnest and was directed against a real threat to the use of music, especially in the church. His whole discussion is intended to answer the objections of the Puritans and succeeds in doing so. He argues against those who object to contrapuntal music in the church, and against the extreme Puritans who would have no music at all. This discussion is found in the twelfth chapter of The Praise of Musicke, entitled “A refutation of objections against the
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lawful use of Musicke in the Church." As a champion of music, Case does not leave the impression of a mere amateur and enthusiast, but shows a thorough grounding and a professional grasp of the subject. In fact, the physician in him almost completely disappears and one is aware that music, more than his own profession, occupied his mind.

But the opposite too is undoubtedly true. Many a physician who was accomplished in music and active as an amateur did not dwell upon it in his writings, let alone write specifically on music. Thus it becomes difficult to know about musical interests in every instance. Such interests are more easily gathered from accounts of the earlier life of medical men, or of those, for example Girolamo Savonarola, who began as medical students but changed their course of life. Here we often read about musical amateurism, especially in terms of the widely used lute. The memoirs of Felix Platter (1536-1614), a famous physician of Basel who studied at Montpellier, besides containing much interesting information about life in general and that of a medical student in particular, give us an example of a medical man who had a pronounced love for music. Platter was a musician himself. He tells us how, while a student of medicine at Montpellier, he often sat at the window and played his lute, and how he participated in midnight outdoors concerts; he tells also of music at the graduation ceremonies. Platter never lost his musical interests, and at an advanced age, he speaks in his memoirs of his extreme pleasure in music. Among the physicians of the Renaissance Platter surely must not be regarded as an exception.

For yet another type of physician interested in music we cite Samuel Quickelberg (1529-1572), who is known to the few specialists in musical history who have occupied themselves with the tempting and troublesome problem of musica reservata. Quickelberg is highly interesting to the historian of music since he is one of two or three who have given us con-
temporary statements about this difficult problem in the music of the 16th century. He was a humanist physician at the Bavarian court, a court which was distinguished for its music and which for thirty-eight years enjoyed the services of no less a man than Orlandus Lassus (1532-1594). Here, by the way, is an instance of relationship between a physician and a musician who served at the same court. Lassus joined the court musicians in 1556 and from 1560 until his death was the director of the Hofkapelle. His relationship to the court physician is evident to us at least through a sort of artistic collaboration. A magnificent manuscript volume of motets (penitential Psalms) by Lassus was prepared at the instance of Albert V. For this volume Quickelberg wrote a commentary which was bound separately, and it is in this commentary that he touches on the esoteric question of musica reservata. It was not a merely casual interest or judgment on Quickelberg’s part that produced the comments on a very famous collection of music. He must have had a vivid interest in music for its own sake and in related aesthetic questions.

Fracastoro, a poet-musician, Case, an apologist of music, Platter, an amateur of music in the simplest and purest sense, and Quickelberg, a humanist-musician, were all professional physicians, and all exemplify various phases of musical interest and preoccupation, which were especially typical of the Renaissance.

The history of the relationship between music and medicine during the era immediately subsequent to the Renaissance follows much the same path. It is true that the 17th century is considered to have inaugurated a new scientific and philosophical as well as musical age, but the discussions dealing with our problem offer little that is decisively new. In music, a closer study of its history shows a clear continuity between the
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16th and 17th centuries, a continuity which is contrary to the conventionally accepted views. Undoubtedly the same, to some extent at least, may apply to the history of science. At any rate, in the matter of music and medicine and especially of the effects of music, we read discussions quite in accordance with the traditional accounts. Not until the 18th century does anyone approach the problem with a measurable scientific and critical attitude.

As a typical 17th century discussion of the subject we may cite an encyclopedic work by Pellegrini, who offers the following discussions in his *Museum historico-legale*: "Ubi quod corpus humanum est Musice compositum" (where it is pointed out that the human body is made up of musical elements); "In quo probatur quod Musica furem extinguit, tristitiam pellit, atque animi passiones moderatur" (in which it is shown that music banishes madness, drives away sorrow, and soothes the passions of the mind); "In quo promiscue ostenditur Musicam morbos curare, dolores minuere, et multa mirabilia operari" (in which it is indiscriminately set forth that music heals diseases, diminishes pain, and works many wondrous things). Since the work is designed, if not for the general, at least for the non-medical or non-musical reader, its presentation of the subject may be considered typical and conventional. It will be noticed that it covers exactly the same ground as did the 16th century discussions, namely, the attribution of musical characteristics to the human body, the effects of music on the mind and on the passions, and the effects of music on the body.

Musical theory proper abided by the conventional views, including also the comparison of the four voices to the four elements. The English composer Christopher Sympson says in his revision of Campion’s treatise on counterpoint: "The parts of Musick are in all but foure, howsoever some skilfull Musicians have composed Songs of twenty, thirty, and forty parts: for bee the parts never so many, they are but one of these foure in na-
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ture. . . . These 4 parts by the Learned are said to resemble 4 Elements. . . .” Sympon wrote in Playford’s well-known and popular Introduction to the Skill of Musick,46 which went through twenty-two editions and was apparently the most generally used musical textbook in England for over three-quarters of a century.

The 17th century was primarily a philosophical age, and all disciplines followed the path of philosophy. But this was so because philosophy itself was strongly naturalistic and affected by the scientific spirit. When the century opened, such men as Kepler (1561-1630), Bacon (1561-1626), and Galileo (1564-1642) had already set the direction for philosophical development in the path of the method of natural science, and soon Descartes (1596-1650) was to inaugurate Cartesianism. The mathematical method of Cartesianism became the ground in which all knowledge of nature was rooted, and it colored thought in all realms. Even such subjects as ethics and music came to be cast in mathematical forms. Thus Spinoza wrote his famous Ethics in a form proper for a treatise in geometry, and Mersenne, Descartes’s co-student at the Jesuit College of La Flèche and a distinguished thinker of the 17th century, wrote works on music, including his monumental Harmonie universelle (1636), in the form of propositions and demonstrations.47 Some relationship between the mathematicism of the 17th century and the phenomenon of the figured bass in music is of at least speculative interest.

In connection with medicine, Descartes was the first to write a book on physiology (De l’homme), treating the subject according to his mechanistic method. The medical historian is aware of the significance of Descartes in the history of medicine. But Descartes also wrote a treatise on music (Compendium musices). This work is brief and offers nothing original, but its opening is significant and is relevant to the question of music’s affective role.48 It begins, almost cryptically, with the words:
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"The OBJECT of this art is sound. The END: to delight, and move various Affections in us." 49 In these few words Descartes voiced the ideal and purpose which are at the very core of 17th century aesthetic doctrine and which were reiterated also by musicians of later generations, such as Roger North: "Musick hath 2 ends, first to please the sence, and that is done by the pure Dulcor of Harmony, . . . & secondly to move ye affections or excite passions." 50

Mersenne takes up the question of the effects of music and the concept of "Isonomia" in yet another work of his not mentioned above, the Questions harmoniques, which is mostly a defense of music. Under "Discours sceptique sur la Musique" he says, "Health is so musical that disease is nothing but a dissonance, mitigated or even corrected by music; this so much so that . . .," and then refers to classical accounts. 51 Mersenne also discusses the effects of music on pain, viper bites, and the like, and writes how in the greater part of America nothing but a strange kind of music is used for the cure of all sorts of maladies. 52

Various other questions are discussed by Mersenne. In Les préludes de l'harmonie universelle he considers whether the perfect musician should be of sanguine, phlegmatic, choleric, or melancholic temperament. 53 He begins by warning that there is no unanimity of opinion and that what is said cannot be demonstrated. Some think the melancholic temperament appropriate for theory of music, since it is contemplative and able to meet the requisites of profound meditation and the understanding of perfect composition. Furthermore, since earth predominates in the melancholic temperament, the latter is more suitable for composition, the ordering of tones. This temperament is solid and inventive, whereas the choleric (fire) is too active and destructive, the sanguine (air) too light, insubstantial, and inconstant to contribute much to composition, and the phlegmatic (water) too fluid to permit high thoughts and
speculation, too unimaginative and cold. For the practical musician, however, the choleric and sanguine temperaments are best. These two are more suitable for song and all other recreations. The voices of the phlegmatic and melancholic are rough and impure, and people of such temperaments seldom sing, but the choleric and the sanguine, especially the choleric, have voices free from impurity. Mersenne goes on to reduce all the temperaments to two in accordance with Galen: the temperate and the intemperate. The former was called by the Latins ad pondus and itself had two types: ad molem, containing equal parts of the four elements, and ad vires, composed of all the temperate qualities. The musician, according to Mersenne, must be of the latter temperament.

We are once more dealing with the theory of four elements and the corresponding four temperaments, this time with a still new application of the theory to our problem. The theory of temperament and its relation to the affective power of music was further discussed by Athanasius Kircher (1602-1680), who ascribed to each temperament a suitable style of music. The melancholic temperament likes melancholy music, the sanguine is attracted to dance music because it activates the blood, the choleric, driven by the force of his swollen gall, is prone to agitated harmonies, and the phlegmatic is inclined to the enjoyment of the feminine voice.54

One more question discussed by Mersenne may be considered here. It is the physiology of singing, found in the treatise on voice, which is a part of his larger work, Harmonie universelle.55 Here the subject is systematically treated. He begins with a discussion of the muscle and its function as motive power (Proposition i), enumerates and describes all the parts involved in use of the voice (Proposition ii), and narrows his focus to the throat and the science of singing. Later in the treatise (Proposition xxxv) Mersenne discusses the various defects of voice and (Proposition xxxvi) offers various remedies.
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Before considering works, mostly by physicians, specifically on the subject of music and medicine, and before leaving the 17th century, a reference to a fascinating man and his famous work may not be inappropriate. We refer to Robert Burton and that extraordinary book of his, The Anatomy of Melancholy. After covering part of the usual ground in ancient accounts of the effects of music, and offering as one reason for such effects the view not unfamiliar to us that “mind, as some suppose, harmonically composed, is roused up at the tunes of musick,” Burton says: “But to leave all declamatory speeches in praise of divine Musick, I will confine myself to my proper subject: besides that excellent power it hath to expel many other diseases, it is a sovereign remedy against Despair and Melancholy, and will drive away the Devil himself.”

Since Burton’s work as a whole deals with morbid psychology, his reference to music presents the latter as a psychological remedy, a remedy for a morbid state of mind. This is not new, for various accounts from ancient times to the 17th century itself (in the latter especially as regards tarantism) imply such effects. But from the 17th century on, the purely psychological effect of music and the effect on the nervous system are clearly brought out. On the other hand, until the 19th century we still find discussions attempting to explain the traditional effects of music on mind and body, and in the 18th century especially, many works, not a small part of them by professional physicians, are devoted at least in part and often entirely to the effects of music on disease.

A list has been given (see note 29) of works on tarantism published from the 16th to the 19th century. In these treatises various other aspects of the application of music to medicine are also discussed. To the list a few more general contributions may be added. W. Rolfinck (1599-1673), professor of anatomy and surgery in Jena, wrote a book in which he included a chapter called “De musica morborum medela.” Franchenau (1643-
1704), a Danish physician, wrote a dissertation in 1672 on the uses of music in medicine. In 1644 the Englishman Philippe Douth published a work, cast in poetical form, in which he dealt with the power of music in driving youth to frenzy and with the dangers of music. Thus, not all discussions were in favor of music. Brendel (d. 1719), a professor of medicine and anatomy at the University of Wittenberg, wrote on the cure of diseases by music, Ettmüller (1673-1732), professor of medicine in Leipzig, on the effects of music on man, and Ancher-sen on medication by music.

The 18th century produced a larger number of works discussing music's role in medicine. A number of these writers reject the well-known legends and strive to establish a more plausible and scientific place for music in the cure of psychopathic cases and of nervous diseases. Luigi Desbout, for example, surgeon of the Royal regiment of Tuscany, wrote a short work in which he described the cure in 1780 of Settimia Tedeschi, a Jewess of Livorno who was afflicted with a convulsive malady. The author closes the discussion by rejecting the older notion that music can be a universal cure, but urges a serious study of the relation of music to disease and the wise use of music in hysterical, convulsive, and hypochondriac diseases. The Dutchman Craanen (1620-1690), physician and follower of Descartes' philosophy, who in his last years served the Elector of Brandenburg, discussed music in his physico-medical treatise. Nicolai (1722-1802), physician at the court of the Duke of Weimar Schwarzburg, Browne, an English apothecary, Malouin, Bachmann, Haller, Villars, and many others wrote on the problem of the application of music to medicine.

One of the better and more critical works before the middle of the 18th century is that of Albrecht (1703-1736), a physician and professor extraordinary at Erfurt and later professor at Göttingen. At about the middle of the century a physician of Montpellier, Louis Roger, published a work which we shall
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pause to consider, since it is typical of the better works, is quite rational within its premises, and summarizes the subject as it was conceived up to that time.

Roger divides his work in two parts. In the first he discusses the media of sound production, transmission, and perception. That is to say, he offers a study of sounding bodies, of sound vibrations in the air, and of the ear as the organism of sound reception. In the second part he discusses the subject proper. This he begins with a brief review of the "history of iatric music." Much of it Roger considers as fable, and he complains that few authors have treated the subject ex professo. Even from among those who have so treated the subject there is not one who has given the results of prolonged observation and experiment. And Roger proposes to do that very thing. He considers the whole subject under two questions: first, whether music is capable of acting upon man; second, how music does act upon man and what the effects are.

Under the first question Roger writes three chapters (Pt. II, chs. 1, 2, 3), discussing the influence of music on the mind, on the body, and on the union of both, which is the animated body. He proceeds systematically and rationally. The first chapter, based on the principle that the mind has a natural predilection for order and that music consists of ordered intervals of sound and time, enters into a clear analysis of the psychology of musical enjoyment. It discusses the mind's attraction to consonant intervals and chords based on the natural harmonic laws, sense of tonality, the force of the tonic, overtones, and the like. Further, it considers the pleasure that the mind derives from rhythmic measure, especially the binary and the ternary, and points out that various rhythms have various emotional qualities and correspondingly various effects on the passions.

The second chapter, though not as valid from the modern point of view as the first, brings us to grips with the issue. Roger sets out to explain the effect of music on matter, but on matter
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that constitutes the human body. Here we come upon the physiology of the time and see also how with such a view of physiology the whole question of music’s effect on the body is quite plausible and, in fact, inevitable.

The human body in his view is composed of solids and liquids. The solids are the bones and the softer parts, nerves, muscles, tendons, cartilages. The liquids are the nervous fluid which is actually of aerial nature, the air introduced in the body (these two being the lightest), and the blood, lymph, and other humors produced by secretions. In the first part of the book Roger had discussed the phenomenon of sound vibrations in the air and set forth how they vibrated other bodies. Now he has to show how sound vibrates matter in the human body and with what effects. Naturally the lighter and more elastic the substance, the greater its susceptibility to sound vibrations.

Since the air contained in our humors has the same properties as the air outside, it undergoes similar changes by sound vibrations. And since the nervous fluid presumably is aerial (Roger offers the latter as a hypothesis), it too is affected by sound just as is air. As the flames of candles in a church are vibrated by the powerful sound of the organ, so these substances are vibrated in us by sound from outside. The blood and other fluids in the body are also affected, just as the surface of a body of water is rippled by sound. Moreover, since the fluids of the body contain air, they are susceptible to sound on this score. Roger also considers the effect of sound on the solids of the human body and discusses sympathetic vibration in unison with the original source of sound.

With this view of the direct, mechanical effect of sound on the various substances of the body, all sorts of actions and results become possible. The vibration of the nerves, of which those of hearing and touch are especially susceptible to music, produces effects in the body itself and transmits sensations to the mind. For example, one mechanically beneficent effect of music
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in connection with the vibration of the nerves is the throwing off of thickened and foreign humors that have attached themselves to the nerves. The agitation of the humors by music, the sympathetic vibration of various parts, have their beneficent effects in the body. Again, for example, the vibration of the blood vessels clears obstructions caused by coarse humors, and one sees the good effect in gouty cases. Roger refers to Baglivi's recommendation (Praxis medica, Lib. I) that if the gouty cannot walk they may at least exercise their voices by talking or by music, and he regards music as capable of fulfilling their need. Thus also does he explain the tradition that music mitigates pain caused by gout. All these positive effects are as natural and plausible as the negative effects of a sharp sound, an explosion, or the scratching of a knife on a hard surface.

The effect of music on the nervous fluid connects the mind and body, since it is actually the mind that directs the flow of the fluid. This view of the mind directing the nervous fluid or "aerial spirits" was, incidentally, propounded by the 16th century writers and by Descartes and others. Having already shown the musical nature of the mind, its liking for music as an ordered art, Roger finishes his last chapter with further discussion of music and the mind: how music affects and effects states of mind, and how these, since the mind is master of the body, influence the latter. Here Roger writes some pages of remarkable wisdom and insight in aesthetic matters. He discusses the aesthetics of composition and the role of ideas in composing music. He cites many cases, recent as well as classical, of music's effects and suggests that if in his day all the known effects are not always found, it is due to the intention of the composer. With the old composers music served a double end. It was to please the ear and to affect habits. With Roger's contemporaries music is composed only with a view to please the ear by surprising it with agreeable harmonies. And this, he concedes, is done
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better than before. But with this one-sided purpose the com-
posers have enervated music and weakened its force by the
abundance of ornaments. Coming from an 18th century man
himself, this last observation is very remarkable. Roger further
points out that actually that music is most pleasing which stirs
passions in us, meaning by this that not superficial embellish-
ment but depth of feeling is what satisfies in music. He admits
that the tender and voluptuous music of his day only advances
the same traits in men and women.

Roger completes his work by citing and discussing various
cases of music’s effects on passions and cases of “moral effects.”
He closes his book by admitting that, all the explanations of-
fered notwithstanding, there is something impenetrable about
the effects of music on man.

Others after Roger wrote works on the subject, as for ex-
ample, Zulatti,73 Weber,74 Saint Ursin,75 Lichtenthal,76 Colò,77
Guiaud,78 Fournier,79 Ferrario.80 The last-mentioned work
brings us to the year 1825, and here we shall leave the subject.
Nor shall we consider the other aspects of relationship between
music and medicine as we did in the discussion of the subject
in the Renaissance. Naturally there were in the 17th to 19th
century, too, physicians devoted to music, as for example Her-
mann Boerhaave (d.1738)81 and, in the 19th century, Theodor
Billroth, amateur musician and intimate friend of Brahms,
author also of a rather extensive work on the question of musical
aptitude (Wer ist musikalisch?).82 In the 17th and 18th cen-
turies there were also discussions on the professional diseases of
musicians, as for example by Ramazzini.83 These subjects, how-
ever, are discussed separately in the present volume.

Not all the works mentioned above have serious scientific
worth,84 but, since they represent only a part of the works writ-
ten on the subject, and since most of these works were written
by medical men, they at least indicate the remarkably wide-
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spread interest during the 17th and 18th centuries in the effects of music on man and in the application of these effects to medicine.

It is only inevitable—and desirably so—that in studying the history of the relationship of music to medicine, one comes also to deal with various matters that fall under the history of ideas and have to do with artistic, philosophic, and scientific outlook and knowledge.

NOTES

1 At times the view has obtained that humanism did not act to the advantage of investigations in natural science. See, for example, Burckhardt, The Civilization of the Renaissance in Italy (Oxford University Press edition, n.d.) 149: “Humanism... attracted to itself the best strength of the nation, and thereby, no doubt did injury to the inductive investigation of nature.”

2 Arturo Castiglioni, The Renaissance of Medicine in Italy (Baltimore, 1934) 69.


4 See, e.g., Leonardo Fioravanti, Della Fisica (1582), the address to the readers (“Alli Lettori”), Chapter 9 (“Che cosa sia la medicina”), and elsewhere.

5 Bibliotheca universalis (1545).

6 Vincenzo Galilei, Dialogo della musica antica e della moderna (1581); Discorso... intorno all’opere di messer Gioseffo Zarlino da Chioggia (1589).

7 Don Nicola Vicentino, L’antica musica ridotta alla moderna prattica (1555).

8 The chief work of Zarlino in theory of music (he wrote also on theological, mathematical, and other subjects) is his Istitutioni harmoniche (1558). Zarlino is the most representative theorist of the sixteenth century, though of course there are other important theorists.


10 Istitutioni III, c.58.


12 Zarlino, Istitutioni III, c.58, c.59, and passim, but especially I, c.6.
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14 Istitutioni I, c.7.
15 Ibid. I, c.2.
16 Istitutioni I, c.2 (1573 ed. p. 9): “massimamente havendo iddio creato l’Uomo alla similitudine del Mondo maggiore, detto da Greci Κόσμος, cioè Ornamento, ovvero ornato: & essendo fatto à quella similitudine di minor quantità, à differenza del quale vien chiamato Μικρόκόσμος; cioè picciol mondo . . .”
17 Ibid. “Ma se tanta harmonia si trova nelle cose celesti & terrestri: ovvero per dir meglio, se'l Mondo dal Creatore fu composto pieno di tanta harmonia; perché dobbiamo credere l’Uomo esserne privo? Et se l’Anima del mondo . . . non è altro che Harmonia, potrà esser che l’Anima nostra non sia in noi cagione d’ogni harmonia, & che col corpo non sia harmonicamente congiunta?” Then follows the passage cited in note 16.
18 From “Pico della Mirandola” in Walter Pater’s The Renaissance (Modern Lib. ed.) 32.
19 Vesalius, De humana corporis fabrica (1543) preface, folio 4r: “ex . . . tota naturali philosophia, nihil tuae Maiestati [Emperor Charles V] gratius acceptius ve procudi posse, historia, qua corpus et animum, ac praeterea divinum quoddam numen ex utriusque symphoniam, et nosmetipso denique (quod vere hominis est) cognoscimus.”
20 Istitutioni I, c.2.
22 Ms. 11.227, Fonds Latin, Bibliothèque nationale, Paris, cited by H.-Émile Rebouis, Etude historique et critique sur la peste (1888) 115: “De accidentibus vero anime, est notandum quod quia nonnumquam ex accidentibus animae infirmitas corporis contingere potest, iram cavant et tristiciam nimiam, sollicitudinem; sint bone spei et fortis imaginat; cum Deo faciant pacem, quia inde mortem minus timebunt; in gaudio vero et leticia, quantum plus poterunt, vivant et, licet gaudium quandoque corpus humectet, spiritus tamen et cor confortat.”
24 Marsilio Ficino, Contro alla peste (Florence, 1576) 92 (‘‘Con-
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siglio di Tommaso del Garbo . . .” c.XXV; “Dell’allegrezza della mente”).


26 *De occulta philosophia* II, c.25.


28 This is treated in his *Compendium musices*.

29 Vincenzo Bruni, *Tre dialoghi* (1601), the first dialogue; Wolfredus Senguerd, *Tractatus de tarantula* (1667, Danish transl. 1702); Christopher A. Schöngast, *Dissertatio de enkurek persarum, sive morsu tarantulae* (1668); Georg Caspar Kirchmaier, *De aranea, in primis vero de tarantulis* (1670); [Thomas Cornelio,] “Extract of a letter written Mar. 5, 1672 by Dr. Thomas Cornelio . . . concerning some observations made by persons pretending to be stung by tarantulas. English’d out of the Italian,” *Philos. Trans. Roy. Soc.* 8 (1672) no. 83, 4066-67; Joh. Müller, *De tarantula, et vi musica in ejus curacione* (1679); Bernard Albinus, *Dissertatio de tarantulae mira vi* (1691); Giorgio Baglivi, *De anatomia morsu, et effectibus tarantulae* (1695); Richard Mead, *De tarantulis deque opposita iiis musica* (1702); Ludovico Valetta, *De tarantula* (1706); Francesco Serao, *Della tarantula, o sia falangio di Puglia* (1742) rejects the view that the tarantula is venomous and denounces the tarantists as impostors; Martin Kahler, *Anmerkung über die Tanzkrankheit die man Tarantismus nennt* (1758, translated from the Swedish, 1758); Anton Friedrich Büsching, *Eigene Gedanken und gesammelte Nachrichten von der Tarantel* (1778); Andrea Pigonati, *Lettere . . . sopra il tarantismo . . .* (1781). I have not been able to consult all of these works and cannot vouch for complete accuracy of the citations.


32 Maffei also wrote a book, *Scala natural* etc. (Venice, 1564, probably the second edition), in which he speaks of every conceivable subject, from the most trivial to the sublimest natural phenomena.

33 *Istitutioni* III, c. 49.

34 Tommaso Garzoni, *La piazza universale di tutti le professioni del
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35 Cf. Zarlino, Institutioni IV, c. 35.
36 Cf. ibid. IV, c. 36.
37 Thomas Morley, A Plaine and Easie Introduction to Practicall Musicke (1597) 1.
38 Mémoires de Felix Platter (1866, translation from the Latin into French). Platter also wrote a work on anatomy, De partium corporis humani structura & usu (1583), a manual of pathology, Praxis medica (1602-1608), and finally, at the age of eighty, Observationes in hominis affectibus.

39 “J’avais un gout particulier pour la musique, surtout, pour la musique instrumentale.” Mémoires de Felix Platter 16f. Cf. also 28, 60, 81.
40 Ibid. 47.
41 Ibid. 50.
42 Ibid. 56, 76f.
43 “. . . mais jusque dans mes vieux jours j’eprouve un plaisir extrême à entendre chanter . . . .” Ibid. 18.

44 On Quickelberg as a physician see C. Broeckx, Aenteekeningen over S. Quickelberg (Antwerp, 1862) and the same author’s “Notices sur S. Quickelberg” in Ann. soc. méd. d’Anvers 22 (1861) 675-682. Quickelberg himself wrote Tabulae omnibus medicis summopere utiles atque ad curandi studium accedentibus in primis salutares (1553); Admonitio et consilium de universo (1565), and other works. On Quickelberg in connection with music see S. W. Dehn, Biographische Notiz über Roland de Lattre . . . aus dem Französischen (by H. Delmotte) übersetzt . . . (Berlin, 1837). For recent works on the same question see Van Crevel, Adrianus Petit Coclico (1940) and Edward E. Lowinsky, Secret Chromatic Art in the Netherlands Motet (1946).
45 Carlo Pellegrini di Castrovillari, Museum historico-legale bipartitum (Rome, 1665), Pars tertia, c. 6; Pars ultima, c. 6, 7.
46 John Playford, An Introduction to the Skill of Musick (1655) 2, 1. The first edition of this work appeared in 1654 and the last in 1730. The Campion-Synpson treatise on counterpoint was finally revised by Purcell.

47 It is interesting and typical that one of Mersenne’s discussions of music occurs in a book entitled La vérité des sciences. Note also another work, Les préludes de l’harmonie universelle (1634) with the subtitle: Questions curieuses, utiles aux Prédicteurs, aux Théologiens, aux Astrologues, aux Médecins, & aux Philosophes.
48 It must be remembered that Descartes wrote an important work on
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the passions, though in this he did not specifically discuss the problem of
music and passions.

49 The English translation, Renatus Descartes' Excellent Compendium of Musick, with Necessary and Judicious Animadversions Thereupon, by a person of Honour (London, 1653) 1. (The translator was Lord Brownecker, first president of the Royal Society.)

50 The Musickall Grammarian (c. 1728) edited by Hilda Andrews (London, 1925) 15.

51 Mersenne, Questions harmoniques (1634) 102: "La santé est si musicale, que la maladie n'est rien qu'une dissonance, qui est tellement addoucie ou même corrigée par la Musique, qu'on dit d'Arion & de Terpander. . . ."

52 Ibid. 103: "C'est chose certaine qu'en la plupart de l'Amérique on n'use point d'autre recepte contre toute sorte de maladies, que d'une certaine Musique fort estrange à nostre esgard, dont ils estourdissent & guarissent leurs malades."

53 Question IV (p. 109) "A scavoir si le tempérament du parfait Musicien doit estre sanguine, phlegmatique, bilieux, ou mélancholique, pour estre capable de chanter ou de composer les plus beaux airs qui soient possibles."

54 Musurgia universalis . . . (Rome, 1650) 7. 545.

55 Harmonie universelle (1636) "Livre premier de la voix, des parties qui servent à la former, de sa définition, de sa proprietez, & de l'oiïye."

56 Robert Burton, The Anatomy of Melancholy, Pt. 2, Sect. 2, Memb. 6, Subs. 3.

57 Werner Rolfinck, Ordo et methodus medicinae specialis commentatoriae . . . (Jena, 1665) c. 19.

58 Georgius Francus de Franchenau, Dissertatio de musica, medico necessaria (1672).


60 Adam Brendel, De curacione morborum per carmina et cantus musices (Wittenberg, 1706).

61 Michael E. Ettmüller, Effectus musices in hominem (Leipzig, 1714).

62 Ansgarius Anchersen, De medicatione per musicam (1720).

63 Luigi Desbout, Ragionamento fisico-chirurgico sopra l'effetto della musica nelle malattie nervous . . . (Livorno, 2nd ed. 1784; 1st ed. 1780).

64 Theodorus Craanen, Tractatus physico-medicus (Naples, 1722).

65 E. A. Nicolai, Die Verbindung der Musik mit der Arzneygelahrheit (Halle, 1745).

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- Christian Ludwig Bachmann, *De effectibus musicae in hominem* (Leipzig, 1792).


- M. de Saint Ursin, *Traité des effets de la musique sur le corps humain* . . . (1803).

- Peter Lichtenthal, *Der musikalische Arzt, oder: Abhandlung von dem Einflusse der Musik auf den menschlichen Körper, und von ihrer Anwendung in gewissen Krankheiten* (Vienna, 1807); revised and translated into Italian by the author himself (1811).


- Jacques Marie Etienne Guiaud, *Considérations littéraires et médicales sur la musique, lues à la séance publique de la société de médecine de Marseille* (Marseilles, 1816).


- Bernardino Ramazzini, *De morbis artificum diatriba* (1700) c. XL.

- They have not all been available to me for examination. Therefore
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not every citation can be guaranteed for absolute accuracy, since some of them were pieced together as to author, title, date, and place of publication from various writings of the 17th and 18th centuries. The citations at any rate may be useful to those who may wish to carry the study of the subject further.
Chapter Six

Rhythm and Health

CHARLES W. HUGHES

The theoretical basis for modern music therapy still remains incomplete. It is true that research in this field demands a combination of aptitudes which are rare and a type of specialized training which is difficult to obtain. Nevertheless, one might have anticipated that more work would have been accomplished under the stimulus of the human needs caused by two world wars. Yet the use of music for healing was a very ancient practice. The Biblical account relates that Saul's melancholy vanished before the music of David's harp. This episode could be paralleled by histories of similar musical cures from Chinese, Hebrew, Arabian, and classical sources.

The present account attempts a brief historical review of the most salient aspects of music therapy with special emphasis on the factor of rhythm. The nature of rhythm determines its therapeutic effects. The first part of the chapter, therefore, is devoted to a concise analysis of musical rhythm. This is followed by a discussion of some of the ways in which rhythm is employed in life situations. Finally, the more specific therapeutic applications of rhythm are discussed. Therapy through music will belong either to the category of magic or to that of
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science. In the former case the healer believes that it is possible to cure sickness by means of songs and dances which possess supernatural power. In the latter category, music and rhythm are employed to obtain characteristic and experimentally verifiable physiological and psychological effects which contribute to the well-being of the patient.

It is peculiarly difficult to study the effects of musical rhythm, since music produces its effects not by rhythm alone but by the union of melody and rhythm or (in more recent Western music) melody, harmony, and rhythm. If we isolate one of these elements for scientific analysis, we destroy the effects which we wish to study. A series of drumbeats may adequately express the dominant rhythm of a musical composition, but they cannot reproduce its mood and atmosphere, they cannot cause the listener to react as he does to the complete composition because they are only part of a whole, and we respond differently to the part than to the whole.

The fundamental basis of rhythm is a uniform pulsation or beat. A periodic movement is more efficient than a non-periodic movement. Thus a normal heartbeat measures time in a fairly uniform fashion. We walk at a uniform pace. We drive a stake with evenly spaced hammer blows. More complicated motions tend to recur at regular intervals to the extent that they are efficiently performed.

If we assume a uniform series of sounds like the click of a metronome, our minds seek some mode of organizing them so that they can be grasped and understood. We impose an accent as a psychological necessity. Our uniform series groups itself into an accented or stressed click followed by one or more unstressed sounds. Such a series, once set in motion, tends to continue, since each group arouses the expectation that the following group will be similar. A Western European would in all probability tend to establish a simple system which would divide the pulsations into groups of two, three, or four with the
beginning of each group marked by an accent, psychologically imposed or actually heard. The melodies of certain other peoples, Greek, Indian, Bulgarian, sometimes display more complicated groupings, such as five, seven, eleven, and thirteen.2

Such a “system of expectation,” to borrow the apt phrase of Chandler,3 is the meter of music. In music like that of many Oriental peoples or our own American Indians, this metric grouping is made clear by drumbeats which continue throughout the performance.

Musicians distinguish between musical rhythm and meter. Meter is a uniformly recurring system of accented and unaccented pulsations. A metric unit consisting of an accented beat together with the succeeding unaccented beat or beats is the measure of the musician. The movement of the melody in time, however, is freer than the underlying meter. Certain tones may have the duration of more than one pulsation. Others may move so rapidly that two or more may occur during a single pulsation or beat. This distinction between meter and rhythm has a close parallel in poetry, where a very considerable freedom in prolonging or multiplying syllables is practiced without destroying our consciousness of the underlying metric pattern.

The mere fact of variety in movement is not the only characteristic of musical rhythm. Duration patterns tend to recur in such a fashion as to emphasize larger rhythmic units. Thus, such patterns may appear in the first and third or first and fifth measures. It is easy to see that in the former case the music will be organized into two-measure groups, in the latter case into four-measure groups. Indeed, even without the aid given the understanding by the use of rhythmic figures, measures tend to aggregate in measure groups on the same general principle that pulsations are grouped in measures.

Once this large unit has been established, we have awakened the expectation that the rhythmic figure will appear again after
a similar time-interval. Such an expectation is not necessarily satisfied at each recurring time-interval, but it should be satisfied frequently enough to give pleasure to the auditor and to make the larger rhythmic structure of the music clear and understandable. A complete satisfaction of rhythmic expectations would defeat its own intent by eliminating the need for attentive listening. In extreme cases, the monotony of uniformly spaced patterns would cause the interest of the auditor to shift elsewhere. This would be more likely to the degree that the pattern was short and easy of comprehension. The monotonous background of drumbeat, banjo, and plucked bass in the jazz orchestra fades to the margin of the listener's field of consciousness, while the focus is on the comparatively irregular movement of the melodic line. At the other extreme, a characteristic rhythm which continually recurred at irregular time-intervals might bewilder the listener and cause him to lose all sense of the larger time-groupings.

Enough has perhaps been said to indicate how complex a development a simple musical factor may display. Indeed, scores of some complication by such composers as Edgar Varèse and John Cage employ only percussive instruments and exploit only effects of rhythm.

The historic roots of the rhythmic system, which has been outlined in the preceding paragraphs, are twofold. Musical rhythm developed from word rhythm and poetry and from the dance. Both influences have continuously interacted with music from the earliest times. The rhythm of speech determined the movement of early song. This was more subtle and less clearly defined where the text was prose, as in the Gregorian Chant of the Catholic Church, clearer and more vigorous in metrical hymns or the songs of the Troubadours. Thus the parallel which was drawn between poetic meter and the various musical measures represents the result of a common historical growth and a common origin.
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The interaction of poetic meter and music was most decisive at an early period. That of bodily movement and the dance has been continuous to the present time. A modern song respects the word accents of a poem, but it often obliterates its poetic structure by superimposing on it a musical pattern which evolves its own rhythms. Modern dance movements still not only directly influence dance music but even interpenetrate such purely musical forms as the symphony. We have already noted that even movements which are not associated with the dance tend to become periodic if they are repeated. Efficient walking or running inevitably falls into a regular alternation of right foot with left foot. A walker tends to swing his arms regularly as he walks. Moussorgsky displayed real insight when he depicted the crippled dwarf in his Pictures at an Exposition by an unbalanced musical rhythm, an abrupt movement followed by a longer tone. The normal regularity of movement is intensified in the dance. In the more developed dance forms, the uniform and monotonous steps of many primitive dances are replaced by more varied rhythmic patterns. A dancer moves to the right and balances this motion by a corresponding movement to the left. Music for the dance may reflect this balance of movement in a corresponding equilibrium of phrases. Thus, not only did the rhythm of the dance pass from the dancers to those who drummed and those who intoned the dance songs, but the structure of the dances might also be revealed in the balanced rhythms of the more highly developed dance tunes.

This motor influence on our music is very strong. Nor has the influence of the dance been confined to dance music alone. All our instrumental music is penetrated by the dance spirit. We are told that all our instrumental compositions sound like march music to cultivated Chinese listeners. It is this fact that permits us to claim that a very large part of the effect produced by our instrumental music is a rhythmic effect.

From the earliest times there was a tendency to reinforce the
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rhythm of dance songs and the dance with percussive sounds which emphasize the rhythmic factor. Such sounds in some cases stimulate the impulse to dance and in a sense typify it. Clapping the hands, stamping the feet, slapping the thighs or the belly were presumably among the earliest modes of marking a rhythm. Such manifestations at a remote period led to the invention of instruments of percussion without, however, entirely superseding these simplest sound-producing movements. Clapping the hands remains a favorite accompaniment for the dance. Striking a hollow tree trunk might be expected to lead to the hollowed logs, the slit-drums of the Pacific islands. Stamping on the ground was less effective than stamping on a hollow cavity covered with bark or a board. Pounding the end of a staff on the ground is refined in the stamping-tubes of varied length employed in Samoa and elsewhere. The basic forms, however, are the drum and the rattle in their manifold varieties. The drum is an advance over the bark-covered hole. It consists of a tense membrane, usually an animal skin, stretched over a frame or a hollow body which serves as a resonator. The rattle, which renders forearm movements audible, often takes the form of a hollow container in which small hard objects move freely when the rattle is shaken. A detailed discussion of such instruments would far exceed the limits of this chapter.

We have seen how music developed from the dance. Since this was so, it is easy to understand that one of the most natural human responses to music is physical movement. Every music lover realizes that this tendency is not always totally suppressed even in the subdued atmosphere of the concert hall. The foot taps in time, the head nods, or a finger moves rhythmically. We may assume that muscular tensions and relaxations are present as a response to music, even where they do not make themselves felt as overt movement. Such physical responses to the periodic factor in music may be accompanied by an appropriate emo-
tional tone. It seems probable that an emotional response to rhythmic movement was originally acquired by association. Such dance associations are amazingly persistent, however, and the emotional character of a rhythm may survive the dance which generated it. Thus the stately, dignified rhythm of the saraband is reaffirmed in the heroic chords which open Beethoven’s *Egmont Overture*. The saraband was obsolete, but its characteristic rhythm survived. In a similar fashion, the rhythmic pattern of the waltz may symbolize grace and romantic sentiment. The rhythm of marching feet may convey any of the manifold feelings that a procession can inspire, triumph for victory, nuptial joy, or somber mourning for the dead.

The specifically therapeutic effects of rhythm will be better understood if we first outline briefly the ways in which rhythm has been utilized as an aid in practical life situations. This seems especially necessary since therapeutic uses of music are only specific applications of general musical capabilities. The simplest and most basic effect of rhythm is to synchronize movements. There is evidence which appears to show that an effect of rhythm is to center attention on itself rather than on the effort of moving to the rhythm. We also know that rapid and animated music exerts a positive stimulus on pulse rate and respiration. Thus it sometimes appears that young people exert themselves more, and for a longer period, at a dance than at more useful and less rhythmic occupations. In a similar fashion it has been observed that a marching band causes soldiers to forget their fatigue, at least for a time, and permits them to march with renewed vigor.

In ancient civilizations, as in more recent times, certain types of work were performed to songs which synchronized the movements of the workers and at the same time served as a pleasant distraction from monotonous toil. Thus, boatmen rowed in cadence, sailors pulled on halyards or threw their bodies against
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the capstan bars to the sound of chanties, agricultural field-workers cultivated the land to the sound of drumbeats. Work synchronized to music has been attempted in certain cases in modern factories, but synchronization of this kind needs further investigation and application before its value can be fully determined.

No doubt the dance is physical exercise, but that was not its original justification, unless we except dances performed by Greek warriors in full armor which might be regarded as a form of ceremonial military drill. It was only in a sedentary urban environment that movement to music in the form of calisthenics became important in conditioning men for arduous occupations or in maintaining health.

The practice of eating to music is an ancient one. The masters of the 17th century produced many collections of "Tafelmusik." Even the great classic masters did not disdain to write Divertimentos and Serenades, some of which were intended to serve as background music for banquets. The restaurant orchestras, the modern equivalent of the tavern musicians of an earlier day, have themselves been largely superseded by the juke-box, the radio, and such specialized devices as Muzak. The historic persistence of dinner music proves that men have found satisfaction in the association of music with eating. Much of the music so employed has had a dance character. In general, ease of comprehension, brightness of mood, and a lack of striking effects have been common characteristics of dinner music. Whether positive physical benefits result from this association is unknown. The known influence of mental states on certain types of digestive disorders would suggest that music contributes to a sense of well-being which may be of positive benefit in certain cases. Milton’s suggestion that music should be employed after dinner “to assist and cherish Nature in her first concoction” seems more reasonable than the usual practice of employing music during the meal. Milton’s idea
was no purely theoretical concept, as is revealed by a passage dealing with the English College of St. Omers, Pas de Calais:

Againe, many of the Students, especially those of the better sort, have skill in Musicke, and therefore must play the Fidlers, and sing a merry song to make the holy Fathers merry, and to digeste their meate. These and the like be their ordinarie recreations after supper, which they call their Postpast.6

It is possible to assemble a certain number of observations which indicate that music is more or less consciously used as an aid to mental effort. An intelligent but not especially musical man stated that he had found that he could do his most creative work while he was listening to music. During the period before World War II when small radios became plentiful and cheap, many students of high school age began to study to the accompaniment of the radio. This practice has continued, but it seems clear that the students do not listen attentively to the music. If they did, one of the activities would suffer or there would be a shifting of the center of attention from one activity to the other. Where the attention of the student was so diverted, music would clearly be a distraction, not an aid. Music used in such a way must be regarded rather as a mild stimulant while remaining in the margin of the field of consciousness. Where inattentive listening becomes habitual, it must render the listener incapable of true musical satisfaction. This use of music as a facilitator of mental activity should be carefully studied. The part played by rhythm in the results obtained should also be investigated. In the too frequent cases where the radio is simply turned on and left on, we may be sure that most of the selections heard will be popular dance tunes with a pronounced motor character. For most people, however, neither dancing nor listening to music is a doctor's prescription; yet it may well be said that the positive benefits of music in terms of human happiness and well-being accrue more from aiding in the preservation of a healthy balance than in reestab-
lishing it once it is lost. The release obtained by listening to music is a precious resource which is not less potent because its secrets yield with such difficulty to scientific research. Several considerations complicate the study of rhythm in its relation to ritual and magic. In two especially well-studied areas, ancient Greece and China, there is much evidence to show the important role which music played in regulating the life of the people. In China we are told that it was possible to tell whether the people of a province were well-governed by examining the music performed there. It was believed that morality and public order were controlled by music. The important role assigned to music as an educational factor in Plato’s Republic and Aristotle’s Politics was due to the conviction that music was an important harmonizing and formative factor. The argument employed by the music-master in Molière’s Le Bourgeois Gentilhomme to prove that music was the greatest art seems roughly parallel to the reasoning which convinced the Chinese and the Greeks of the efficacy of the art. The central power of music for both peoples, however, lay in the tones and tone relationships employed, not in the movement of tones in time. For the Greeks the tones which formed the Lydian scale were effeminate in effect. Certain examples which deal with specific curative effects show a similar emphasis on tone relationships. When Athenaeus says that “persons subject to sciatica would always be free from its attacks if one played the pipe in the Phrygian harmonia over the part affected,” he prescribes both a specific musical instrument and the scale in which the instrument was to perform. He says nothing of the rhythms which the pipe was to play.

Another broad question which puzzles the student is the fact that it is not possible to fit certain ancient or primitive healing practices into the categories which are habitual with us. Some of the Greek usages, such as the social dance and rhythmic military evolutions, are familiar to us. Other prac-
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tices are foreign to our way of life. Yet the mad dances of Dionysus reappear again and again in the course of history. What are we to think of these dances which generate frenzy or a trance-like ecstasy in the participants? Fundamentally we cannot understand them, for they are justified by psychic states which can be fully comprehended only through participation. Sometimes such dances are definitely related to therapeutic rites or magic healing. Often they produce in the dancer a consciousness of identity with a spirit or a divinity. Such dances are characterized by a persistent and increasing rapidity of movement which continues until the participant achieves a trance-like state or frenzied madness. The rites of Dionysus, the whirling Dervishes, the Sun Dances of certain Indian tribes of the Western plains, all show a basic similarity in the means employed and the effects produced. Perhaps the dance improvisations of converts “full of the spirit” at revival meetings represent the only vestiges of these ancient practices existing in our own time and country.

The effect on the personality of the dancer as a result of his self-identification with a higher power is often well-marked. Equally real is the violent emotional experience which the dance provides. Sometimes music serves as a catharsis or release rather than a stimulus to religious ecstasy. Aristotle in his Politics expresses this point of view in a passage which states that “some persons fall into a religious frenzy as a result of the sacred melodies whom we see restored as if they had found healing and purgation.”

More important than all the other uses of music, at least from our point of view, more in accordance with music’s essential nature and therefore more potent, is the effect of music on the emotions. Music when it truly stirs and moves the hearer has two important effects: it so centers the attention of the auditor on the music that for the moment he forgets himself, and it creates within the listener an emotional response.
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appropriate to the mood of the music. This response is accompanied by the same physiological changes that accompany emotional states as they occur in life situations. Such a response is a response to the total and complex effect of music. Yet an examination of the pieces employed to test the emotional effect of music would indicate that rhythm is a primary factor in determining the kind of effect produced. It is not only the presence or absence of a pronounced rhythmic pattern which is involved here, but also the general rate of movement, be it fast, moderate, or slow. Richard Browne emphasizes precisely this point when he remarks in his *Medicina musica* (1729) that to cure the spleen or vapours "a soft Adagio wou'ld be very improper." He prescribes instead the "airy sprightly strokes of an allegro." On the other hand, "to soothe the Passions it is necessary to have recourse to an Adagio, yet nevertheless, if play'd alone to Persons entirely free from Disorder, it may, for Reasons aforesaid, so enervate the Body, as in some measure to tend to the Production of Diseases." In the light of recent research Richard Browne seems less visionary to us than he would have appeared to our immediate predecessors. It is this power of music over the mental tone and the mood of a listener which explains the effect of music on persons suffering from mental disturbances.

Though in most cases where a cure has been effected by music the details lack precision and the attitude of the observer is naive, we can still perceive that the malady of the patient was psychological in nature. Exact details concerning the music employed are even less abundant. Rarely do we find any hint as to the movement or rhythm of the pieces employed. The chief interest of such cases for us lies in the fact that they demonstrate the belief of the writer in the efficacy of this type of treatment. Such was the cure effected by the famous "Vingt-quatre Violons" of the French court on a young wife who had fallen into a melancholy state after a long and serious illness.
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The violins were concealed behind a tapestry at a time when the lady was awake. "The violins commenced to play these instruments all together, which 24 men sounded with all their might and with great force, so that the lady in surprise expected nothing less than such harmony, which had such force as to drive away at once this melancholy condition, and recovered her early good health and her robust good humor." 10

Peoples completely dominated by the concept that the world was controlled by powers or spirits who could in their turn be influenced by human beings could have no idea of medicine in the modern sense. Certain aspects of early Greek life show the effect of this idea. To understand the full implications of such a system, however, we must study the therapeutic practices of primitive peoples. In such cultures it is clear that the health and the very existence of the individual depended on the performance of rites which had no direct connection with disease or its cure. If the controlling powers were not placated, the people would suffer or die. The dances, the chants, and the rituals which restored a sick person to health were necessary only when the ceremonies which placated the controlling powers, the precautions which normally warded off evil magic or satisfied the spirits of the dead, were neglected. In other words, normal observances were intended to preserve the well-being of the tribe or the individual. Sickness was due either to the wrath of the spirits or to the enmity of human beings possessed of magic powers. The function of the established practices might be roughly compared to modern preventive medicine. Once the spirits were angry or a hostile magician had caused sickness, there were remedies, and these frequently involved music and dancing.

The intervention of rhythm in healing rituals as well as the specific intent of such ceremonies was extremely variable. Music entered into rites which were therapeutic in the sense that they were necessary to the well-being of the whole people,
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and also into those which were directed to the cure of an individual patient.

The word-patterns employed in magic formulas had definite rhythmic qualities. There are a considerable number of cases where the rhythmic factor was made even more evident by the use of a rattle or drum, by bodily movements such as clapping or stamping, or by actual dance steps. Healing by means of a charm or magic song is a practice which has persisted from extremely remote times down to the present. The efficacy of such formulas depended in part on the repeated appearance of certain particularly important words. The prescribed repetition of the entire formula a specified number of times multiplied the appearances of such words. A formula recorded by Marcellus in his treatise De medicamentis was to be repeated three times (a magic number), another three times three. Some of the extant examples show rhythmic and metric qualities, rhyme, alliteration, and the like. The familiar children’s jingle, “Rain, rain, go away, come again another day,” is a fair example of the type. But this is not medical magic; it is weather magic. Another formula (sung to the tune of “Pop Goes the Weasel”) runs as follows: “When I went to Mary’s house Mary had the measles. I gave the doctor fifty cents, Pop goes the measles.”

Ancient formulas of this kind were intended to be sung. This we know from the texts which survive, from their rhythm and meter, and from descriptions of their use. The music has vanished; the practice has been recorded in literary references as well as in the beliefs and usages of modern primitives.

The formulas inscribed on the walls of the funeral chamber of King Ounas (perhaps 3000 B.C.) were designed to preserve the king from injury by poisonous snakes. “The serpent uncoils; it is the serpent that uncoils . . . serpent that descends, subside, retrace your path.” The famous Egyptologist Maspero, who discovered and translated the inscriptions, says, “All these
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formulas appear to be rhythmic and intended to be sung.”

Such healing and protective formulas for a dead king provide us with an early example of the magic chant.

Classic authors were familiar both with such remedies and with those who practiced them. In Homer’s Odyssey we read that the wounded Odysseus bled no more when the son of Autolycus intoned a magic song. Plato refers to the healing virtue of chants. In his Charmides a supposed remedy for a heavy head consisted of a leaf and a magic song; the leaf, however, was completely ineffective unless it was accompanied by the proper song. To the Latin authors, the singer of chants was the praecantatrix; Plautus employs the term in a passage of his Miles gloriosus. Cato the Elder in his De agricultura relies on ancient songs (cantiones) to heal dislocations; they had to be sung three times. Pliny the Elder refers to charms as does Macrobius at the close of a passage which deals with the effects of music:

Thus, every aptitude of our minds is governed by songs. One sings while advancing to war and on the retreat, rousing or quieting martial ardor by song. Music grants slumber or withholds it; it reminds us of troubles or dismisses them. It arouses rage and inspires clemency. It likewise heals the ills of the body, hence the excellent mode of curing the sick called praecinere (a singing of incantations).

That this practice did not vanish with the decline of classical civilization is shown by the treatise of Marcellus, De medicamentis. This author, though he quotes from the approved classical authorities, nevertheless displays a curious mind and a pragmatic spirit. “I have collected with the greatest care the simple remedies which rustics and common people (agrestes et plebeii) have discovered by chance, and which experience has proven efficacious.” Marcellus gives practical examples of such remedies. To dislodge a foreign body from the eye, a wreath of artemisia is placed on the head and while the singer rubs the affected part, the song tetune resonco bregan gresso is intoned.
It is interesting to note that the word used for these magic songs is still the ancient term praecantio.

This practice of classical antiquity finds a close parallel in the healing songs of certain American Indian tribes. Among the Indians of the Northwest there seem to have been two rather distinct healing arts, one based on the use of medicinal plants, the other on the singing of songs with special powers. In these rites, however, the simple word rhythm of the early examples was reinforced by drumbeats or the sound of a rattle. In one case we are told that when the medicine man needed both hands to touch the affected parts of the patient and was therefore unable to shake his rattle, he handed it to an assistant who continued the shaking. The rhythmic element was thus not regarded as a purely auxiliary element, but one essential to the ceremony, one which could not be dispensed with.

Santiano, a medicine man whose songs are recorded in Frances Densmore's Nootka and Quileute Music, sang by himself if the case was not a serious one. If, on the other hand, the situation demanded it, he would ask relatives and friends to join in the singing. This procedure, of course, would be possible only where the songs were quite generally known, as was the case here. Both men and women sang, and the women marked the time by clapping their hands. This group singing was regarded as a strengthening of the power of the healer. The length of the treatment varied with the seriousness of the disease. The performance of a song or two songs might be sufficient. On the other hand the treatment might last for a long time. The song (No. 177) which was said to be used for group singing is simple and more rhythmic than those employed by Santiano himself. Healing songs might be inherited. One employed by Santiano (No. 178) belonged to his uncle or aunt. Though the melody was sung to syllables, their meaning was not known. In such texts in “dream language,” the meaning of the words was known only to the first owner who learned
the song in a trance. Nevertheless, subsequent singers repeated
the syllables with care though they did not comprehend them.

This method of obtaining songs in a vision or dream was not
unusual among the American Indians. A healer of the Clayo-
quot Indians (from the west coast of Vancouver Island) Áčnichi't by name, was said to have acquired his power to heal
from a wolf. "He had been praying two days for a plentiful run
of herring and left his rattle beside his bathing pool. It disap-
peared and was gone for two days, but on the third day it was
returned by a wolf. He saw the wolf and heard it singing. He
considered the songs a gift from the wolf, learned them, and
used them in treating the sick." Mrs. Guy, who recorded the
songs of this medicine man, made a comment which throws
a somewhat different light on the use of assistants to help in
the singing: "A new doctor had to have lots of singers to help
him but an old doctor did not need them; he asked only the
people who lived in the house to sing with him."

The custom of singing for the sick survives among the Negroes
of the Bahamas, though the song has lost its magic power as a
healing agent and has become a symbol of parting. "When a
sick person is in danger of death, men, women, children of
every age meet in his hut, taking possession of the largest room,
the doors, the windows, and sing mournful airs while the
patient lies in a room at the side. If he does not die at once they
begin the following night. Soprani, tenors, altos, basses mingle
without regard to the laws of harmony." It seems at least
possible that we have here a healing ritual so modified by
Christianity that its original intention has been entirely lost.

Music played a part in the so-called dance manias which be-
gan during the Middle Ages and continued at least to the 18th
century. These dances took various forms, such as St. Vitus's
dance in Germany and tarantism in Apulia, both of which first
appeared in the 14th century. Certain characteristics which they
display seem to relate them to the dance of ecstasy, but they
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have a new and terrible significance when we associate them with the plagues of the period, of which the Black Death was only one. We are told quite specifically that the performances of the flagellants who lashed themselves in the streets of London were due to the dread of outbreaks of disease and to a desire to avert such epidemics by a blood-sacrifice. Driven by a kind of group hypnosis, sufferers from the dance mania danced madly and persistently. In some tales of the period a curse by a priest forced a group of noisy dancers to continue their revels in spite of themselves. Thus certain dancers of Paris were condemned to dance for a year. Sometimes a priest intervened to free the dancers from their obsession. Again, we are clearly told that the dance or the music was a cure for these hysterical seizures.

The Nuremberg Chronicle (1493) describes the dances of the Chorisants who appeared in 1379:

The people began to dance and rush about; they formed groups of three and danced in one place for half a day, and while dancing they fell to the ground and allowed others to trample on their bodies. By this they believed that they could cure themselves of illness, and they walked from one town to another and collected money from the people, wherever they could procure any.

The chronicler is skeptical, however, for he continues, “and it was a swindle undertaken for the purpose of obtaining money and that a number of them, both women and men, might be tempted to unchastity and succumb to it.”

The victims of the dance mania suffered from melancholy and depression together with a variety of other symptoms, such as low bodily temperature, nausea, the appearance of sexual stimulation, and the failure of the senses of sight and hearing. They were aroused by the sound of music and at first they responded by movements. Then they danced at an accelerated tempo until they could dance no more, when they sank to the ground. A glistening metal surface or a particular color often
possessed a powerful attraction for them. They preferred to dance near water and even cast themselves into the sea on some occasions. The mania was contagious without respect to age, though women were more likely to be affected than men.

Tarantism survived the other phenomena of the kind. By the 17th century it was general throughout Italy. It became less frequent after that period. The modern tarantella is generally said to be the descendant of the older dance, but this conclusion would appear to rest on no very secure foundation. Perhaps the attribution is due only to a similarity in name. Tarantism was supposed to have been caused by the bite of the spider (*Lycosa tarantula*). Some accounts say that the dance effected a cure by dissipating the poison, presumably through the pores of the skin. Both the supposed cause and the explanation of the manner of the cure appear to be subsequent rationalizations of phenomena which were not otherwise explainable. Paracelsus is said to have been the first medical authority to have prescribed a rational cure for sufferers from the dance mania. Rejecting the use of incantations, he diagnosed the various aspects of the disease as *chorea imaginativa* (auto-hypnosis), *chorea lasciva* (sexual stimulation), and *chorea naturalis* (hysterical laughter).23

The parallelism of tarantism with other forms of dance mania and the fact that the mania is said to have been transmitted to those who were not actually bitten suggest this conclusion. The wording of Brocklesby's account suggests that he did not believe that the mania was actually caused by the spider's bite. He says, "A gentleman of great candour, who formerly lived three years at Gallipoli, assures me, he had frequently observed old women as well as young girls seiz'd with a melancholy disorder, which they call the bite of the Tarantula, that was cured no other ways than by musick. . . ." 24 In such fantastic examples of group hysteria, rhythmic motion evidently served as a release for the participants. The contagious character of
the mania, the transition from melancholy to exhilaration, the appearance of self-hypnosis, and the sexual aspect of the attacks seem to have parallels in the dances which sometimes accompany revivals and conversion in certain of the Christian evangelical sects in recent times.

In the case of the tarantella the dance was supposed to counteract the effects caused by the poison of the spider. A whole series of primitive rites were similarly designed to cure a sufferer of a specific disease. These rites should be distinguished from the dances which were designed to preserve the well-being of a whole people on the one hand and those which aided an individual to attain a mystic state on the other. We have already seen that therapeutic magic may involve the recitation of magic formulas, of chants or songs with an accompaniment of drum or rattle. The intervention of rhythm becomes even more pronounced when bodily movement or dance movements are employed.

An especially clear case of a dance which was undertaken not so much to cure as to ward off a disease may be found among the Dene tribe. Its members regarded the shadow which obscures the face of the sun or moon during an eclipse as a scab. Fearing that they might catch the disease which produced such an effect, they gathered in a clearing and danced slowly in a single line. "Each dancer bends forward and beats time by striking his right hand against his thigh, while he mutters a petition beseeching the demon of disease to keep away from him." 25

In at least one instance, a cure is supposedly accomplished when the demon who has taken possession of the patient speaks through her lips revealing his place of origin and the person who sent him. This is true of the dance rituals performed for demoniacally possessed girls of the Nayars who live on the Malabar coast. The patient was placed before her house and watched by the village folk who gathered around. "Then one
by one the masked magicians come before her and execute most frightening dances to the accompaniment of terrifying music."

Philip Thornton has described in some detail a ritual performance of the Gnawi, a North African people, to cure a man who was afflicted by a disease which had caused him to lose weight. The celebrants sang to the rhythms of two drums and iron castanets (*tjaktjaka*), then circled from right to left around the drums with gradually increasing excitement. As one of them left the circle and danced in front of the drummers, their women brought out the sick man on his bed. They then arranged themselves around him in the form of a triangle, playing on tambours (*binder*) and small clay drums (*agwal*). As the drums again sounded a new rhythm, the circle of dancers reversed its motion and the women uttered continuous screams. They grasped a black cock, a white cock, and a buff hen and danced while holding them. A black goat was similarly seized by two men. As the sick man stood erect on his bed with his arms lifted, the women twisted off the heads of the fowls and marked their own foreheads and breasts with the flowing blood. The goat was then decapitated with sacrificial knives, and the celebrants successively sucked the blood from a heart wound which was opened by a knife blow. The forehead and body of the patient were smeared with goat's blood and he was then taken back into the house. The women ate the kidneys and liver of the goat; with this exception, the sacrificial animals were consumed by fire. The object of the dance was to propitiate the Jnūn or spirits who had caused the disease. In another ceremony performed on the following day, the men remained in the interior of the house, drumming and praying constantly to drive away the Jnūn. Here the rhythmic element is assigned a specific role in the ceremony, that of frightening off malignant spirits rather than simply marking the rhythm for the dancers.
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Our author also describes a whirling dance by followers of Sidi ben Hamduj which accompanied the prayers of pilgrims who had come to seek relief at certain sulphur springs. This dance increased in tempo and intensity as the rhythm of the drums had its effect on the dancers. "Their glazed eyes, long since fixed in a wild stare, and mouths dripping with blood-stained saliva, are obvious signs of complete auto-hypnosis." The ceremony reached its climax when the dancers hacked the back of their heads with small hatchets till the blood stained their robes as an offering for the afflicted pilgrims in the springs.27

As is evident from the examples presented, specific healing practices in early civilizations and among primitive peoples depended on magic. Where the patient's malady was mental rather than physical in character, the belief that magic would aid in curing him might indeed contribute to that end. At the least we may assume that such ceremonies contributed to the morale of the patient. In turning from these early practices and beliefs to more recent applications of music to therapeutic ends, we turn from the regions of magic to those of practical application and finally to those of science. If we measure by the exacting standards of science, however, we still know relatively little of the effects of music. Thus, much of what is stated in the following sections, though supported by current practice, lacks the confirmation of controlled laboratory experimentation. These areas have to some extent been explored in practice, but in many cases cannot be exploited with a clear and precise understanding of the interactions and results produced.

Music has long been recognized as a unifying and stimulating factor during physical exercise. This effect is shown in its crudest form in the cheerful setting-up exercises which come over the radio in the early morning hours. At a more elevated level we have classes in calisthenics, in dancing technique, and in social or folk dancing. The dancing masters of the Renaissance
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attempted to cultivate through the dance a graceful and easy carriage and a perfect command of the body. A recent technical bulletin of the War Department entitled Music in Reconditioning in ASF Convalescent and General Hospitals states concisely that "strongly accentuated rhythm in proper cadence, especially in music which is well known, definitely increases the work load limit in calisthenics. Because of this a greater number of exercises will be carried to completion when they are accompanied by properly timed and accentuated music."

The Greeks, with their instinct for artistic form, were able to combine the rhythmic movement of the dance with the practice of those movements necessary to the soldier. Military drill is a very precise rhythmic exercise frequently performed to a musical accompaniment. The Egyptians prepared their soldiers for war by special physical exercises and by a dramatic military dance. Maspero describes this regimen in some detail:

While still young they [the sons of present soldiers] were taken to the barracks, where they were taught not only the use of the bow, the battle-axe, the mace, the lance, and the shield, but were all instructed in such exercises as rendered the body supple and prepared them for maneuvering, jumping, and wrestling either with closed or open hand. They prepared themselves for battle by a regular war dance, pirouetting, leaping, and brandishing their bows and quivers in the air.28

The practices of primitive peoples furnish many other examples of the war dance.

At the time of the Renaissance military evolutions had the character of a spectacular dance. In the equestrian ballet and the military pageant all pretense of military utility had vanished. As armies learned to fight as units rather than as groups of individuals, drill was used as a means of subordinating the will of the individual to that of his commander. It is interesting to note that the interest taken in military music at the time of Louis XIV coincides with the development of what was, in

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many respects, the first modern army. As increased precision of mass movement assumed greater importance, military music became more necessary as a regulating force and as a means of generating martial spirit. This was a familiar conception in Roman times and one which re-emerges clearly with the development of the modern army. The relationship of rhythmic movement to physical conditioning, well known in ancient times, is utilized as an important element in modern military training programs.

The evolution from undisciplined hewing and hacking to a precise art of attack and defense characterized the evolution of fencing as a highly rhythmic art. The composers of music for operatic combats had little difficulty in arranging music for movements which already possessed certain characteristics of the dance. It was no accident that certain of the dancing-masters of the Renaissance were also teachers of fencing. Indeed, one fencer’s movement was actually adopted as a ballet step, the so-called pas de fleuret. The hygienic motive in the practice of fencing became important when the development of firearms had made the precise handling of sword or foil a largely ornamental art. What had been a matter of life and death, the indispensable accomplishment of the gentleman, became a healthful rhythmic exercise, a competitive sport.

Medical authorities believed that the dance could be a positive aid in treating certain disorders. Richard Browne deals at some length with the relative merits of riding and dancing, considered as physical exercise. He concludes that “Dancing excels in the Cure of the Spleen and Vapours, and melancholick Affection; in Agues, and in a suppression of the Catamenia.” An Italian authority, Dottore Giovanni Francesco Zulatti, who published in 1787 in Venice a book entitled Della forza della musica, devotes some space to a discussion of dancing as a therapeutic aid:
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Thus ... rapid and joyous dance music in general aids infirmities more than any other kind of harmony as may be seen from the adduced observations. Not only does the very joy which it stimulates destroy the sadness which in general accompanies melancholia, a sadness which tends to increase, but distraction and happiness are the greatest promoters and accelerators of a cure.30

It has been found that music is peculiarly adapted to the reestablishment of muscular coordination where this power has been diminished either as a result of mental shock or because of physical disability. “At Grasslands Hospital in Valhalla, New York, children in the polio wards take their exercises with music. Sometimes the exercises are done while the children sing little songs with dramatizations which call for clapping, waving or wiggling of the toes.”31

Music is unique among the activities which have been employed for therapeutic ends because it is its own metronome. An increase in coordination brings an automatic increase in musical and rhythmic satisfaction. The more precise the coordination, the better the result, and therefore the greater the pleasure for the performer up to the limit of his powers of perception and understanding. No doubt in most craft work the product will tend to be superior to the degree that the movements which produce it are precise and rhythmic. But in the handicrafts the finished product involves work over an appreciable time-interval. The satisfaction felt by the worker is more largely an end product. In music, on the other hand, satisfaction is continuous and the product, e.g., the performance of a Mozart minuet, may take only one or two minutes and its repetition no more. Improvement is therefore more easily noted and checked.

Olin Downes reported on the experiences of Corporal Ray Green, formerly instructor in music therapy and reconditioning at Fort Logan, Colorado, in the Sunday New York Times of October 21, 1945:
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A man whose nerve centers were anything but under control began at the piano and ended by performing in a very creditable way a Clementi sonatina, with greater advances in coordination. Another had learned a little succession of chords and a simple arpeggio formula which delighted him, and he was solicitous of memorizing exactly a series of chords that involved crossing his hands so that he would continue to improve his coordination after leaving the hospital.

A boy with a brace on his arm spent his first six weeks on Bach's C major prelude—the prelude to which Gounod later wrote the air of his famous Ave Maria. He played this piece on a public program. He felt that in doing so he had passed a milestone.

These examples make clear the unique suitability of music for restoring muscular coordination. Its rhythmic qualities stimulate a precise muscular response. At the same time, the subject enjoys a musical experience which is its own sufficient reward. For this purpose, instrumental performance is the ideal medium, since here the rhythmic responses which are latent in the listener are expressed by physical movements. Of all instruments the piano is probably the most suitable, since it is essentially rhythmic and percussive in nature and since the difficult problem of tone-production is reduced to a minimum.

Singing and the playing of instruments have often been recommended as healthful rhythmic exercises. We may contrast William Byrd's famous "Reasons . . . to persuade every one to learn to sing" with a brief directive from a recent army bulletin. Among the claims put forth by Byrd are the following: "... The exercise of singing is delightful to Nature & good to preserve the health of Man. It doth strengthen all the parts of the breast, & doth open the pipes. It is a singular good remedy for a stutting & stampering in the speech." In describing the use of a music workshop the army bulletin mentioned earlier remarks that "ward officers should avail themselves of the opportunity to prescribe exercises with instrument playing as a
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physical and occupational therapeutic modality for orthopedic, plastic and chest cases."

Music forms a medium for co-operative action at a level which is so simple and so free from the conflict of ideas and opposing interests which complicates community life that patients who cannot enjoy any other form of common action can still dance or sing together. Van de Wall describes mental patients with no social contact of any kind beyond the bare fact of being near each other who were finally able to join in a folk dance to their own considerable satisfaction. Thus we find the rhythm band used not only as a means for developing the rhythmic sense of children but also in hospitals and institutions where, in addition to the musical values, the participants have the satisfaction of contributing to a group effort. As a musical activity becomes more complex, the demands on individual skill and intelligence increase, but the feeling of "taking part" remains a constant factor. Choral singing, playing in chamber groups, band, or orchestra all demand individual co-operation of a very precise and intelligent kind and result in mutual satisfaction and in a group pride and loyalty which may be very intense.

Musical group activities present relatively few of the difficulties which are constantly present in other types of co-operative effort—the clash of antagonisms, the jockeying for competitive success. Music demands a subordination of the individual to the group, a merging of individual desires in a common effort. Deviations from this rule, such as lapses in rhythm or the inaccurate interpretation of time values, are reflected in a less successful or unsuccessful performance. Such differences will be obvious to musically endowed members of the group. Possibly more subtle slips from rhythmic virtue will be less clear or, indeed, not clear at all to unmusical participants. Conformity to this principle of subordination of self to the common musical good will, in most cases, bring an automatic
reward in the form of greater musical pleasure and greater satisfaction in group accomplishment.

Many individual experiences might be cited to show how a listener may be so completely absorbed in the movement of music as to lose for the moment all consciousness of self or of external surroundings. While such complete absorption in music is rare, probably most listeners who are sufficiently musical to enjoy attentive listening have moments of self-forgetfulness when they are most strongly attracted to music.

Abnormal mental states are frequently accompanied by an excessive interest in personal grievances, injustices, or troubles. Such self-centered individuals may find relief in listening to music if their musical capacity and memory span are sufficient to make listening pleasurable. At least during the time that music is heard, the center of attention shifts from self-contemplation to absorption in music or in the moods stimulated by music. Here again we do not know much more than the fact that music may cause such pleasurable states. We cannot control the appearance of these moods but must be satisfied to provide conditions favorable for their appearance. An extreme example of this power of music to absorb the attention of the individual is provided by experiments in which music was played to patients who submitted to operations performed with local anesthesia. Music was found to be efficacious in allaying anxiety and in distracting the attention of the patient. 34

In this chapter, however, we are not concerned with the total effect of music but rather with the effect of rhythm. We must therefore turn to examples which show that states of self-forgetful musical satisfaction may be produced largely by the movement and rhythm of music. Psychological experiments have demonstrated that rhythm is the important factor in the recognition of music. Composers have long been aware of this fact, and it is possible to point out many symphonic and operatic
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passages in which composers have expected an audience to recall a previously stated theme when its rhythm alone was played. A particularly good example occurs in Act I of Wagner's Die Walküre. Hunding enters his house as the orchestra announces his theme. He threatens Siegmund, who has taken shelter there, with death on the following morning. As Siegmund prepares to sleep, there is a shadowy and menacing recall of the Hunding theme, now reduced to a purely rhythmic drum figure.

It is not unreasonable to assume, therefore, that the rhythmic element plays an important and sometimes dominant part in the pleasure taken in music and in the intense concentration which is the result of attentive and interested listening. It may further be assumed that the rhythmic factor is more important in proportion as the listener is inexperienced or lacking in musical capacity. We know that such listeners generally prefer rapid and rhythmic music, "something with some life to it," to slower and more lyric selections. Everyday experience gives abundant indication of this. As the musical endowment or the experience of the listener increases, the other factors, melody, harmony, tone color assume an increased importance. Such considerations are of obvious importance to those who employ music for listening, whether for therapeutic or for purely recreational ends.

It is also possible to show in a more definite fashion that the listener may on occasion concentrate on the rhythmic factor. Such situations will occur when actual rhythmic bodily movement is imagined or is actually present. We may experience this at three levels. At the first level, where the subject is himself the dancer, we have already shown that absorption in the dance may reach the point of self-hypnosis. Even in social dancing it is probable that the phrase "the intoxication of the dance," so often employed in one form or another, is more than a conventional expression. Admittedly the elements of social pleasure, flirtation or courtship, pleasurable surroundings, and many other
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factors reinforce the rhythmic factor. Nevertheless, rhythm, together with its expression in rhythmic motion, makes the dance what it is. At the second level, the creator of dances may be completely absorbed in imagining rhythmic movement. No documents show this more clearly than the autobiography of Isadora Duncan. In a particularly striking passage she speaks of the images which filled her imagination:

I so ardently hoped to create an orchestra of dancers that, in my imagination, they already existed, and in the golden lights of the stage I saw the white supple forms of my companions; sinewy arms, tossing heads, vibrant bodies, swift limbs environed me.35

Finally, the part which rhythm plays at the third level in the satisfactions which the spectator or auditor derives when he is neither participant nor creator is less tangible though not less important. Here the evidence derived from the dance itself seems less important because the pleasure experienced by the spectator is complex in nature. The physical beauty of the dancer, literary and dramatic elements suggested by costume, accessories, or story, all play their part in addition to the movement of the music and the rhythmic response of the dancer. Nevertheless, the muscular responses of the listener and their emotional concomitants obviously form an important part of the audience reaction both to music and to the dance. Data derived from tests of audience reaction to music, like those conducted by Esther L. Gatewood, suggest the importance of rhythm in determining audience response.36

It would seem, therefore, that the vital fact concerning music is the emotional reaction of the listener and his intense preoccupation with the music. This will probably remain the crucial point both in music and in its application in music therapy. In this emotional reaction, rhythm clearly plays an important role; but much more scientific study is needed to determine more exactly just what this role is.
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NOTES

1 I Samuel, 16.
2 See for example Heinrich Möller, ed., Griechische, Albanische und Rumänische Volkslieder, pp. 10 and 14, for Greek folksongs in \( \frac{7}{8} \) meter.
3 Albert R. Chandler, Beauty and Human Nature (New York, 1934) 262. Chandler uses the phrase in a discussion of poetic meter, but it is equally applicable to music.
4 For example, the "Tafelmusik" of G. Ph. Teleman.
5 John Milton, Tractate on Education.
7 In Act 1, Scene 2, the music-master says in part: "Without music, a state could not exist. . . . Does not war come from a lack of harmony between men? . . . And, if all men studied music, would that not be a way of coming to an accord and of witnessing universal peace in the world?"
8 Athenaeus, Deipnosophistae XIV, 624b.
9 Aristotle, Politics, VIII, 7 (Jowett translation).
10 Jean Denis, Traité de l'épinette (Paris, 1650) 24.
11 I owe this formula, which is sung in the New York area, to two of my students, Alice Quen and Rita Schwartz.
13 Homer, Odyssey 19. 457.
14 Plato, Charmides, 8.
15 Plautus, Miles gloriosus, act 3, scene 1, line 96.
16 Cato the Elder, De agricultura, ch. 160, p. 46 in the translation by "A Virginia Farmer" (Fairfax Harrison), published under the title Roman Farm Management (New York, 1913).
17 Pliny the Elder, Natural History, XXVIII, 3 and 4.
18 Macrobius, Comm. in somniun Scipionis II, 3. 9.
19 Combarieu, op. cit. 87. This charm appears to be meaningless or deliberately obscure. Jakob Grimm interpreted it as "ancient celtic." Combarieu claims that bregan is Midi patois.
20 Charles L. Edwards, Bahama Songs and Stories (American Folklore Society, Boston, 1895) vol. 3.
22 Quoted in Lincoln Kirstein, Dance (New York, 1935) 89.
23 Ibid.

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30 G. F. Zulatti, *Della forza della musica* (Venice, 1787) 44.

31 Margaret Winslow Fowler, “Music as Medicine,” *Coronet* 19 (Jan. 1946) 142.

32 William Byrd, an English composer of the Elizabethan period famous alike for madrigals, church music, and instrumental compositions, prefaced these “Reasons” to his *Psalmes Sonets & songs of Sadnes and pietie* (London, 1588).


34 Edward Podolsky, M.D., *The Doctor Prescribes Music* (New York, 1939) ch. VI.

35 Kirstein, *op. cit.* 269.

Chapter Seven

Medical Men Who Have Loved Music

FIELDING H. GARRISON*

Of music, the mathematician LaGrange observed: "Je l'aime parce qu'elle m'isole." He frequently did some of his best work during music. But that was in the 18th century.

If a physician, particularly a modern physician, has cared for music at all, at least to the extent of becoming a proficient performer upon some instrument, or an amateur composer, it is usually at the expense of what little leisure he has. He may be what the Spaniards style an aficionado, frequenting concerts with the same enthusiasm that tourists at San Sebastian display in following the toreo or the virtuosity of some toreador. If dragged by his wife to musical functions, as a lamb to the slaughter, he may sit them out "in sad civility," his professional sagacity saving him from the affectations of Balzac's critic, who "applauded in the wrong place, blew his nose during the cavatina, and was ever on the lookout to appropriate the sayings of

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witty men”; or he may be frankly and blankly indifferent, like the character in Turgenieff’s story, who said: “If music affects us deeply, it is injurious; if it does not affect us at all, it is tiresome.” The doctor of today is a busy man; if he is to succeed in his profession he is apt to be an overworked man, like all professionals or industrials in modern life, with little of the large leisure which people enjoyed in the 18th century or in other ages gone by. His hobbies, as a rule, are likely to be of some literary or technical kind more intimately related to the details of his profession.

Until recent times, moreover, or at least outside the Germanic countries, music and the musician did not enjoy the tolerance and esteem which we know of today. In antiquity, the “godlike minstrel” of Homer, the long-haired musician (crinitus Iopas) of Virgil, the gleeman of the Saxons, the Celtic and German bards with their rhapsodies (the barditus of Tacitus) were familiar figures in the halls and courtyards of the great. Greek music, with its tetrachord and enharmonics, its Doric, Phrygian and Lydian modes, its double flutes, its strains of psaltery, cymbals and syrinx, was intimately connected with the rhythmic and structural origins of lyric and dramatic poetry, the meters of which were actually stamped on the ground, dance-wise, by Pindar and Sophocles, as they chanted their sublime numbers. The old pentatonic scale of Scotland and Ireland, which gives this music its peculiar, quaint monotony, points to the primitive five-toned instruments of the ancient Celtic bards. In the 16th, 17th, and 18th centuries, the spinet (virginals), the harp, and the harpsichord were much in the hands of the ladies. The contra-bass, the old “hoss-fiddle” of New England and the Protestant countries, was affected by the sterner sex as affording the ground-bass to psalmody. “Have you played over all your old lessons o’ the virginals?” says the goldsmith’s wife to her daughter in Middleton’s comedy; and one recalls the scene in the house of the Lord Advocate of Scotland,
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where the arch Barbara Grant, at the spinet, puts David Balfour through his paces:

Hae nae I just got the lilt of it?
Was nae this the tune that ye whistled?

I am Miss Grant, sib to the Advocate,
You, I believe, are Dauvit Balfour.

But by this time the musician, like the actor and the surgeon, had become a déclassé, almost an outcast. In the 17th century Puritanism began its imprisonment of the human spirit for three solid centuries; and, in the middle of the 18th century, as humorously documented by Oliver Goldsmith in the episode of Mrs. Tibbs, snobbery, the mean admiration of mean things, arose, and the composer or virtuoso, while tolerated, came to be looked on as a half-menial, who, like the needy parson, might well sit below the salt. Church congregations might marvel at Bach’s organ fantasies upon a figured bass, but Bach himself lived in comparative obscurity. As Runciman says, “He hardly cared to claim social equality with the citizens who tanned hides or slaughtered pigs; and probably the high personages who trimmed the local Serene Highness’s toenails scarcely knew of his existence.” Mozart, divine child of genius, was snubbed, insulted and allowed to starve by his patrons, who addressed him in the third person singular, and was once kicked down stairs by an archbishop’s lackey. Emerson tells us in English Traits that “when Julia Grisi and Mario sang at the houses of the Duke of Wellington and other grandees, a ribbon was stretched between the singer and the company.” Hans von Bülow, Theodore Thomas, and others are said to have interrupted musical performances until the talking ceased. Arthur Nikisch once declined to conduct at a private residence at which his players were instructed to enter by the servants’ door below stairs. To the noble patron in George Moore’s novel, the idea of a professional musician connotes “long hair and dirty hands.”
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The epigram of the poet-composer, Peter Cornelius, summarizes the general bourgeois feeling, that a musician, as Major Pendennis once observed of the family doctor, is not a good parti for the daughter of a thrifty Paterfamilias:

Sie sind als Mensch mir ganz scharmant,
Mir angenehm durchaus;
Doch sind Sie nur ein Musikant!
Darum, Hinaus! Hinaus!
War'n Sie Assessor, Rat in spe,
Das säh noch anders aus,
Doch Musikant—O jemine!
Hinaus! Hinaus! Hinaus!

In John Galsworthy’s novel Beyond the relation of the professional musician to married life is worked out in detail. The book’s remorseless realism is evidence of the distance we have traveled since the romantic days of “Charles Auchester” and the sugar-candy fables of Elise Polko. The whole episode of Gyp’s unhappy marriage with the sensual violinist Fiorsen brings to focus a world-old problem. The artist, particularly the musical and dramatic artist, is not well fitted for the married state. It is sometimes of the essence of his being that he should be mobile and changeable rather than stable, wild and temperamental rather than staid and reliable, while for the young girl, carefully brought up, the French proverb still remains true: Une demoiselle n’est pas une grisette. In other words, artists, if they must mate at all, usually mate best in their own class and kind. But this is a kind of biologic law which applies to all classes and grades of human society; and, other things being equal, it would be difficult to predict that the morals of a given musician might be worse than the morals of a given greengrocer.

It seems strange to read, at this time of day, in the biographic memoirs of the eminent clinician, Henry Ingersoll Bowditch, that his father, Nathaniel Bowditch, a celebrated mathema-
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tician, who had translated La Place, actually “gave up playing
the flute because at one time it brought him in contact with
companions whom he thought undesirable in their morals,
and in consequence of which he denied the study of music to
his children.” ¹ This parochial spirit, an effect of what Presi-
dent Eliot defines as “the Puritan, Genevan, Scotch Presby-
terian and Quaker disdain for the fine arts,” has been happily
obliterated in our own time. Dr. Bowditch, at any rate, did not
allow his father’s prejudices to interfere with this part of his
life.

I could not [he says] stamp out the intense love of music which at
my birth was implanted in me. I whistled as a child early, and at all
times. My earliest impressions were of the notes I produced; they
came as freely as they came from the bobolink who, dancing on the
dry mullein stalk, warbles forth his rich notes in our spring days. I
rejoiced in my tones as much as the lark does in his, as he “ascends
toward heaven’s gate.” My loving mother, being a pious woman,
would sometimes say, as I think now, in despair, “Do for the land’s
sake (she did not like to say Lord), Henry, stop whistling.” My
father would launch poetry at me, and cry: “He whistled as he went,
for want of thought.” Ah, no! How much was he mistaken, for some
of the sweetest, divinest thoughts have come to me all my life
through music, although incapable of playing at any time or upon
any instrument. How shall I ever forget the scornful look which
father gave me on one occasion when, fascinated by the music of the
Salem Infantry Company (I presume it was the Light Infantry, for
surely even I, a little fellow, could never have followed the Re-
publican (Democratic) Cadets of that Day), I followed closely,
marching with the soldiers up the main street in Salem, and expect-
ing of course that they would turn down Federal or Chestnut streets,
and bring me home in time for dinner. I followed them a little way
up along the turnpike, still hoping for their return. Finally, as I sub-
sequently found, they were going to Lynnfield Hotel to have a “good
time.” I returned disconsolate, and was met with shocked looks from
all. My father seemed to look upon me as contemptible. Alackaday!
What troubles music had brought upon me! Nevertheless, I loved
it; and though it became a part of my conscience even not to learn

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on any instrument, I still whistled. I entered college and soon was thrown in contact with my lifelong dear friend, Rev. Mr. Paddidge, of Pepperell, Mass. He played divinely, I thought, on the flute; and we had frequent “duets” at the open window-seat in old Hollis during my junior year, I whistling the “first” and he playing “second” to it. Such dulcet tones attracted the attention of Robert C. Winthrop, a classmate, president of the Pierian Sodality; and being in want of some bass instrument to play on in that body, proposed to me to try the bassoon. What should I do? Conscience said “Nay.” Love of music said, more strongly, “Take up the offer.” And so, braving my father’s chiding and instructions, I plunged in medias res. Imagine me then, not knowing a single musical note, seated in my low-studded room in the upper story of Hollis; but Phoebus! what notes I brought out! “Whoop!” “whoop!” and “whoop!” again, without variation, was all that I could accomplish. I must say that I was thoroughly disgusted with myself and with all mankind about me; and the next day I politely returned the bassoon to Winthrop, declined the honor of membership to the classic Pierian Sodality, and decided that I was too old to begin then to try to learn new tricks. But music has been all my life long my delight and my inspiration. I have listened (while standing three and a quarter hours in the Sistine Chapel) to the “Miserere,” and was almost persuaded thereby to become a Catholic. Under the magnificent and grand arches of Westminster I have been thrilled by the magnificent anthem, “His Body Is Buried in Peace; His Name Liveth Forevermore,” as it was sung before thousands of the great men and women of England, gathered there at the reinterment of the bones of John Hunter, one of the noblest of men, and whose name will float down the centuries as one of the grandest and ever-to-be-remembered disciples of our medical profession.

Thus, gentlemen, I have sketched the trials of my youth; and I compare them with what occurs now. Music is not now necessarily or commonly connected with drunkenness. Music can be the delight of every family, for every child now learns music as a part of the primary education.

Before closing, let me allude to two persons whose influence has been for the last quarter of a century leading up to this blessed result. I allude to John S. Dwight, who, by his “Journal of Music,” and his very able and always generous criticism, has upheld the divine
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effect of music on the human mind and heart; and to Henry L. Higginson, who, by his noble generosity, has sustained for so many years the Symphony Concerts, which have in reality educated the present generation to a high appreciation of all that is beautiful and noble in orchestral music.

Dr. Bowditch's wife was a talented singer and performer on the piano and harp, sometimes accompanying the fine voices of her sons on these instruments. Of her playing, he wrote:

Olivia is just playing that most magnificent Funeral March by Beethoven, on the death of a hero. It is one of the times that say to me there is something divine in man. Olivia plays it to my taste exactly. I would like to hear its noble strains at the hour of death. They would give what Herder asked for when dying—noble, great thoughts.²

Perhaps the earliest of the great European physicians to follow music as a pleasure or hobby was Felix Platter (1536-1614), of Basel, who made a large collection of instruments, which still exists, played three or four of them, was an accomplished lutanist, and, in his youth, employed his talents in serenading his sweetheart. In the 17th century came the learned Jesuit priest, Athanasius Kircher (1602-80), of the old medieval town of Fulda, who was not only a medical man, but an accomplished mathematician, physicist, optician, microscopist, and Orientalist. He was probably the first physician to employ the microscope in investigating the minute organisms causing disease, described "tarantism," and made a notable contribution to ethnography in his splendidly illustrated book on China (La Chine illustree, Amsterdam, 1670), one of the important texts of "sinology." In 1640, he published at Rome his Musurgia universalis sive Ars magna consoni et dissoni in x. libros digesta, a huge folio of some 1,200 pages, which is a vast summary of all that was known of the theory of music in his time, including the anatomy and physiology of the ear and the throat in man and animals, descriptions and cuts of the different musical instruments, the science of harmony, the physics of the Pytha-
gorean monochord, symphoniurgy or the art of composing melodies, a history of Greek and later music, a long account of chromatics and enharmonics, the theory of time and rhythms in music, in which the rhythms of the Greek, Hebrew, and other poets are considered, canon and the art of writing for different instruments. It contains notations of the songs of different birds and the sounds of animals, well-executed full-page plates representing various musical instruments, and strange specimens of ecclesiastical and other music of Kircher's time. This work was written at Rome, where Kircher was in residence after 1637, and where, in his museum or "Kircherianum," many of the musical instruments described by him were no doubt to be seen. Kircher also wrote a *Phonurgia nova* (Kempton, 1673). That the learned and versatile priest must have been a performer upon some instrument himself, possibly an organist, may be inferred from the *canzone* by Pompeo Colonna, Prince di Gallicano, which follows the dedication of the *Musurgia* to Leopold, Archduke of Austria:

Signor tu, che fra bellici strumenti,
Per fare le cure al tuo scettro men gravi,
Ti volgi ad ascoltar voci soavi,
Ed empi il cor di musici concenti.

E forte in un mostrando, e mansueto,
Il nobil seno in simili diletti,
Fai, ch'in te riconoscano i soggetti
D'Amore, e timor misto un giogo lieto.

Ben e ragion, che se di music'arte
ATANASIO eggi mai spiega l'ampiezza,
Al nome tuo, che tanto'l mondo apprezza,
Suo profondo saper sacri le Carte.

Se'l seguace d'Ippocrate, e Galeno,
Nel suo curar la musica intendesse:
E coi suoi studi investigar sapesse
Le varie note di Natura appieno:
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S'avvederia con nostri minor danni,
Che non si tolgon da contrarij i mali,
Ma quelle consonanze naturali
C'ha'l rimedio col mal vedria cogli Anni.

In 1679, the Danish physician Caspar Bartholinus (1655-1738), son of the famous anatomist, published De tibiis veterum, a study of the double-flutes of Greece, from which the clarinet, the basset horn, the oboe, the English horn, and other woodwind instruments are derived.

In the 18th century, Hermann Boerhaave (1668-1738) of Leyden, one of the great medical teachers and theorists of his time, was perhaps the first physician on record to cultivate chamber music at his house.

Dr. William Burton says, in his Life of Boerhaave (1746):

His application to study was greater in the last ten years of his life than in any space of equal duration from the year 1700. When business was over, he took the exercise of riding or walking, and when weary, revived himself with music, his most delightful entertainment, being not only a good performer on several instruments, particularly the lute, which he accompanied also with his voice, but a good theorist likewise in the science, having read the ancient and best modern authors on the subject, as appears by the lectures he gave on sound and hearing, and during the winter he had once a week a concert at his own home, to which by turns were invited some select acquaintances of both sexes, and likewise patients of distinction from other countries.

Leopold Auenbrugger (1722-1809) of Vienna, the discoverer of percussion of the chest in diagnosis, wrote the libretto for The Chimney-Sweep (Der Rauchfangkehrer), an opera of Salieri's, which was a great favorite with Maria Theresa. Beethoven often visited the house of Johann Peter Frank (1745-1821), the founder of modern public hygiene. In England, John Arbuthnot (1667-1735), friend and medical adviser of the poet Pope, was a composer of sacred anthems, and one of these, As pants the heart, is in the collection of the Chapel Royal. To
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him his colleague Mead jestingly said: "I look to you, Arbuthnot, to preserve harmony amongst us." In 1749, Richard Brocklesby (1722-97), one of the founders of military hygiene, published an anonymous treatise recommending music for the cure of diseases. The theme is as ancient as music itself—witness the familiar passages in Homer, Shakespeare, Dryden’s Alexander’s Feast, and St. Cecilia. The medical literature of the subject is extensive. William Withering (1741-99), a Birmingham practitioner who introduced the use of digitalis in heart disease, devoted his leisure hours to the flute and harpsichord, and Edward Jenner (1749-1823) played both the violin and the flute. Anne Hunter, the wife of the great Scotch surgeon who was Jenner’s preceptor, was a patron of music, and wrote the words for Haydn's Creation and for his charming canzonet, My mother bids me bind my hair. But John Hunter himself had no taste or liking for music, as the well-known anecdote makes plain:

On returning home late one evening, after a hard day's fag, Hunter unexpectedly found his drawing room filled with musical professors, connoisseurs, and other idlers, whom Mrs. Hunter had assembled. He was greatly irritated, and walking straight into the room, addressed the astonished guests pretty much in the following strain: "I knew nothing of this kick-up, and I ought to have been informed of it beforehand; but as I am now returned home to study, I hope the present company will retire." This intimation was of course speedily followed by an exspect omnes.

In considering the many physicians who have been amateurs of music in modern times, it seems an outstanding fact that most of them have been in the class distinguished for original work in the exact sciences upon which medicine is based. The great physiologists, in particular, Helmholtz, Ludwig, Engelmann, and others, have been famous as musical enthusiasts. Physiology, as Leonardo da Vinci surmised, is, in the last analysis, a mathematical science. We should not think much of a
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bank clerk, a musician or a physiologist who could not count. There seems a logical relation between pure mathematics and its musical analogues, harmony, counterpoint, and the art of fugue. Saint-Saëns has written very capable papers on astronomy. The thought of the mathematician, Joseph Sylvester, seems apposite:

Herein I think one clearly discerns the internal ground of coincidence of parallelism, which observation has long made familiar, between the mathematical and musical. May not Music be described as the Mathematic of sense, Mathematic as Music of the reason? the soul of each the same! Thus the musician feels Mathematic, the mathematician thinks Music—Music the dream, Mathematic the working life—each to receive its consummation from the other when the human intelligence, elevated to its perfect type, shall shine forth glorified in some future Mozart-Dirichlet or Beethoven-Gauss—a union already not indistinctly foreshadowed in the genius and labors of a Helmholtz! ³

Helmholtz, the greatest mathematical physicist, who was also a medical man, is, in fact, the most prominent of the group of physiologists who have followed music. He was not only a performer and learned connoisseur of music and musical literature, but he was the founder of musical aesthetics as a science, the author of the most exhaustive treatise on the physiological basis of tonal sensations which has ever been achieved. Musicians themselves, as we know, care little about the scientific import of these things, and their aesthetic contributions have been almost entirely of the literary and artistic kind.

Why an octave or a fifth should be more satisfying to the ear than a minor third; why certain chords had a character of their own; what was the physiologic basis of discords; what was the true nature of beats; what was the physiologic significance of the progression of the notes in a melody; what were the physiologic laws, if any, that regulated the development of musical capacity in the human race; all these were questions the musicians cared little about, and if they did allow them to occupy their attention they were dismissed as insoluble. Men took refuge in the notion that music was music because it
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was adapted to our spiritual nature, and they thought there was little use in endeavoring to examine the physical and physiologic materials of which musical tones were composed.  

Helmholtz began to study these things in the fifties, his papers on the physical basis of harmony and dissonance, the theory of open organ pipes, musical temperature, timbre (Klangfarbe), the Arabian and Persian scales, etc. culminating, in 1863, in his great work on Tonempfindungen or tonal sensations. This work, as is well known, was divided into three parts, of which the first explains the physiologic mechanism of the ear and the way in which sound vibrations and overtones are conducted through the ear to the auditory nerve, the second treats of the effect upon the nerve itself of tones and combinations of tones, and the third deals with the psychology of musical aesthetics and the origin of the different scales or modes and harmonies. He divides the historic evolution of music into three periods, viz., the homophonic or univocal music of antiquity and of primitive and Asiatic peoples; the polyphonic or multivocal music of the Middle Ages, and the harmonic music which arose in the 16th century and has been prominent in Europe since the time of Bach. These divisions have been used by historians of music to date, and it seems significant that the feudal spirit of the Middle Ages should be typified by massive polyphony, the struggle for freedom of thought in the 16th and 17th centuries by a recognition of the value of melody as well as of thorough bass, and the industrial democratic movement of modern times by the use of the folk song by Haydn and Beethoven, and the extension, by Wagner and Brahms, of the Greek melos, in which the figurations of the accompaniment are sometimes an essential part of the continuous melody.

All his life Helmholtz was an ardent concert-goer and could have been an able critic of music. He was highly appreciative of the admirable performances at the Paris Conservatoire:
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At the concert at the Conservatoire we had a Symphony by Haydn, a piece from Beethoven's Ballet of Prometheus, and the whole of the music from the Midsummer Night's Dream, as well as a chorus of Bach, and Händel's Hallelujah Chorus. One hears better choral singing in Germany, but the perfection of the orchestra is unique of its kind. The oboes in Haydn's Symphony sounded like a gentle zephyr; everything was in perfect tune, including the high opening chords of the Mendelssohn Overture, which was repeated at the end, and generally sound out of tune. The Prometheus was the most enchanting melody, with the horns predominating. This concert, after the Venus of Milo, was the second thing of purest beauty that life can give.5

Professor McKendrick, of Glasgow, gives the following impression of Helmholtz at a concert:

The first time the writer saw him was in 1872, in the Gewandhaus, in Leipzig, during a performance of Mendelssohn's "Midsummer Night's Dream." Near the orchestra he saw a head of such splendid proportions, with the eyes having a rapt expression, as the sensuous music floated through the hall, and he thought "that must be Helmholtz!" It could be no other. A few days later he saw the great physicist in his own laboratory, and received kindly advice regarding the ophthalmometer and acoustical apparatus.

Among the great physiologists who have followed music, the most eminent name after that of Helmholtz is Carl Ludwig of Leipzig, who had over two hundred prominent pupils, most of whom have been the leading teachers of his subject in our own time. One of these pupils refers to his "enchanting personality." He was in fact one of the most attractive of university professors. In relation to music, his role was mainly appreciative, but he followed the Gewandhaus concerts and had chamber music at his house. As his pupil von Kries relates:

As a great friend of music he was a constant visitor of the many concerts with which Leipzig abounds, particularly those at the Gewandhaus. But he loved to assemble musical talent at his own home, where he was a thankful and intelligent listener. . . . When the new Gewandhaus at Leipzig was erected and the decorative frescoes
of the concert hall completed, he said to me, with indignation, that if these remained, he would attend the concerts no more. With such paintings in sight, musical enjoyment would be unthinkable. But he did not mean this, and, in any case, reconsidered his decision.6

Among the other eminent German professors, Theodor Wilhelm Engelmann, whose name will always be associated with Gaskell’s in the physiology of heart muscle, was a friend of Brahms, and to him Brahms dedicated his charming string quartet in B flat. Ludimar Hermann, Julius Jacobson (the friend of Graefe), Wilhelm Ebstein, and Karl Kahlbaum, the psychiatrist, were all musical, sometimes giving concerts at home. The histologist Henle learned to play the violin, viola, and violoncello, so that he could take any part at need in an improvised string quartet. Mikulicz and Neisser were accomplished musicians and Clavierspieler, and in their youth had thought of becoming professional musicians. Max Schultze was a good violinist. Wilhelm His identified the remains of Bach when they were resurrected in the yard of the Joanniskirche at Leipzig and had the sculptor Seffner make a bust of the great composer from his measurements, which turned out to be an admirable likeness. Naunyn, the eminent clinician at Strasbourg, overcame through his attractive chamber music evenings a good deal of the prejudice which obtained among the Alsatian population on account of his austere demeanor; these evenings came to be important social functions in the city. His wife was a talented singer. Julius Jensen, the alienist, also had a talented wife and was often seen with Notenhefte under his arms at concerts. Duke Karl Theodor of Bavaria, who became a well-known ophthalmologist, was musical and played in the orchestra. Alfred de Bary, an assistant of Flechsig at Leipzig, was at once a professor of psychiatry and a prominent tenor at Bayreuth and Munich. Borodin, one of the composers of Prince Igor, was once a Russian army surgeon.
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In England, Sir Richard Owen was a talented player on the violoncello. His biographer relates:

He was never tired of listening to his favorite compositions, although as he grew older his taste in music became much narrower, and he could only listen with pleasure to the music admitted to be “classical” in his younger days. Wagner, Grieg, and more modern composers were to his mind “intolerable and not to be endured.” The keys of his little old-fashioned piano had been touched by many of his musical friends—Moscheles, John Ella, and Halle, and had served many a time to accompany Jenny Lind and his own famous ’cello by Forster.

Sir Robert Christison (1797-1882) of Edinburgh, who wrote the first treatise on toxicology in English, although self-taught in music was a good bass singer. We read in his memoirs:

As a singer, both as a soloist and in part-songs, Sir Robert took a high place among the amateur musicians of Edinburgh. He was gifted with a bass voice of unusual power and good quality; and although he never had time to take lessons, constant practice in quartet singing and in small musical societies brought his voice to some degree of cultivation. He had only the most cursory knowledge of the science of music and used to quote, as a signal proof of the low condition of music in Edinburgh thirty years ago, that people regarded him as an authority on music simply because he was rather prominent as a singer in society. Nevertheless, music in Edinburgh owed a great deal to him, as he was one of the first amateurs to disregard and oppose the absurd remnant of Puritanism which caused the cultivation of secular music by societies or clubs to be considered as a somewhat dangerous accomplishment, allied to dissipation. When a number of young men, with some hesitation, met together about thirty-five years ago to form one of the first choral societies in Edinburgh, Sir Robert encouraged them by his presence, and congratulated them on the changed state of opinion which enabled them thus to come forward, contrasting it with the stricter notions prevalent in his youth, when no attempt of the kind could have been ventured on.

We are indebted to Dr. Peddie for the following notice of the musical doings in which Sir Robert took a part. “Dr. Christison, Dr.
Bennett, Dr. Macaghan, and myself were among the first gentlemen amateur vocalists who ventured to perform publicly in Edinburgh. We had sung much together, and were known as the singing doctors, at parties, and at dinners of the Harveian Society and of the Colleges of Physicians and Surgeons; but it was not till the 20th December, 1851, that we performed in public, at a concert in the original St. Cecilia’s Hall, under the patronage of Lord and Lady Murray, for the benefit of the widow of Mr. Mainzer, when about £70 were raised for her. Dr. Christison, Dr. Macagan, myself, and Mr. John Christison appeared as glee and quartette singers in the Music Hall for the first time on the 27th March, 1863, at a concert for the benefit of the Edinburgh Artisan Rifle Companies. This public appearance of professional men as amateur singers made some sensation at the time. We performed subsequently at several of the annual concerts of the University Musical Society. Dr. Christison was one of the most active and enthusiastic members of the Amateur Vocal Club, from its formation at Dr. Bennett’s house on 19 April, 1852, till the final meeting in 1876.”

Sir Robert’s voice retained much of its power and quality till he was past seventy, and he did not give up taking an occasional share in part-singing for several years afterwards. The last occasion on which he joined in anything of the kind was on the eighty-third anniversary of his birth, when he took the bass part of Bishop’s well-known glee, “Mynheer Van Dunck.”

On three occasions, Christison was asked by the authorities to exercise the right of patronage in filling the vacated Chair of Music in the University of Edinburgh. In making a crossing from Brighton to Dieppe in his early days, he found that his traveling companions—two English and two Irish doctors and Schetky, a drawing master of the Portsmouth Naval Academy—were musical, so that he was able to improvise a nautical concert:

We had not been long together when we discovered that we were a fortuitous congregation of musical atoms, which soon arranged themselves in harmony. Schetky played excellently Turner’s violoncello, Corban played the violin fairly, Crawford the flute well; and Schetky, Turner, and I found no end of trios for tenor, counter-tenor
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and bass. Time passed thus very agreeably in spite of baffling breezes, to the high approbation of the ship's company and the steerage passengers, and under the frequent applause of the many vessels which we passed near enough to be within hearing. But, if the whole truth must be told, the harmony of sweet sounds was apt to be frequently and abruptly interrupted by the nautical qualms of Turner and Crawford; and we had the ill-luck, in our fat mate's estimation, to stir up the storm of the 5th in Yarmouth roadstead.9

In America, the early history of private and even public interest in music is obscure. Mr. O. G. Sonneck, the learned Chief of the Division of Music in the Library of Congress (1902-1917), has shown that the earliest ascertainable date of a public concert in the country was that advertised in the Boston Weekly News Letter of December 16-23, 1731, the next in order of time being the announcement in the South Carolina Gazette for Saturday, April 8-15, 1732. After the date of this Charleston concert, there are abundant records of public performances at Charleston, Annapolis, Baltimore, Williamsburg, Fredericksburg, Petersburg, Norfolk, Richmond, Alexandria, Savannah, New Orleans, Philadelphia, New York, Boston, Salem, Newport, Providence, Hartford, and other New England cities. The St. Cecilia Society of Charleston, South Carolina, was originally founded in 1762 as a serious musical club, but after 150 years of continuous existence it became an exclusive association of Charleston's old first families, devoted to assembly balls and other social functions. The musical societies of Stoughton (1786), Concord (1797), and Essex (1797), Massachusetts, followed, and on January 24, 1735, the theatrical season began at Charleston, with the performance, at the courtroom, of Otway's Orphan; this was followed on February 18 by our first operatic performance, Flora, or Hob in the Well, tickets of admission to the courtroom costing 40 shillings each.

In these valuable records of early concert life and early opera in America, which are due to the patriotic zeal and erudition of
Mr. Sonneck, we find no note of the participation of physicians, although the colonial group of South Carolina physicians is, according to Dr. Welch, the most brilliant in our early medical history. That some of these at least may have solaced their leisure hours with flute, violin or harpsichord, like Withering or Jenner in Old England, would seem a natural inference. The Pierian Sodality of Harvard University, a gathering of students for mutual improvement in instrumental music, was founded on March 6, 1808. For a number of years, it had from three to fifteen performers, who sometimes serenaded the inhabitants of Cambridge. In 1832 there was only one member, but in 1880 there were more than forty; in 1881 the Sodality fused with the Harvard Glee Club and gave concerts, and in 1885, it was pronounced by the Boston Herald to be “foremost among amateur organizations of the land.” Independent of the Glee Club during 1898-1904, and tutored by a professional coach, it began to take up the higher forms of music, including the symphonic, about 1907-13. Dr. John W. Farlow, librarian of the Boston Medical Library, played the piano parts with the Pierian Sodality in 1873. The late Dr. James Brown McCaw (1823-1906), of Richmond, Virginia, who founded the famous Chimborazo Hospital and edited the short-lived Confederated States Medical and Surgical Journal (1864-65) and whose son, General Walter D. McCaw, became librarian of the Surgeon General’s Office, was for many years president of the Mozart Society of Richmond. This isolated record, at the South, like that of Bowditch at the North, may be typical or exceptional. In most “German-American” families music became a household word. Some American physicians and biologists of German descent, such as Drs. Christian A. Herter, Jacques Loeb, Arpad G. Gerster, John C. Hemmeter (composer of Hygieia, dedicated to Professor William H. Welch), Sidney Kuh, D’Orsay Hecht, Otto Juettnner and Gustav Langmann have been capable performers, or even composers.
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Of all medical men who have loved music, the most interesting is Billroth; of all relations between Minerva Medica and Frau Musica, between Polyhymnia and the daughters of Aesculapius, the most alluring is to be found in the musical friendship and epistolary correspondence of Billroth and Brahms. Brahms, the stocky, sturdy, blond Hamburger, who delighted that his picture was given in German school geographies as a representative of the Aryan race, now gruff and repelling, now exquisitely sensitive and tenderhearted, now sarcastic and burschikos, now charitable in the most stealthy, modest way, incomparably the strongest and worthiest figure in modern German art; Billroth, the stalwart Viking of the North Seas, pioneer of the surgery of the larynx and digestive tract, and greatest German surgeon of his time, grandson of a famous soprano, sensitive and melancholy underneath his calm exterior, a dreamer and a philosopher, a musician and a poet in his natural instincts, a "sentimental North Sea herring," as he wittily styled himself—these two met at Vienna in the sixties to found something more than a lifelong friendship, indeed a sort of musical brotherhood.

At this time, Brahms was conductor of the Singakademie; in 1872-74, he was directing the concerts of the Gesellschaft der Musikfreunde, and Edward Hanslick, of Prague, whose essays have the literary charm of Schumann or Liszt, was beginning to make his mark in musical criticism. Brahms, Hanslick, and Billroth formed a sort of artistic triumvirate. They were frankly anti-Wagnerian, devoted to the older classical trend of Bach, Beethoven, Haydn, and Mozart, and the romantic trend of Schubert, Weber, Schumann, and Mendelssohn, which are combined in the music of Brahms. Of this friendship, Billroth's Briefe, published after his death in 1895, are a fascinating memorial. I translate most of the passages relating to music below. The first letter in the collection, addressed to Billroth's mother in February, 1850, is an enthusiastic rhapsody of fourteen pages.
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on the singing of Jenny Lind in Götttingen, the wholehearted self-surrender of a youth of one and twenty. The first letter to Brahms is dated from Zurich, May 17, 1866, the last (January 12, 1894) from Abbazia, where Billroth died on February 6, 1894. In this unique musical correspondence, which ranks with the Schumann letters or the Wagner-Liszt Briefwechsel in interest, we are taken into the full current of the musical life of Vienna, the concerts, operas and oratorios, Billroth’s piano duets with his friends, and the chamber music evenings, at which Brahms was of course the central figure. Billroth, in spite of his prejudice against Wagner, is everywhere a charming critic of music, beginning with his account of a trial performance of Brahms’ Sextet in G major:

Zurich, June 15, 1866, I wanted to play second viola, and have got famously in touch with my part; but as I began to play, I found myself trembling with such anxiety and excitement that I could do nothing. Fortunately Eschmann of Schaffhausen, another viola player, was there and took my place. I was terribly vexed and must have cut a farcical figure. The presence of Brahms, the heat of the day, the fact that I had been hard at work since 6 A.M., all contributed to get me in this entirely unaccustomed state of excitement, all the more inexplicable in that I had already taken a part in the Brahms’ sextet fourteen days before, when we played it alone at my house. Like an old boy, I had to undergo the bitter experience that it is foolhardy to attempt to execute anything in science or art unless one has mastered the matter in hand. Over and above this experience, I have learned never to play a piece in the presence of the composer unless it has been perfectly prepared beforehand. I had previously written to you about the second sextet of Brahms in unfavorable terms. Since then I have got to know it better and find it of extraordinary beauty, so clear, so simple, so masterly that one cannot enjoy it enough. Hegar, Eschmann I and II, a cellist from the orchestra, Burkhard and Ganz were the performers. But, as I now knew the piece very exactly, I had a very clear idea of the pains which Brahms must have undergone, although he passed it all off in his most amiable manner. Kirchner, Brahms and Hegar had been
carousing freely the night before and were tired; all that helped to make the general mood a languid one.

Vienna, Dec. 24, 1867. Brahms becomes the more lovable to me the oftener I meet him. Hanslick says very rightly about him that he has the same faults as Bach and Beethoven: he has too little of the sensuous in his art, both as a composer and player. I believe it is more from an expressed intention to avoid the sensuous than from a lack of it. His Requiem, the first half of which was produced recently, is really so sublime in a supersensuous way, so Protestant, so Bach-like, that it was only carried through with difficulty here. The hissing and clapping became a formal passion, a battle of the factions; finally the applause triumphed. Joachim has been here for two months. I have heard him often, have been with him often and have found him personally most amiable. He is a magnificent creature. When one hears him play the last quartettes of Beethoven, every one must think himself an ass that he did not hold this music the most beautiful in existence. Everything became so clear and simple, so beautifully modeled in his hands, that no one noticed it was being modeled; it went along of itself like the rising of the sun or the moon. When Brahms and Joachim play Beethoven, Bach, Schubert together, the notes are not photographed à la Bülow, but the conceptions appear to the ear as living tone pictures, appear and disappear. It seems to me strange that anybody should applaud. This genre does not suit everybody; the modern man, with his peppered palate, will not find it to his taste; but to me it is the highest thing which can be done by reproductive art.

Very different is my impression of Rubinstein, who has given five concerts. He is a highly gifted man, a talent of the first rank, not without originality, but badly educated. His compositions (piano concerto, chamber music) are interesting enough to give one pleasure in their beauties, and to neglect what is ugly or tiresome. So is it, too, with his playing. I have never heard any one play so beautifully, yet never have I seen an artist so belittle the finest things with such frivolity. An innate crudity sometimes becomes unpleasantly apparent, in combination with a grace of execution, an intensity of tone and execution of ravishing effect.

Vienna, March 29, 1873. Brahms is very active here as conductor; he has got up incomparably beautiful performances and wins the most cordial recognition from the connoisseurs. His Triumphlied,
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with organ and a colossal chorus, produced a wonderful effect; it is massive, monumental music; its effect being that of a continuously pleasant eerie feeling; at the same time transparently simple in the grandest al fresco style. It is certain that nothing quite so considerable has been wrought since Händel. In the last concert Brahms had the hardihood to attempt one of the most difficult of Bach's cantatas with text by Luther (Christ lag in Todesbänden). It was damnably tart music (verdammt herbe Musik), although of sublime effect here and there. But at the hands of a conductor so highly revered as Brahms, even this was pleasantly received by the Viennese. Two Volkslieder a cappella by Brahms produced such a storm of applause that it seemed the roof might cave in. The old King of Hanover was half beside himself with musical intoxication. I wish you could hear something like this once; one is really carried away by the beauty of intonation of this choir, its crescendo and decrescendo, its forte and piano, executed as if by one voice. Brahms directs all that as Renz steers a trained horse about in his circus.

Vienna, Jan. 1, 1875. Manfred! Ah, but you should have heard and seen it! Reflections are useless, it is indescribable; full-blooded poetry and full-blooded music! It is stunning in a sensuous way; one dreams, one floats in the soft air without effort. The scene of the spirit of Astarte always brings the tears to my eyes; even now, as I think of it, I am thrilled through and through. Such music! "Dost pardon me?" "Manfred, farewell!" "Tomorrow my sorrows end!" If Astarte strikes the right warm tone here and if Manfred is sympathetic, together with a Vienna orchestra and Herbeck as director! I tell you it is maddening. Is it a fortune or misfortune to feel things in this way? For me every other new thing we have had lately dwindles by comparison. Especially the great D major Mass of Beethoven, which I have heard for the third time, after studying it beforehand. For me this music is more defunct than the weakest of Bach and Händel. Not that it is specially abstruse! No! But tiresome, insignificant in invention. Tortured, bootless music. Beethoven cannot write for the chorus, except ineffectually; his fugal themes are mostly without effect, and one is so glad when the tortured squalling comes to an end. If people wanted to be honest, most of them would speak as I do. For the professional musician all this is as Michael Angelo's Sistine Chapel for the painter. But even for a cultivated musical ear it is dull music, especially for
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Protestants, who have no youthful poetic associations in mind. . . . I have already heard the Brahms string quartettes seven times this winter, sometimes at home, sometimes in concerts. In our four-handed rendering at Carlsbad, we took all the tempi much too fast. Brahms requires everything at very moderate tempi, because this music, on account of its many harmonic changes, cannot otherwise unfold itself properly; this is essentially true of all complex modern music. Beethoven, Schumann, Wagner, Brahms, in all the riper works of their later period, favor the Andante-Tempo which Wagner called "specifically German." Through Mendelssohn's influence, rapid tempi became too much the vogue; yet there was much less really inward passion in these effects than seemed to us formerly. In any case, I will not permit anything to be said against Mendelssohn.

Vienna, Aug. 3, 1879. At this moment my fingers tremble after playing Bach for an hour. That is a tremendous tax for the fingers; for not only each measure, but the whole must be shaped forth like a Gothic stone structure, tall and great. This morning I have given myself up to this music with a kind of passion.

Vienna, Jan. 4, 1881. You have naturally heard much through me of Brahms, also of Dvořák, a gigantic talent. If X speaks of him somewhat pityingly, Brahms says: "I do not understand you; I could almost jump out of my skin with envy at the thoughts which come to this man merely by the way." Dvořák often writes very hastily indeed; in dawdling fashion, but he dawdles à la Schubert; he is now so highly remunerated by his publishers that he is carried, through his easy productivity, into Vielschreiberei. Were he younger and had he been discovered earlier, he would undoubtedly have achieved something worth while; but now, whatever he does not achieve successfully by a lucky shot, he does not improve at all by brooding over it. Dvořák's nature is akin to Schubert's, even though he does not come anywhere near him, especially in his songs. . . .

Kirchner has arranged the new Hungarian Dances of Brahms, and also his Liebeslieder for two hands. Get these; whoever knows what beauties Brahms has concealed in the middle and counter voices of these things will not find admiration enough for Kirchner's arrangement. . . .

In the plastic arts, aside from the decorative, Vienna has always been very weak. Yet I find the Beethoven monument entirely unique
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in its beauty, impressively characteristic, very musical, in any case. The art critics may have their objections to the figures around the base; but you must not abuse the statue itself, or I shall be cross with you.

Vienna, July 27, 1883. From some indications, it appears that my house was once owned by one of the most famous professors of the period just after Joseph II, Johann Peter Frank. I was satisfied with the probability as far as it went. But Pohl went immediately to the municipal council, burrowed in the dusty property records, and elevated the probability to certitude. The wife of the famous Johann Peter Frank’s son, an inconsiderable medical professor, was in her time a famous singer; she sang in the Creation and the Seasons under Haydn. Through this circumstance, Beethoven came to the house, where musical evenings were often given in the garden, with illuminated scenes from the Italian operas of the time. . . . The interesting thing for me is that Joh. Peter Frank and Beethoven met in my house, and that a similar relation—let us not be arrogant!—obtained between you and me one hundred years later. . . . Beethoven certainly wandered in this direction; must not Haydn, too, have had rehearsals with the above-mentioned cantatrice in this house? What a noble triad: Haydn, Beethoven, Brahms!

Abbazia, Dec. 29, 1884. People say there are no promenades here. Inconceivable! Along the seashore, in both directions, are excellent roads on which one really finds no hotel guests, though many other things can be seen and heard there. “May Night,” “On the Lakeside,” “On the Lake,” “Evening Twilight,” “Summer Evening”—all the Brahms melodies stream towards me here (der ganze Brahms klingt mir hier emmertort entgegen). I trot along the streets to the measures of the last movement of your F minor piano quintette, and the third movement of my (I mean his) A minor string quartette brings me back in comfortable time. I can wish nothing better.

Abbazia, Jan. 8, 1886. Brahms is in Vienna and lives at IV, Carls-gasse No. 4. On the seventeenth of this month his new symphony (E Minor) will be produced, after which I give a baptismal dinner. The new work is already known to me from an arrangement for two pianos; it is very beautiful and grand in conception and execution. That Brahms will yet surpass himself does not seem to me probable from his latest works. Beethoven and Schumann also, and many others of the great, have really had nothing new to say after
reaching fifty. Even the most original artist will give out at fifty, if he lives that long; if we have understood his accomplishment up to that time, his later things seem to give us little that is new. At that time, the artist can still conceive things beautiful and great, but gains little by attempting to go beyond the limits of the beautiful à tout prix and surpass himself over his own head, as Beethoven, to my feeling, tried to do. A gigantic exception is Haydn, who in the Seasons, has already assimilated the Mozartian originality to himself and has begun to transform it into a new Haydn species.

**London, Oct. 2, 1886.** Dinner at the hotel and then a charming, but musically very clever, opera, the Mikado.

**St. Gilgen, Sept. 3, 1888.** Wagner was indeed a very considerable talent in many directions; but if he had not been a Capellmeister for twenty years and learned the whole trade of scenario and scoring in actual practice from his youth up, he could never have brought his ideas to expression. His scores are the product of a refined practical ability and a very healthy, sometimes morbid, over-excited human understanding. He learned the trade of Weber and Meyerbeer. That he has applied this technical experience to the expression of his ideas, and while remaining himself, has stood upon the pedestal erected by others, that is certainly a proof of his highly genial artistic individuality.

**Vienna, Feb. 24, 1890.** (To Professor Engelmann in Utrecht.) You and I stand apart from our university colleagues, since Brahms has dedicated his third string quartette to you and the first two to me. Lately, Joachim was here with his quartette and played yours in B flat. I was almost jealous of you; the effect was colossal. The piece has been repeatedly played here by Hellmesberger, Rosé, Heckmann, etc., but such a clear exposition of this piece, formless in its beginning and so complex in its modeling, I had hardly thought possible. The most difficult rhythmical combinations sounded naturally, as if they could not have been otherwise. Even alongside of Beethoven, Mozart, Haydn, and Schumann numbers, its success was colossal. The most conservative old sons of music came up to me (here I pass for a Head-Brahmin) with the assurance that they had never understood the quartette until now. And the great glue-boiling public was in ecstasies. The viola movement had to be played da capo.

**Vienna, Dec. 18, 1893.** (To Brahms.) Our conversation of yester-
day was uncommonly instructive to me; your statistics of today, for which I am most thankful, show the extent of your interest. It proves to me that in any scientific work, one cannot be too careful in getting control of his facts before beginning to reflect. . . . That pieces in a minor key attach themselves easier to us moderns, you will admit; we have the related fact that, in our immediate surroundings, dull soft colors are, on the whole, more agreeable to us than brighter ones. In our youth it was otherwise. Modern man does not like dazzling light effects in his living room. Note the modern preference for painted windows. High sharp voices are unpleasant to us. In the salon, people speak in a minor key. . . . My general impression would be that with Händel and Haydn, the major period begins, and that before that time, incidentally in the oldest folk songs, the minor key is supreme. That this view is incorrect, so far as the folk songs are concerned, you have lately shown me, even though the minor is more prominent in the Scottish and Swedish folk songs than in those of other peoples . . . All folk songs in the major, as well as all modern folk songs in major, easily leave with me a trivial impression, while those in the minor seem distingués. An old melody in the minor seems to me less antiquated than an old melody in the major. . . . What do you think of the following? I have the impression that what you call the "specific physiognomy" (das eigene Gesicht) of a composer, and what is otherwise understood to be his specific originality or his novel mode of expression, rests mainly upon new harmonic combinations in the middle voices, otherwise upon the peculiarity of the rhythms employed (Meyerbeer). The cessation of the custom of enhancing the motives by means of variations, and the trick of only repeating them, once they have been set up, seems to me very characteristic of Wagner and the modern French and Italians. In this case the organic growth of the musical compositions ceases immediately; it is more a laying together of the self-same stones, a mosaic or kaleidoscopic effect with unchangeable, multi-colored stones. That can be very pretty; but no other enhancement of values is possible except through the intensity of color effects.

Vienna, Sept. 23, 1893. (To Brahms.) Unfortunately, my dear colleague, N., otherwise so prominent and so widely cultured, is so absolutely unmusical that I can do nothing with him. He likes to hear music, especially singing, and sometimes attends concerts
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with his musical wife. Yesterday I played to him "Wir winden dir" in F sharp major, with accompaniment in F major. He said immediately, "that is from the Freischütz," but made no other remark. Then I played the melody in G major, the accompaniment in F major, and asked him if he noticed any difference. Answer: "I liked the first better." Can you form any conception of such a state of hearing? It would be interesting to make such investigations frequently. As yet, we do not in the least know how far people are unmusical who still get a certain definite pleasure from music as a rhythmic series of sounds.

This investigation was carried out to some extent in Billroth's posthumous essay, Wer ist musikalisch?, which is a kind of miniature pendant to Helmholtz's treatise on tonal sensation. The manuscript, somewhat fragmentary in character towards the end, was turned over, after Billroth's death, to Hanslick, who published it with an introduction. At the beginning, Billroth points out that a sense of rhythm, such as is exhibited by Neapolitans dancing the measures of tarantella to the punctuation of the tambourine, by Egyptian porters moving in processional order to the monotonous rhythms of Arabic verses, by soldiers marching to drum taps, is perhaps the most essential element of a feeling for music. From reports made to him by officers in various Austro-Hungarian regiments of different racial complexions, he found that there are recruits and soldiers who never acquire the sense of rhythm necessary to keep step without watching their comrades' movements. From observations similar to the one mentioned in his letters, he found that there are persons who are rhythm-deaf as well as tone-deaf or harmony-deaf, persons who have learned to play musical compositions in a purely mechanical way, yet are incapable of recognizing the selfsame pieces when they are played by others. The essay is a neat little discussion of the scientific aspects of the subject, in the style of Hanslick, whose biographical memoirs contain, in an appendix, a number of interesting letters.
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from Billroth. Brahms died in 1897, having survived his friend Billroth three years.

NOTES

1 V. G. Bowditch, H. I. Bowditch, Life and Correspondence (Boston, 1902) 2.340-341.
2 Ibid. 1.256
6 J. von Kries, Carl Ludwig (Friburg and Leipzig, 1895) 22-23.
7 Life of Richard Owen, by his grandson (London, 1894) 2.261.
8 The Life of Sir Robert Christison, Bart. . . . ed. by his sons (Edinburgh & London, 1885-86) 2.368-370.
9 Ibid. 1.205-206.
10 To the reprinting of this paper in the Musical Quarterly Mr. Sonneck, editor of the Quarterly, added the following note: "The distinguished author of this article is in error. In these books I mentioned his quondam colleague, Dr. Adam Kuhn of Philadelphia, an enthusiastic amateur-musician who attended Governor Penn's musical gatherings in Colonial times."—Editors.
11 From information kindly furnished by Dr. Farlow; see Harvard Musical Review 1 (July 1913).
Chapter Eight

Occupational Diseases of Musicians

ALFRED H. WHITTAKER

In presenting Dr. R. C. Brown of Preston with the honorary degree of Master of Arts, at Cambridge, in recognition of his benefactions to the new research hospital, the public orator took occasion to refer to the connection between medicine and music arising from the fact that Apollo was the father of both Aesculapius and the Muses. On this ground it may be claimed that medicine and music are sister arts. But it is no mere poetic fancy that music is related to medicine. Much has been written of the therapeutic effect of music, but very little about the effect of music upon musicians or upon the various groups of workers associated with music. Like the workers in a large industry, the range of occupation may extend from the office worker down to the laborer, with all the various types of occupational exposures and hazards which the various occupations in a single industry may entail.

Historical References to the Health of Musicians

Before considering the specific diseases of musical occupations let us observe, for a moment, historical references to vari-
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ous occupations. As early as 1831, Thackrah gave serious attention to the effect on the health of workers of their occupations. He points out that "clergymen, who preach long, frequently, or with vehemence, as well as orators, actors, public singers, and persons who play much on wind instruments, are subject to pains in the chest, spitting of blood, and diseases of the larynx." There is also reference to Fallopius, who says that "bass-singers and cowled monks, who shout much, are subject to hernia." Mention is also made of those who suffer from confined atmosphere in a fixed position:

Spending most of the day in one apartment they breathe impure air. Although most of them are distressed by remaining in one posture, and complaint is made especially of pain in the chest, this affection is not dependent on the state of their thoracic viscera; for neither the general symptoms, nor percussion, or the use of the stethoscope, indicates disease. Neither do we find the size of the chest considerably diminished. It is less indeed than in soldiers and husbandmen, but scarcely less than in the average townsman. The capacity of the lungs as indicated by a jar of water measurement is not at all less. The digestive organs suffer the most; a fact apparent even from the countenance and tongue. The circulation is imperfect, the head becomes affected, and though urgent disease is not generally produced, yet a continuance of the conduct in its full extent never fails to impair the constitution and render the individual sickly for life.

Ramazzini, who devoted years of his life to the study of the effect of various occupations upon the health of workers, published in 1700 the De Morbis Artificum, which contains a chapter on the diseases of voice-trainers, singers, and the like:

No sort of exercise [he says] is so healthful or harmless that it does not cause serious disorders, that is, when overdone. This is the common experience of voice-trainers, singers . . ., and others whose profession is singing and using the voice. In general they suffer from hernia. . . . I am convinced that using the voice heats the body more than any other kind of exercise. . . . Moreover, it
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may well be that the lungs are worked harder than by running, because the respiration is so unevenly maintained when you sing, recite, or read aloud; for the words must be delivered now in a low tone, now with emphasis, as the occasion demands. It is no wonder that such persons become short of breath and sometimes rupture some vessel in the chest and spit blood. . . .

After discussing various maladies of the respiratory system he continues:

In the same class of the infirm are flutists and those who play the pipes; all in short who play wind instruments with cheeks puffed out; for from the violent exertion of the breath necessary for blowing trumpets and flutes they incur not only the maladies above mentioned but far more serious ones, e.g., ruptures of the vessels of the chest and sudden discharges of blood from the mouth.

S. A. Tissot, in his observations on the manner of treating particular disorders and speaking of diseases of the breast, states that “musicians, especially, often die of complaints in the breast; and after death we frequently find their lungs inflamed, suppurative and ulcerated. M. Morgagni has seen a young man who was thrown into a phthisis by too frequently exercising a very fine voice: the ulceration of the lungs extended from the trachea to the larynx and throat; and he was suffocated in attempting to swallow the yolk of an egg.” And Thomas Beddoes reports that “playing on wind instruments is known to injure the lungs. Fifers on board ships of war, who accompany the drum at stated hours, and play quick marches when any piece of duty that requires hoisting is going on, are apt to become consumptive.”

In speaking of literary people, Robbins discusses conditions which apply to musicians:

When the brain labours, constantly and alone, it robs not only the organs of locomotion but of digestion; and nothing but general exercise can restore justice to both. If then, our students would only study as much as they do and exercise more, we should not be called
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so often to mingle in the sorrows of society in the loss of its most beloved and most learned members. And, if they would only be careful to exercise as much as they study, they might study much more than they do, and yet enjoy perfect health. ⁶

The first half of the 19th century witnessed great advances in the knowledge of physiology. William Beaumont had made a significant contribution to American medicine by his observations of gastric physiology, a study which was to prove to be of inestimable help to all countries. It was now no longer necessary to make the generalizations, such as those of Thackrah, Ramazzini, and others. There was now direct proof of the effect of emotional strain on organic physiology, and symptoms exhibited by musicians could be explained on a scientific basis.

Horace Green in discussing the causes of follicular disease of the air passages, a disease which consists primarily in a morbid condition of the glandular follicles of the aerial, denies the prevailing belief that the exercise of the vocal organs in public speaking and singing was the prominent and exciting cause of this disease:

Where a predisposition to the complaint exists, an undue or irregular exercise of the organs of the voice would tend, undoubtedly, to develop the disease; but without the presence of this increased susceptibility, irregular use of the voice, in public speaking, singing, etc., is not more liable to excite the disease, than is the constant employment of this organ, in ordinary conversation. If public speaking, alone, is an exciting cause of the malady, how happens it that lawyers, who speak every day in the year, are so seldom subjects of this affection? I have made inquiries among the auctioneers of this city, many of whom are engaged throughout the season, in "crying" for hours, at their daily sales; I have not been able to find a single individual of this fraternity who has been, to any considerable degree, a subject of this throat-ail. The truth is, the vocal organs are strengthened by the daily, regular use of the voice, in precisely the same manner as the arm of the smith is invigorated and its muscle strengthened and developed by constant use.⁷

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A few years later Samuel Sheldon Fitch also published his observations on a part of the anatomy which forms an important section of the singing apparatus. He writes:

We should always remember that the vocal organs, in singing or speaking, are placed in their proper position and any current of air is more or less forcibly dashed upon them from the lungs, that the strength of the tones and the power of the voice depend upon the volume, the density, and the momentum of this current of air. Now, any speaker or singer, who attempts to speak or sing from a half-filled chest will soon greatly injure his vocal organs; his voice will become weak, his throat become irritable and inflamed, his windpipe injured, the upper part of his chest become flat and contracted, and much pain at the top of the chest; to these, singing and speaking is a great injury; but to those who always, when singing or speaking, do so from a chest well filled with air, these exercises rapidly enlarge the chest and give great power and firmness to the vocal organs. I met, two years since, a young gentleman, who, alone, unassisted, gave a concert in a large hall at New Haven, Connecticut. He told me that, originally, he had a very small, contracted chest and was a teacher of the pianoforte; necessity compelled him to become a teacher of vocal music; but his chest was so narrow and contracted, and his voice so weak, that he almost despaired of being able to accomplish singing; yet, by practicing as I have mentioned, and inhaling the air, his chest began rapidly to expand, so that in three years, his voice acquired power and compass that enabled him to pronounce words so as to be heard distinctly one mile. 

Our modern cities do not record vital statistics to reveal the causes of death among musicians, or the comparative frequency of disease, or the life expectancy of singers and instrumentalists. James Wynne, in a Report on the Vital Statistics of the United States (1857), found that the average length of life among musicians was 40.46 as compared with 55.25 for physicians. Although life expectancy was much shorter ninety years ago, the statistics reveal a startling death rate among musicians. In 1822 Patissier pointed out that:
The violent expirations which the players of the wind instruments made to produce music cause hemorrhages with the violence of their breathing in their desire to surpass their co-players.

The players of the stringed instruments are also afflicted with this same occurrence because of their cramped position in playing on their instruments from the violin to the bass viol.

Vocalists are mostly afflicted with overstrain of the vocal cords, which are very much overtaxed and this can only be overcome with absolute rest. The overstrain or loss of voice is occasioned by singing in open air, damp air, and singing in full voice. The Italian method of singing which allows for a variation of tone quality was conducive to longer life of the vocal cords, which the French method of full-voice singing did not teach. Complete rest and baths of the feet and good pectorals are advised for treatment of impaired vocal cords. In later stages, laryngitis and catarrh develop and then singing must be abandoned as a profession.

Music may degenerate in fashion and many peculiarities are born. Cultivated early and in an exclusive manner the art develops a peculiar sensitiveness which is often a disorder of nature and becomes of such peculiar nature that doctors are unable to combat it.10

Modern Conception of Occupational Diseases of Musicians

A German discussion 11 of social hygiene has pointed out that there are many types of musicians, including the artist, the ordinary player, the arranger of music, the mechanical, jazz-like player, and the professional musician. The professional musician uses only skilled methods in producing sounds; these methods entail a continual drain on his physical and mental abilities, and illnesses often result which are peculiar to his profession. Nervous exhaustion, for example, caused by a muscle spasm in neuromuscular fatigue, will appear in the pianist and in the drummer. Emphysema of the lung is seen in both the singer and the hornblower. Muscle fatigue and finger sores arising from pressure on the cutaneous tips of the
fingers are common to the guitar player. The hornblower may have a hypertrophy of the abdominal muscles, which can result in a relaxed abdominal wall. Muscle spasms or cramps occur at the area of the nerve endings in the fingers of pianists and organists. Zither players have the same neuro-muscular spasms and hypersensitivity in the left hand. In string players, especially violinists, spasms are frequent in the left thumb and forefinger and the right thumb and forefinger. The flute player may develop a spasm of all the fingers, the drummer one of the thumb and wrist, the violinist one of the right deltoid muscle because of the elevation of the bow. Hornblowers have muscle spasms of the lips and tongue muscles; singers suffer from various muscle strains. Harp players may develop spastic muscles of the legs from holding the harp between the legs. Even the director is not immune; he may have a mild spasm of the shoulder and right arm muscles. In addition there is apt to be generalized fatigue of the eyes and ears and central nervous system of all musicians when they have been musically active for a time.

Now the musician, in spite of a tendency to such ailments, is usually of sound health and long-lived. His lot was more simple in ancient times when musical instruments were simple in construction and in use; with the passing of the centuries they have become more and more complex and thus have a more complex effect upon the musician who uses them.

But there has been in the modern musical age a corresponding advance in knowledge of medical conditions. It is now possible to consider the specific hazards to which the musician is exposed and to work out a preventive program. It is necessary, however, to remember that the diseases encountered among musicians differ in no way from the same diseases in other types of workers. For this reason the prevention of the diseases and the treatment of the diseases should be carried out by a specialist in whose realm the particular disease falls.
Extensive investigations on occupational diseases of musicians have been made by Singer\textsuperscript{12} and by Flesch.\textsuperscript{13}

As human existence has become more complex, young people have found it more difficult to choose a vocation. External causes—social, political, and communal—instead of an inner inclination have become deciding influences in this matter. The opportunity for gain, consideration of favorable circumstances, and the proportion between supply and demand must always regulate the number in the professional fields. It happens all too frequently that those who are talented and suited for a certain calling are obliged to remain in the background because actual need drives them from their life course. Others, although untalented and unfit, may be free from considerations of money and the need of quick returns and may be able to fulfill their aims and even carry out superficial desires.

Some attempt is made by means of scholarships to help in the selection of talented students and to assist those without means to continue their study. Unfortunately when musical talent is noted in the child, parents often tend to push an educational program which is beyond the physical ability of the child. A greater responsibility consequently falls upon the teacher, who should recognize at once the limit to which the student can be forced. The age of puberty is especially in the dangerous zone and great care should be taken by both the parents and the teachers at this time. It is a period of transformation and discord, with increased fatigue, irritability, and emotional fluctuation. The change in process causes the child to be receptive, productive, creative; there is a tendency to fantasy, with meditative solitude, and there is also a stimulation of production and an awakening of the hope of becoming an artist, an actor, or a musician. Admonitions at this time are often futile.

Especially where talent conquers physical defects, the musical profession can become a menace to the constitution,
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and here in particular medical guidance and protection by the teachers should be most carefully administered. We must remember also that musical talent, in its average form and magnitude, is quite common. For no other special activity, for no other profession, is there so much general inclination and aptitude. The teacher is, therefore, prepared to encounter among musical devotees, creators, and interpreters an unusually large number in whom the balance between energy absorption and energy production is disturbed. The demands which the musician's career places even upon the student are enormously great, greater sometimes than those encountered in the practice of the profession itself. Therefore the tendency toward occupational disorders may appear during the years of ripening and is not always delayed until maturity.

The better the school and its teaching methods, the rarer is professional disease. Today it is required, and rightly, that the teacher of young music students be well-informed on the physiological fundamentals of his special vocation and that he impart his knowledge to his pupils. Thus derangements of the muscular apparatus and the nerves are often, if not always, avoided. A musician performs not only with his arms and legs, with the throat and fingers, but also with his entire being, both physical and spiritual. This continuous overtaxation must find some compensation. There must be a careful distribution of work and rest intervals, especially since the actual mental and physical requirements which burden the student musician are large in comparison with those in other branches of work. Moreover, throughout the entire duration of the study course, theoretical and practical exercises are closely associated. Intellect, body, emotions, and temperament are always active. The instruction in music differs widely from the instruction in medicine. The medical student attends the course of anatomy, listens to lectures, and receives instruction at the sick bed, but independently he neither examines, treats, nor prescribes on
his own responsibility. The musician, on the other hand, studies technique and applies it immediately; he is taught counterpoint and at once utilizes the theoretical knowledge in imitative exercises. He is, therefore, simultaneously a student and a creator, a theorist and a practitioner, and with the enlargement of material control, his inclination and his ability for independent production grow. While he studies he is already working on his own responsibility.

Chemical studies have been made to determine the average expenditure in different musicians. These studies show that in hornplayers from 70 to 90 per cent of energy is expended, in violinists about 160 per cent, in clarinet players about 111 per cent, in kettle drummers about 275 per cent. The average expenditure of a pianist, chemically determined, corresponds to the average expenditure of those who do hard physical work. It is an interesting fact that interest in a composition will delay fatigue. A conductor can read a composition enthusiastically for two hours without feeling any fatigue, but were he to be timed without his orchestra, he would slacken after ten minutes. In just the same way the scholar who writes a work of several volumes, or the musician who composes a four-act opera has writer’s cramp more rarely than does the stenographer to whom work is dictated. Here again, however, rest is essential. A pause of two minutes after forty of practice and a pause of four minutes after eighty of practice give the most profitable and advantageous results to the musician.

We cannot label as professional diseases all those which appear within a profession. Professional activity may disclose a pre-existing disease. So in music the increased demands upon the sense organs and the motor mechanisms may reveal a tendency toward a certain disease. An injury to the hearing caused by otitis media is naturally more serious to a musician than to a shoemaker, but it is not the result of his professional activity. The same is true of a supersensitivity of the ear nerves,
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the irritation of which produces simultaneous color-sensations of a specific nature, or skin pains, or disagreeable feelings in certain organs. Color-hearing, the so-called acousti-optical synesthesia, is an intensified reaction which befalls the layman as well as the musician. Other complaints may be common in many types of workers but more frequent within a certain profession; the singer, for example, is especially subject to diseases of the larynx. Here, however, heredity and a tendency to degenerative changes may enter in.

Investigation should begin with the physical ailment or the evolution of mental symptoms into physical symptoms. There is an important biological connection between body structure and character, between physical stigmas and relationships and the entire external form of temperament. According to Kretschmer's ingenious doctrines in scientific research, such connections certainly exist, and even the eye of the layman is able to differentiate between the sensitive over-aesthetic type and the robust motor-type. Mimic gestures, head and feature formation, height, weight, mood level, skin and bone structure, vascular and glandular apparatus, development of the motive mechanism, form and play of the hands, elasticity and heaviness of the walk, the equipment and application in the struggle with society and social opinions—all these enter into the impressive exploration of an artistic organism.

Let us consider first the nervous system. Although the artistic temperament is frequently accompanied by nervous instability, a sound nervous system is essential to success in the musical field. Trivial nervous complaints are common to every person of superior mental range. The serious mental disorders are almost never the consequences of overwork.

In this connection, a word should be spoken in behalf of the favorable, positive relation between the nerves and muscles, between mental and physical phenomena, which is present in those playing and listening to music. Not all that appears to
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be nervous in the movements of expression is disease; not all that is disease is to be condemned; and not all that seems peaceful is free from nervous traits. Some eras, styles, cultures, and creators profess themselves open to the ideal of a harmonious peace; other eras, styles, cultures, and creators evince discord, unrest, nervousness. Nervousness may be productive and creative. It is the great affliction—but perhaps also the crowning treasure—of our time.

Disturbances in the nervous system may, of course, approach mental abnormalities and may definitely interfere with the progress of the musician. The fundamental tendency toward a psychopathic personality is innate. Situations which aggravate the struggle in life sometimes label the entire complex of character transformation as acquired; but physical maladies, spiritual disappointments, and mental anguish only hurl the ignition torch of physical change into the powder magazine of inborn inferiority. One may well ask himself occasionally whether, in view of the many hopeless existences in musical life, the irrevocable adhesion to music and the impulsive urge toward artistic creation are not, even in themselves, a symptom of a special, perhaps of a psychopathic, degeneration. And it is well to remember the fear which is engendered during the first moments of an artist's presence on the stage, when he simultaneously comes in contact with an audience which he does not know, with his instrument, with the work to be performed, with the lighting effects, the noise, and all the disturbing movements of the concert hall. Even great virtuosi confess in confidence to such a fear.

There are violinists, cellists, flutists, pianists, and drummers who have certain disorders of the arms and hands that are known as professional neuroses. These disturbances are tormenting and present an extraordinary difficulty in their treatment. Both in literature and in practice many instances are known in which the career of a talented person was interrupted
for a long time or had to be abandoned entirely because of these difficulties and impossibilities of hand-mechanism. The ailment affects only professional players; the amateur musician is hardly ever subject to it even though he may practice very industriously and intensively on his instrument. It is not the usual type of cramp. Weakness, fatigue, tremors, and pain are present just as frequently as are these cramp-like muscular contractions. All these complaints may exist simultaneously in a profession-neurosis, or one symptom may overwhelm the others to such an extent that, when isolated, it predominates as a disease. Movements which are necessary to every normal person’s living and which have been habitually made since youth never lead to neurotic troubles. The muscular movements to which we refer are combined and related to one another in an uninterrupted alternation of stretching, bending, spreading, supinating, and pronating. Therefore, the question concerns a technique to be learned in practice, since the direct cause of almost all hand and arm complaints among practicing musicians lies in systematic exercises not suited to the individual’s constitution.

Insignificant minor changes of an objective nature are found in the hands of pianists as a result of overpracticing. These include distortions, muscle inflammation, and periodically appearing, neuralgia-like pains. But in view of their extraordinary rarity these can be regarded merely as secondary, subordinate symptoms, and not as integral parts of a neurosis. Furthermore, these organic accessory symptoms are seldom found in violinists and cellists, perhaps because stringed instruments are better adapted to the player’s hand than the less personal and less individually constructed instruments used by pianists and organists. It is clear, therefore, that the actual base of these neuroses must be in the brain. There must be an organic or functional central change which eventually becomes released through peripheral irritation. The irritations of the movement
processes are felt with abnormal intensity and thereby the central nervous system becomes even more irritated.

The pain of fatigue which appears during practice is not a pain in the sense of a nerve inflammation or a neuralgia. Diseased persons describe it more as a lasting, unpleasant sensation of heaviness, exhaustion, and fatigue. As a matter of fact, it appears to be only the sensation of a tiring musculature, to which, then, there is gradually added a physical dislike for playing which on its own terms first really injures the performance.

It should also be noted that rarely is this disease seen in persons over thirty-nine years of age, for persons who suffer chronically cannot persevere in the profession. States of fear, stage fright, irritability, migraine, or constitutional headaches, symptoms of vertigo, insomnia, and general fatigue, accompany the disease. Many of the victims are physical weaklings and are undernourished. With men, alcohol also seems to play a causal role. The condition is not associated with accident. Musicians who have received severe injuries in the war do not, in consequence of a local trauma, reveal while playing an instrument the characteristic symptoms of fatigue, paralysis or pain. Occasionally several individuals in a family are attacked by this same disease, and we must accept as contributing factors a neurotic predisposition and perhaps also a psychic susceptibility to infection. There is no doubt that mental influences, especially naturally unpleasant experiences, can transform occasional symptoms of fatigue in professional players into chronic, systematically fixed neuroses.

The most commonly known form of occupational neurosis is writer's cramp. It demonstrates the subjective-objective symptoms of all diseases of overexertion. The principal class attacked by it is the group of professionally writing persons, that is, authors, auditors, secretaries, etc. But it is also part of the occupation-neuroses of musicians, since the musical author, the musical critic, and the composer may be afflicted with it.
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It happens much less often than would be expected from the quantity of matter which is written, probably because emotional participation and the high mental tension required during creative, active writing prevent overexertion in the organs exercised.

Rarer than this form is the tremor form. Even before the afflicted person writes, there appear oscillating agitation and trembling movements in the fingers; the paper is sometimes touched by the pen and sometimes not, so that the script becomes restless and undulating, and, as a rule, a horizontal line cannot be maintained precisely. Less frequent is a paralyzed sensation without cramps and tremors. After several minutes of writing the hand and pen sink loosely down upon the paper and a feeling of fatigue connected with pain is present. No paralysis or paralytic-like debility of an organic nature exists here, for the affected person, though thus locally tired, can immediately resume exercising in another actually more strenuous activity.

What has been stated in regard to writer's cramp applies also to the occurrence of complaints in the professional activities of pianists, violinists, cellists, and flutists. Quite rarely are those artists afflicted who are already in public professional life, the virtuosi who for months master an enormous repertoire and are in the habit of practicing for many hours during the day. On the contrary, the suffering is most common among students and among pupils of conservatories and high schools. Women are in the majority. With pianists, the right hand is generally attacked, rarely both hands, and almost never the left hand alone. The sickness is a protracted one and may indeed be incurable. Overexertion is the only cause, for even after months of rest the victims may suffer from the disorder, and if they try to write with the left hand, they may develop writer's cramp in that hand also.

The right and left hands of violinists are equally affected by
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the disease. Pain in the fingers which press the strings, disagreeable sensations in the bowing hand, and quickly appearing fatigue in both hands and arms are observed more often than the real cramp-like symptoms. Disorders appear in the flexors of the hand, and with continued practice there is muscular tension of the extensors so that either grasping becomes impossible or the fingers cannot be raised from the strings with sufficient rapidity, elasticity, and convenience.

Poor bowing can very easily produce such a condition. Improvement in the method of playing may remove the disturbance, especially when it is a matter of cramped holding of the bow or a false, one-sided vibrato. The earlier custom of inserting a cushion under the armpit in order to facilitate playing according to form has been rightly abandoned, for this fixation of the shoulder can lead only to an excessive enervation and to a cramped strain of the shoulder and arm muscles. A stiff position of the right wrist, faulty fixed holding of the left thumb, pressure of the thumb on the neck of the violin, and outside rotation of the left forearm can also lead to temporary pains, feelings of paralysis, and tremors.

Pains in the shoulder are occasionally experienced by violinists who are in the habit of taking abnormal positions, either raising the bow too high, for example, or lowering the instrument far below the horizontal line. Inclining the head too much will overtax the neck and shoulder muscles and may lead to permanent change in the position of the head with contraction and cramp-like tension of the muscles concerned.

The professional disorders of cellists are, in reference to the arms and hands, similar to those of violinists. They occur less often than does violinist's cramp, however, since the cello is played with the arms suspended and not raised, and is played less commonly than the violin.

Player's cramp is not found in contrabass players. The tonal dimensions are essentially greater, and the placing of an indi-
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Indulgent tone occurs without any extreme bending or holding positions of the fingers. It is perhaps also not unimportant that contrabass players rarely play a long and fast tempo.

Neurotic complaints are rare with organists. They do complain at times of strain on the legs just as do contrabass players who must stand while playing and who sometimes even develop flat feet. There may be also backstrain in the organist resulting from playing from the bench without proper back support. Occasionally in zither players there is a peculiar lameness and muscular atrophy of the right thumb. In flute players, there occurs a cramp-like muscular change which makes it more difficult both to raise the individual fingers from the holes of the instrument and to hold them securely.

Musicians suffer also from disorders of associated brain activity. Under such conditions the musician, an intellectual worker and a sensitive interpreter, is more seriously harmed by the failure of his active memory and by the waste to his technique and artistic expression than perhaps a laborer, whose chief duties are in the nature of mechanical handicraft. There is, in fact, no other professional class whose memory must so continually stand the inner strain of excitement. Assimilation, blood pressure, pulse and breathing, action of the heart, vessels, and veins, all undergo in strenuous musical work an extraordinary intensification; the more deeply a person feels music, the more strongly marked also are the accompanying physical symptoms. These are felt partly as exertions, partly as pleasure-stressed emotions. In long-sustained work, and especially when one still has to struggle with elementary technical matters, the advancement of all the vegetative and physical functions is intensified, with no corresponding advance in the emotional state, and fatigue, enervation, and physical weakness are the inevitable consequence.

There are other vasomotor disturbances which affect the musician. The hands of violinists and pianists sometimes become
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moist and hot. This may be an indication of general exhaustion or the expression of an internal disease, but in predisposed persons it can also be the result of an irritation of the vascular and glandular activity caused by artistic participation. Violinists so affected are not able to play clear double stops and pure, clean harmonics. The fingers slide off strings, the tones become unsteady, and the most ardent striving for intonation is set at naught. Under similar conditions pianists, flutists, etc., become inaccurate.

Occasionally scaly or moist eczemas occur, and these may require a long time for cure. Calluses on the hands are a protective measure against pressure, against fissures of the skin, against infection by contact, and against the penetration of dirt. Fortunately such affections are rare, just as are mucous-membrane inflammations and skin inflammations arising from contact with the resin. More frequently, if a chin rest is not used, the violinist is subject to inflammation and infection in the hair follicles of the beard. In violinists and cellists, unpleasant pains may develop in the tips of the fingers. The fingers attacked are those that are used for the strongest pressure on the strings, that is, the second and third fingers of the left hand; occasionally also the index finger or thumb of the right hand suffers from pressure from the bow. This paresthesia is often combined with moistening of the hands. There are violinists on whose fingers, though they play for a long time, a callous skin does not really form. If such players press the strings very intensely and vertically, the catgut then becomes a constantly new skin irritation and a trauma for the muscles and nerve endings.

There may be circulatory disorders in the fingers in long continuous playing, disorders which may persist even outside of musical activity. Heat and reddening of the finger tips, with an extraordinary sensitivity to pressure and hot temperatures, more probably denote the contracture of a myalgic and perineuritic disease caused by chronic trauma. After a few days of absolute
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rest, these disorders may spontaneously disappear; on the other hand, they may continue for months and defy all local treatment. The wrapping of the ailing fingers with kid gloves or adhesive plaster temporarily prevents pressure and intensification of pain. This simple method is occasionally employed even by virtuosi in public playing.

Instrumentalists who suffer from increased perspiration require special skin, hand, and nail care. Splits of the skin, poorly cut nails, and especially moist hands promote the entrance of bacteria into the lymphatic and blood channels. Infection may also develop under the calluses.

Pressure of the chin rest can be similarly disagreeable. A skin thickening, reddish-brown in color, commonly appears on the left side of the violinist's neck. Flutists and oboe and clarinet players occasionally feel a painful sensation in the tongue during the long, continuous passages, as in the accompaniment of operatic pieces. Usually this diminishes quickly. In trumpet, horn, and trombone players, strained, painful sensations in the lip muscles may occur; they pass soon after the musician stops playing. Drummers have pains in the hands, like those which we have described in the professional neuroses of violinists and pianists.

Among musicians of the symphony orchestras it is rare to encounter disturbances of the lip, but these have become well-known among musicians of the moving picture theaters. They are particularly noticeable among wind-players such as flutists and trombone players. The overexertion of the lips interferes with proper playing. The upper lip, after a brief attempt at blowing, becomes weakened and is caught at the opening of the instrument, and blowing becomes finally almost impossible. The lip becomes thinner, the outer edge is bunched up and curved, and its tension is less well controlled. Treatment of the upper teeth to bring them into position to provide better support is helpful. Frequently eczema appears on the lower lip of
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the flutist. Bleeding of the lip may be observed after hours of strenuous blowing.

Various forms of nervousness are typical of the wind-player. Even in the orchestra he carries by his solo activities far greater responsibility than does, for example, the ensemble violinist. His anxiety may lead to a disturbance in the secretory function of the mouth. The oboe, clarinet, and horn soloists are particularly affected. This nervousness results from a rush of blood to the head, the excitement of breathing, and continued lip-placement; the saliva excretion becomes decreased in expectation of the coming responsibility. Dry lips interfere with proper blowing, an insufficiently moistened tongue produces inelasticity. Vibrations of the tube thus result especially after fatigue. Some musicians also have noticed "poor placement" and a defect in the lip flexibility produced by heat or cold. The changing of tubes and reeds in blowing does not facilitate the evenness of placement.

Players of any instrument may complain of eye pains when reading notes. The lighting is not always the best. As for the auditory organs, clonic spasms of the musculature of the ear trumpet may occur as a result of motor neurosis in the middle ear, and a clock-like ticking in the ear ensues. These disturbing noises coincide with the convulsions of the soft palate, and as soon as the palate is fixed with the finger, the ticking sounds in the ear will cease. There are also cramps of the muscle of the middle ear which result in noises originating in the ear itself. They may be combined with a contraction of the muscle which keeps the ear drum under tension, and they are frequently and especially clear during yawning. In this case, as with the draw-out humming ear noises occasionally heard during singing, it is probably a question of transmission from the muscles used in mastication and the pharyngeal muscles of the throat.

All these symptoms are almost always nervous in origin and arise from overexhaustion or overwork. They are manifested as
special accentuations of a general neurogenic disturbance. Also psychogenic in origin are occasional tonic tension cramps of the pharyngeal musculature, which are subjectively exhibited as a feeling of a ball in the throat, or as difficult or defective swallowing. There may be some defective or reduced sensitivity of the palate or the pharynx. These conditions are typically hysterical in origin.

Nervous conditions cause some musicians to be sensitive to high tones as well as to any sound that is too loud, shrill or noisy. The musician, feeling such physical discomfort accompanied by stomach pain, intestinal colic, or even toothache, is greatly handicapped in his work. There is also the condition of color-hearing, the so-called "chromatic phonopsis" which may make it difficult to pursue a musical profession.

Wind-players are sometimes afflicted with a disagreeable disease which occasionally compels the abandonment of the profession. It is known as emphysema and consists in a dilatation of the small cells of the lungs, which lose their elasticity and become fibrous, so that there is interference with the proper contracture and expansion of the lung. This condition can be largely avoided by proper breathing while playing; the lungs should be filled evenly, too forcible inspiration and expiration should be avoided. For emphysema, once established, there is no cure. It seldom appears in orchestral musicians before the fortieth year, when it may be combined with disorders of breathing and heart efficiency. The obliteration of the upper and lower collarbone cavities may be noted also among wind instrument players; this condition is due to dilatation of the upper lobes of the lungs and is especially noted among oboe players.

The greatest amount of air is consumed by trombone players, a lesser amount by bassoon and oboe players, a small amount by flute, clarinet, horn, and trumpet players. The tendency to emphysema may result from the wind instruments, although this has not been shown by roentgenological studies. Finally,
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The constantly increased intra-abdominal pressure contributes to the formation of hemiae, and the contracture of the abdominal musculature may interfere with the proper physiology of the gastrointestinal tract.

Let us turn now to occupational diseases peculiar to singers. The apparatus of the larynx is as important to the singer as the musculature of the arms is to the violinist and pianist. The pharynx and mouth cavities, the nasopharynx and nasal cavities, are essential for correct speaking as well as for artistic singing. Even the most common diseases of the lips, teeth, tongue, palate, uvula, tonsils, jaw, and frontal cavities can interfere with the functioning of beautiful speech or singing. Affections in the mouth especially interfere with the upper tones which determine the modulation and timbre of the voice. Frontal and jaw cavities are included among these important organs for resonance. Thus a student of voice should be sure that the upper respiratory tract is free from evidence of disease. It is the responsibility of teachers to insure the correct method of breathing and singing so that damage permanent in nature will be avoided. Most people exhibit faulty breathing methods in everyday speech, but with the increase in classes in public speaking the importance of breathing is becoming more generally appreciated. Correct and economical breathing is essential to an artistic speaking or singing performance. Faulty breathing produces disorders of the speech, such as hurried speech, a blustering voice, stammering or drawling or indistinctness, as well as a lack of emphasis.

There are many persons who have discontinued the pursuit of another profession because of necessity or lack of ability and who pursue instead the study of singing. With these singers the danger is especially great, for in striving for quick returns, they overdo their studying, overdo their voices, and overrate their powers. Thus they are constantly threatened with professional disorders.
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Many students of voice change from teacher to teacher, and this change in methods is conducive to various disturbances. There are few singers who have studied with only one teacher, and there are still fewer singers who do not acquire different instruction from every teacher. Sudden and constantly interrupted and changed methods of teaching, perhaps in reference to coloring of the tone, of hard, soft or medium voice placement, or of the tone resonance, have an important effect upon vocal range, sureness of intonation, vocal power, and tone. In order to compensate for the defects which the teacher less often perceives in the pupil than the pupil perceives in himself or in his environment, the methods are changed and the duration of practice is lengthened; the pupil is the first to notice the appearance of hoarseness or harshness in the voice, a trembling, quick tiring, or false intonation. Overexertion only increases the defect. Thus even in healthy, capable musicians actual professional disorders which could not arise if physical signs and functions were properly considered are occasionally developed through incorrect teaching.

Functional hoarseness is most frequent in early childhood. Even before the voice change, many children with a normal objective larynx condition have harsh voices. This is the result of faulty singing instruction, which requires the children to sing loudly and which does not give enough consideration to the range of the childish voice. Too much is often demanded, in study, of delicate voices. The individual limitations of production capacity are unusually varied in vocal organs. It is the teacher's concern to understand the pupil's individuality—his constitution as a whole, and his throat in particular. Through the investigations of Paulsen and Gutzmann, the voice range is accurately known for each age and due consideration should be given to this range.

Many touring singers, especially when they have attained fame, undertake prearranged tours, and after several concerts
notice irregularities in singing without realizing that they are caused by general exhaustion, by the inevitable "cold," and the use of stimulants. But many others, and they are probably in the majority, conceal under the form of professional troubles either a defect in technical training or a simple lack of talent.

Phonasthenia or sound-weakness may be regarded as the most important and the most frequent disturbance among singers. This disease, which has been studied by many workers, is the real functional and professional disease of speakers and singers. It always originates in connection with overexertion and over-fatigue, whether from an excess of practice by a healthy person or from the normal amount of practice by a nervously diseased person. When this premature voice weakness appears in speakers, the speech, after a brief period, becomes tired, toneless and feeble; the fatigue is attended by pressure sensations in the throat, and by cough irritations; the voice eventually becomes tremulous; the tone is poorly sustained; and finally total voicelessness sets in. The condition is most frequently exhibited in singers as disorders of intonation, of vocal power, of tone duration and of vocal tone. A study of the throat with the laryngoscope may disclose actual muscle weaknesses of the longitudinal tensor muscles whereby the upper tones are more deeply affected than the lower ones.

The objective symptoms of this voice weakness are therefore the detonations arising from low tension of the vocal cords. If the singer notices such detonation, he then drives the tone high; indeed, he overcompensates the tone pitch and sings too high, or the pitch oscillates and the correct tone cannot be sustained, or the tone sounds harsh and unclear and can be produced only in mezzoforte and no longer in piano. In attempting to swell the tone, he loses it completely; and one hears only the stream-out of air. The first symptoms of fatigue are always audible in the same few tones, two to four half-tones, usually the transition tones of the chest to the head register. If the first
disorders are not recognized, are disregarded, or are not treated, the disease then spreads over a wide area and may finally attack the entire vocal compass (as far as the deep chest tones).

Through tricks and special selection of compositions, through forte singing and through favoring the coup-de-glotte, the singer may seemingly succeed in overcoming the defects, but all he does is cheat them, and after two to four years his voice is ruined.

The singer is more exposed to colds than other musicians and more seriously disturbed by them, for to the vocal reed belong all those organs covered by mucous membrane that display predisposition to catarrhal ailments. Sometimes such conditions are also affected by physical characteristics, like a widely or too narrowly formed nose. In the first case, the air passes through the nasopharyngeal cavity too quickly to become warm and to be freed from dirt or bacteria. A singer with a narrow nose must often resort to mouth breathing.

The most common symptom of an existing inflammation of the mucous membrane of the pharynx, throat, or trachea is a husky voice. Hoarseness, with the exception of the hysterical type, is always a symptom of a catarrhal alteration of the vocal cords. The first need is forbearance in speaking and singing. With chronic inflammation there is found in the larynx, by examination with the speculum, not only redness, but also a thickening of the mucous membrane with increased mucous secretion. After a period of singing, the voices of some men and women singers seem to be muffled by a veil, and this condition is the symptom either of nervous fatigue or of an increased mucous secretion.

There may be nodules of the vocal cords, but the same nodules are found in people who do not sing. They are small thickenings on the edges of the vocal cords and are frequently the cause of hoarseness with adults as also with children. In singers, they often first strike the attention when forte singing and intonation of upper tones are still accomplished success-
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fully, while piano singing and singing in the middle register are poor.

In conclusion we may assert that most of the main professional disorders are principally caused by neurasthenic, hysterical, and psychasthenic excitement. It cannot be emphasized strongly enough that overevaluation of the physical condition under any circumstances must be avoided. The fewer the organic changes in the fingers, arms, muscles, nerves, pharynx, and throat, so much the more frequently and intently must treating physicians use psychotherapeutic methods.

NOTES

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7 Horace Green, A Treatise on the Diseases of the Air Passages (1846).
8 S. H. Fitch, Functions of the Lungs, Mode of Preserving Male and Female Health to a Hundred Years (1859).
10 Philibert Patissier, Traité des maladies des artisans (1822).
11 Handbuch der Sozialen Hygiene (Berlin, 1926).
13 Julius Flesch, Berufskrankheiten des Musikers (1925).
In discussing the subject of emotional expression in music, I should make it clear that I am writing as a musician and a theorist with no special knowledge of musical therapeutics. It is my hope, however, that I may be able to throw some light upon the material of which music is made and to clarify our terminology and our thinking.

Such an analysis is, I believe, important if we are to use music as a means of influencing human beings. Music is a curiously subtle art with innumerable, varying emotional connotations. It is made up of many ingredients and, according to the proportions of these components, it can be soothing or invigorating, ennobling or vulgarizing, philosophical or orgiastic. It has powers for evil as well as for good. If we are to use it as a social or

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therapeutic force the first essential is that we find out something about it.

If I devote some little time in attempts to secure accurate definitions it is because, in company with the other arts, terminology in music is frequently loosely used. Too much discussion has been in terms of indefinite phraseology, frequently borrowed from other arts and not always particularly suitable. Inasmuch as emotional response to music is intimately connected with such basic factors as consonance, dissonance, rhythm, melodic displacement and the like, it seems wise to discuss these factors in terms which are as concrete as possible. This may be of some value to those who are interested in analyzing and classifying different types of music for practical use.

The material of musical composition may be described as consisting of three relationships of tone: the relationship of tones sounded simultaneously, the relationship of tones sounded consecutively, and the relationship of tones in terms of time. The first of these is commonly referred to as harmony, the second melody, and the third rhythm. A secondary relationship of horizontal lines of tone with each other is usually referred to as counterpoint. The relationship of a single melody and harmony is usually called homophony. The combined relationship of multiple melodic lines to the sonority governing that association has been given no name but might be referred to as the study of polyphonic sonority. The over-all relationship which embraces all of the basic and secondary relationships in what might be called pitch-space is usually given the somewhat misleading name of form.

The sensuous material of tone which in all of its relationships constitutes music needs no explanation in a book such as this. It might not be unwise, however, to point out that the tonal material as standardized today in occidental music is a fairly accurate approximation of the musical material naturally available in the over-tone series of nature and, therefore, has some
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claim to a scientific basis. It is obvious that if one takes two tones which constitute the relationship of 2:1, the perfect octave, in which the upper tones have duplicating overtones, one has the practical limits of a musical scale. This ratio may theoretically be divided into an infinite number of scale degrees. The smallest of these pitch differences would, of course, become indiscernible to the human ear. However, if we were to use only a pitch increment appreciable to the average human ear it would be quite possible to produce a musical scale with at least 48 scale degrees instead of 12. The scale as we know it is, however, an eminently practical means of musical expression, and since it has sufficed for the development of occidental music we may perhaps most wisely confine our attention to the development of music within this system.

This system may be described briefly as consisting of the division of the octave into twelve equal parts, mathematically the twelfth root of the octave ratio, 2/1. This produces the following scale:

1. $\sqrt[12]{2}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$, $(2)^{1/12}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$, $\sqrt[12]{2}$.

The relationship of 1 to 2, exactly duplicates the relationship of a fundamental to its 2nd partial; the relationship of $1: (2)^{7/12}$ closely approximates the $3/2$ ratio of the fundamental and its third partial; and the relationship of $1: \sqrt[12]{2}$ somewhat less satisfactorily approximates the $5/4$ ratio of the fundamental to its 5th partial. Since these three partials comprise the consonant relationship of the major triad it will be seen that the present equally-tempered scale is a rather satisfactory means of musical expression both harmonically and melodically.

The history of thoroughly integrated harmonic and melodic composition is usually considered to begin in the 16th century, though many theorists would include music written much earlier. The hallmark of this music is melody in simple scale
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forms and an overwhelming preponderance of consonant sonority. It includes, furthermore, a tight integration of the melodic line with the sonority in terms of time relationship so that the predominantly horizontal as well as vertical effect is consonant.

The sonorous material of the sacred music of Palestrina, for example, consisted essentially of three types of harmonic bodies: the major triad, the minor triad, both consonant, and the diminished triad, a mild dissonance, which I shall illustrate. (No. 1.)

![Major Minor Diminished Triad](image)

There are no complete compositions of this period which have exclusively consonant harmonic implications, but we may cite a short excerpt from the motet *Veni Sanctus Spiritus*, by the 16th century Italian composer Giovanni Pierluigi da Palestrina, which is composed entirely of consonant sonorities. This excerpt consists exclusively of the use of the major and minor triads. (No. 2.)

![Minor Major Major Minor Minor Major](image)

Short examples of this type of writing are numerous in 16th century literature but comparatively rare at a later period. It is
interesting, however, to turn quickly to the 19th century and see Richard Wagner momentarily using this technic in the beginning of Lohengrin to depict purity and absence of human passion. (No. 3.)

It is comparatively easy, of course, to write music of complete consonance if only harmonic bodies are concerned. It is easily shown, however, that in the music of the Palestrina style almost complete consonance exists even in passages of contrapuntal complexity where a number of melodic lines are moving at once. This is achieved by means of the most careful coordination of the harmonic, melodic and time elements. Each component part of a melodic line is almost invariably consonant with the prevailing sonority at any point of rhythmic stress. Any melodic note which would produce a dissonant impression is used in conjunct motion at unstressed metric points, and thus the illusion of complete consonance is preserved. As an example of this I should like to quote the famous Amen cadence from the Credo of the Pope Marcellus Mass. (No. 4.)

Music of this type may be described as being calm, serene, and in a sense impersonal. It has little to do with the emotion of the individual. It is cosmic in character and had its greatest development in the service of the Roman Catholic Church.

The expression of personal feeling in music seems inevitably to be associated with the use of dissonance. Indeed, the expression of emotion in music seems to be bound up in the contrast between dissonance and consonance, the former producing a
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The dissonance of the music of the Palestrina style was for the most part dissonance secured by the metric device of displacement of a melodic line. In the familiar dissonant suspension, for example, a tone which is consonant to one sonority is delayed in its movement while the remaining tones move on to another consonant sonority in which the first melodic tone is held over as a dissonance. A tension is thus set up between the melodic tone and the consonant chord to which it is itself dissonant. In the same section of the Pope Marcellus Mass from which the previous example was taken we have an excellent illustration. When in the Credo the word “mortuorum” is
reached, the sonority suddenly becomes dissonant by virtue of the fact that the tone in the upper voice which was the consonant 3rd of a major triad is held over into a B flat major triad of which it is not a part. The result is a sharp dissonance on the word "dead" contrasting strongly with the prevailing consonance. (No. 5.)

In listening to this music it will be observed that rhythmically the music might also be considered to be essentially "consonant." The melodic voices proceed smoothly, the moving tones being for the most part equal subdivisions of the metric pulse. Where notes are of unequal length the longer note generally occupies the principal pulse and the shorter notes follow the longer—quite the opposite of the rhythm of modern jazz.

Even in this age of essential consonance we can find examples of the conscious employment of free dissonance for emotional effects. No better example of the radical of his day can be found than the fascinating figure of Palestrina's younger contempo-
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ary, Gesualdo. Man of the world, social gallant, artistic dilettante, swashbuckling swordsman who did not hesitate to settle his arguments with steel, Gesualdo himself constitutes an interesting psychological study. Cecil Gray in his little book Gesualdo, Prince of Venosa, Musician and Murderer gives an interesting picture of this musical radical.

It is natural that such a man should be musically as well as socially unconventional. If we examine his music we find the use of free dissonance for expressing the emotion indicated by words. In his setting of the madrigal Tu m’uccidi, o crudele he uses the dissonance of the unfamiliar augmented triad to emphasize the word “kill” even though the poem has to do only with the killing of love by the heartless fair one. (No. 6.)

He introduces another technic which is even more important. This has to do with what we may call dissonance produced by the process of association. Let me construct a simple example. The first six notes of our national anthem outline a consonant triad. The line is purely melodic in the sense that these notes are sung in unison without harmonic accompaniment. The impression, however, is one of harmonic consonance because the mind retains the memory of the previous tones and relates them as a consonance. If the opening melody had the same direction and rhythm but were written as follows: F, B, G-flat, C, G,
D-flat, the effect would be melodically dissonant even if no two tones were ever sounded simultaneously. (No. 7.)

In his motet *Moro lasso al mio duolo* Gesualdo employs this technic by using consonant chords which, though consonant in themselves, produce an effect of unrest by the juxtaposition of consonant sonorities which have a dissonant relationship with each other. (No. 8.)

Inasmuch as I am attempting to cover four centuries of music in a few pages we must now make a jump of about 150 years, leaving the period of vocal polyphonic music developed under the protecting aegis of the Catholic Church and going to early 18th century Germany to a style also vocal and contrapuntal, but Protestant rather than Catholic in its inspiration.

We find that in the intervening years a great change has occurred relating to both sonorities and contrapuntal lines. Music has lost its predominant consonance and has developed a personal emotionalism always associated with the use of dissonance. To the two consonant and the one moderately dissonant triads commonly used in the music of Palestrina we have added in the music of Bach a fourth triad, mildly dissonant, and a
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group of four-tone and five-tone combinations of various degrees of dissonance. The reader is referred to the three basic Palestrina sonorities and then to some of the additional dissonant sonorities which we find in Bach. (No. 9.)

No. 9

Not only has the use of dissonant sonorities greatly increased but the pattern of dissonance followed by resolving consonance has become so established that it has given rise to a whole chain of associations which makes itself felt subconsciously by the average listener. From this establishment of what the musician calls tonality we have not only the tension between consonance and dissonance but the tension set up between a so-called key-center and notes related to it. The term dominant has come to have a psychological as well as a purely technical meaning. The musician speaks of the frustration of tonality by evasion, of "positive" and "negative" progression; in short, a whole series of adjectives which have their origin in the "feeling" induced by the music.

Another important technic has also been developed which has to do with the time-relationship of melodic lines. I have pointed out that in the Palestrina style the sonorities were essentially and predominantly consonant, but that dissonance
was introduced through rhythmic displacement of melodic lines by what the musician calls suspension, anticipation and the like. In the music of Bach, however, dissonance in the melodic line is consciously used by the simple expedient of reversing the order of consonance and dissonance in terms of their position relative to the rhythmic pulse. That is, instead of having the consonant melodic note on the strong pulse followed by an interpolated dissonant “passing” note, the order is reversed so that the dissonant melodic passing note comes on the accent (over a consonant sonority) and is followed by the consonant resolution. By this device the melody in itself takes on consonant and dissonant implications and the possibilities of emotional expression are thereby greatly increased.

The example which I have chosen to illustrate these points is a short passage from the opening of the final chorus of the Bach St. Matthew Passion. The music depicts the grief of the Christian world at the death of its Saviour and is one of the noblest examples of the expression of sorrow in all musical literature. (No. 10.)

The age of Bach was followed by the so-called classic period which introduced surprisingly little additional technical material to that employed by Bach. It did, however, explore further the possibilities of rhythm, of homophony, and of formalized structure. This period marks the predominant influence of the dance upon serious music. This influence, combined with the highly formalized structure inherent in the classic age, produces
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a music which is highly rhythmic, graceful and sometimes invigorating. It is not essentially emotional music but reverts somewhat to the impersonal characteristics of the music of the 16th century.

With the coming of the 19th century and the beginning of the Romantic school of composition we find the further intensification of emotional expression. Emotion, furthermore, has come to mean "personalized" emotion, the expression of the individual. For this reason music will be seen to bear the personal mark of its creator. His own emotional experiences, his philosophy, will be directly reflected in the music. For the time being "abstract" music does not exist. This highly personal conception of music finds its most complete expression in the music of Richard Wagner.

Let us examine briefly the opening bars of the Prelude to Tristan and Isolde. Wagner is seeking here to set the stage for the passionate drama of tragic love and frustrated passion. He achieves his aim by utilizing with consummate genius the technique already described. The melodic line is harmonized by a dissonance resolving to a dominant consonance but with an accented chromatic dissonance in the melody. Before this har-
mony can seek its point of rest the phrase is torn from its tonal context, sequenced twice, and expanded in order to heighten as much as possible the emotional tension. When the dominant chord is finally resolved the normal resolution is evaded by the so-called deceptive cadence and the music proceeds on its passionate and frustrated way. (No. 11.)

This period is full of interesting case histories for the psychiatrist. There is, for example, that curious Russian genius Scriabine, with his attempt to fuse the senses of color and sonority in his symphony *Prometheus*. Space permits, however, only a quick reference to Claude Debussy, founder of the Impressionist School, in some of whose compositions there is the closest approach to a clinical use of sonority. Upon the theory that a given sonority produces a certain effect upon the listener, Debussy has created impressionistic moods by repeated use of the same type of harmonic structure. This is only one characteristic of the technic of the French master, but it constitutes a new approach to the value of a sonority as an end in itself. The above brief illustration from a work written entirely in the whole tone scale with no other type of sonority utilized is a most striking example. (No. 12.)

The 20th century in music is developing in a variety of directions and it is too early to describe what its most important contributions may be. It seems probable, however, that the resources to be newly explored will have at least as much to do with time relationships, rhythmically and metrically, as with harmony and melody. As an introduction to the 20th century we may cite a few bars from Stravinsky's *Rites of Spring*. You
will notice not only the use of a more complex type of dissonant sonority but the intrusion of a strong but irregular pulse which seems to revert to primitive music. (No. 13.)

Some Objective Studies of Rhythm in Music

It is not necessary to point out the emotional attributes inherent in rhythm. The mass hysteria present in recordings of the rhythmic chants of primitive peoples and the similar mass hysteria of the modern "jam-session" indicate—at times all too clearly—the emotional tension producible by subjecting groups of people to concentrated doses of rhythm. The reasons back of this rhythmic excitement, however, are not always clearly understood and require some explanation.

In the same way that tones of definite pitch constitute the raw material of which harmony and melody are made, so equal divisions of time constitute the raw material of rhythm. To pursue the analogy further, as there are theoretically an infinite number of different tones and combinations of tones, so there are also an infinite number of combinations of rhythmic patterns. Here the similarity ends, for though the infinity of pitch-tones has been reduced to a finite number through arbitrary agreement the infinite number of possible rhythmic relationships persists.

To begin we must distinguish between beat, tempo, meter, and rhythm. All written music presumes division of time into
equal pulses or beats. These beats may be slow or fast, expressed or only implied, but they are always equal divisions.

The variation of the speed of the recurring pulse is generally referred to as the tempo of the music. In other words adagio simply means a slow beat, a beat of long duration, and allegro means a fast beat, a beat of short duration. For the sake of easy reference we may think of a moderato tempo as the tempo of the normal pulse—approximately 72 beats per minute. This is also the tempo of a leisurely walking gait, the andante tempo of music, as illustrated, for example, in the Wedding March from Wagner’s Lohengrin (written alla breve for purposes of comparison).

\[
\begin{array}{c}
\text{(} \frac{1}{4} \text{) 72} \\
1 & 2 & 1 & 2 & 1 & 2 & 1 & 2 \\
\end{array}
\]

A tempo twice as fast as the normal pulse—144 beats per minute—is at the rate of a fast march, as in Bagley’s famous National Emblem march.

\[
\begin{array}{c}
\text{(} \frac{1}{4} \text{) 144} \\
1 & 2 & 1 & 2 & 1 & 2 & 1 & 2 \\
\end{array}
\]

A tempo three times as fast—216 beats per minute—is approximately the tempo of the Italian Tarantella, the dance which is supposed to have originated from the excitement induced by the bite of the tarantula. It is also the tempo of the half-beat of the jitterbug rug-cutter who has been bitten by one of our deadlier swing bands!

The mind refuses to consider each beat as a separate, independent entity and proceeds rather to group them. The grouping of beats produces meter. The most elementary metric grouping is the natural grouping by twos, suggested possibly by
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the natural grouping of footsteps in walking. By instituting a slight accent on every other beat this duple meter becomes readily apparent. This is the fundamental meter of marches and of the great mass of popular music.

\[
\begin{array}{cccc}
1 & 2 & 1 & 2 \\
\end{array}
\]

By accenting in groups of three rather than two we produce the second basic meter, triple meter. This is the meter of the waltz and of many graceful and charming folk dances.

\[
\begin{array}{cccc}
1 & 2 & 3 & 1 \\
\end{array}
\]

This is an over-simplification of the subject of meter, as there are also compound duple rhythms and compound triple rhythms formed by the grouping of basic units within a larger compound unit. There are also in contemporary music complexes of duple and triple rhythm in combinations of groups of three and two within larger units of, for example, five or seven.

\[
\begin{array}{cccccc}
1 & 2 & 3 & 1 & 6 & 1 \\
\end{array}
\]

In the main, however, this simplification serves our purpose.

When we have discussed tempo and meter we have, however, not yet discussed rhythm itself, for rhythm is essentially the combination or subdivision of time units within fixed metric patterns, and it is to these temporal relationships of notes within a metric design that music owes a large part of its ability to produce effects which are soothing or exhilarating, quieting or disturbing.

Now, in proceeding to the consideration of the effects of
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rhythm, we may lay down a few simple principles. First, everything else being equal, the further the tempo is accelerated from the pulse rate toward the upper limit of practical tempo the greater becomes the emotional tension. Second, as long as the subdivisions of the metric units are regular and the accents remain strictly in conformity with the basic pattern, the effect may be exhilarating but will not be disturbing. Third, rhythmic tension is heightened by the extent to which the dynamic accent is misplaced in terms of the metric accent. Fourth, the emotional effect of “off-balance” accents is greatly heightened by an increase in dynamic power.

Let us begin our illustrations with a duple meter with subdivisions of two. This is an English folk dance of ancient vintage. It will be noticed that the dynamic accent is in complete accord with the metric accent, producing an effect of smooth rhythmic balance.

Here is a similar case, but with a slight variation in that the stronger dynamic accent is shifted from the first to the second beat.

Our third dance is also in duple rhythm but with a subdivision of three, giving an increased rhythmic vitality.

The stately court dances of the 17th and 18th centuries were for the most part conceived in this balanced form. The style is
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beautifully illustrated in, for example, the Minuet from the C major or "Jupiter" Symphony of Mozart

and persists in the early works of Beethoven as illustrated in the charming Minuet from the G major Sonata.

A beautiful illustration—one so theoretically perfect as to constitute what we might call a clinical example—is found in a Gigue of Händel where the dynamic stress in a triple meter is on the first beat, the harmony is repeated in the second beat without accent, and the third beat receives no stress at all as half of the beat is occupied by a rest. The result is a rhythm of superb grace and elegance, again with the metric and dynamic accents in complete accord.

Even the classic composers, however, were intrigued by the disturbing effects of off-balance rhythms, and we find "Papa" Haydn in the Minuet of his "London" Symphony deliberately disturbing the regular rhythmic flow of the dance by placing a dynamic accent on the third beat of each measure—a mild disturbance, it is true, but a forerunner of later developments.
As dissonance began creeping into the music of the 19th century composers in their search for the expression of emotional tension, so the introduction of rhythmic unbalance was used for the same purpose. The first movement of the “Eroica” Symphony serves as an excellent illustration. The movement is in a basic three meter, but in the most exciting part of the movement Beethoven introduces a duple dynamic accent into a triple meter. In other words, the dynamic and metric accents are thrown violently off-balance.

As I have already pointed out, the composers from the 16th century to the 20th were highly conscious of the possibilities of dissonance for the arousing of emotional excitement. The older composers were equally conscious of the power of rhythmic displacement to create similar tension, and the 16th century theorists established numerous “rules” to keep music on the straight and narrow path of rhythmic regularity as well as consonance. The increase in the use of disruptive dissonance and rhythmic irregularity from the 16th to at least the middle of the 19th century was slow and gradual. With the advent of the 20th century, however, caution was generally abandoned and music proceeded rapidly on the path to greater harmonic dissonance and greater rhythmic irregularity.

The development of rhythmic irregularity has found its most
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fertile field in contemporary popular music. It began mildly enough in early American “rag-time” by the simple device of a shifted accent in the melodic line, a device which had long precedent in classical music. See, for example, Braham’s famous “Limehouse Blues.”

From this it proceeded, more subtly, through the use of the classic device of the super-imposition of a three-beat rhythmic figure upon a basic two-beat meter (as previously illustrated in the Beethoven example) in Zez Confrey’s “Stumbling.”

It finds its ultimate development in the current “Boogie-Woogie” craze. A short technical explanation of this queer atavistic manifestation is, I believe, in order. Popular music has in large measure discarded the more graceful three meter for the more “square” and angular two-beat measure. Now it is apparent that if eight beats follow one another in two-beat meter there would normally be four groups of two beats with a slight accent on the first of each group, that is, 1 2, 3 4, 5 6, 7 8. It is apparent, however, that, arithmetically, eight may be divided into unequal groups of three and two, for example, 3 3 2, in which cases the accents fall 1 2 3, 4 5 6, 7 8.

In “Boogie-Woogie” a repeated figure in the bass—the classic basso ostinato—continues indefinitely in regular rhythm.

Above this the harmonies are placed on accents at variance with the basic meter.
When the ostinato is played by a vigorous pianist and one or more violent slap-bass artists, and when the harmonies are played by six leather-lunged trumpets and trombones intent on mayhem on the ears, the effect can be devastating.

There is a particularly—to me—nerve-racking variety which I understand is called "Indian Boogie-Woogie"—the title apparently constituting the white man's crowning insult to the noble Indian. In at least one version a little crass dissonance is added to the usual ingredients with the following results:

I have attempted in the foregoing paper to review a few of the most important developments in the history of musical composition and to remark upon the technics which have contributed to particular types of musical expression. The emotional connotations of music are highly complex in character. They are also, I believe, more powerful than is generally realized. Music in its relationship to the emotions presents several fascinating fields of study, none of which has been widely explored. There is first, the study of music as an expression of the individual who creates it; second, the study of music in relation to the age from which it springs; third, the scientific analysis of musical technics and their relationship to emotional expression; and fourth, the study of the effects of these various types of music upon the listener.
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A combination of the third and fourth categories which would enlist the aid both of skilled musical theorists and of psychiatrists would, I believe, throw much light upon the influence of music, both benevolent and malevolent, in the lives of people. For in this day when through the radio the country is literally flooded with sound it seems logical to assume that music is destined to play an important part in helping to preserve mental sanity on the one hand or, if misused, to add to the emotional strain of an age already overtaxed by disruptive forces.

In conclusion it may be appropriate to say a word about contemporary popular music. Popular music, like any other kind of music, may be good, bad, or indifferent in quality. Much of it is harmless, some of it is over-sentimental, some contains at least a modicum of phantasy and beauty. I hesitate to think, however, of what the effect of music upon the next generation will be if the present school of "hot jazz" continues to develop unabated. Much of it is crass, raucous, and commonplace, and could be dismissed without comment if it were not for the radio whereby hour after hour, night after night, American homes are flooded with vast quantities of this material, to which accompaniment our youngsters dance, play, and even study. Perhaps they have developed an immunity to its effect—but if they have not, and if the mass production of this aural drug is not curtailed, we may find ourselves a nation of neurotics which even the skill of the psychiatrist may be hard pressed to cure. It seems, therefore, only poetic justice that musical therapeutics should develop at least to the point where music may serve as an antidote for itself!
Psychiatry is the utilization of words, their meanings, and the dynamics behind them for the purpose of bringing about the proper attitude toward life. The meanings of words appeal primarily to the cerebral hemispheres, the master brain. There must be no resistance or inhibition on the part of the master brain to initiate action. After they are passed by the master brain, emotional reactions and organ functions follow. If someone calls me names, I become emotional and am perhaps ready to fight. My glands and organs participate in this, but only after the master brain has made the situation clear to the organism.

The powerful verbal form of therapy, so skillfully and successfully developed by the psychiatrists, was long ago used by

* This chapter is based upon material presented in two articles: "The Past, Present and Future of Musical Therapy," by Ira M. Altshuler (Educational Music Magazine, Jan.-Feb. 1945) and "Music—An Aid in Management of the Psychotic Patient," by Ira M. Altshuler and Bessey H. Shebesta (The Journal of Nervous and Mental Diseases, Aug. 1941). The material is reprinted by kind permission of the authors and the editors of the Journals in which the articles originally appeared.—Editors.
The poet, philosopher, writer, educator, and preacher. Its “therapeutic” influence before its elevation into a scientific doctrine had made itself felt in education, religion, social and political life, and in propaganda.

Analyzing the powers of music, one should keep in mind that music has always been an important factor in the instinctual, emotional, intellectual, cultural, and spiritual life of people, and as such, from time immemorial, exercised a sort of therapeutic influence.

Music, even more than the spoken word, lends itself as a therapy because it meets with little or no intellectual resistance and does not need to appeal to logic to initiate action. It is more subtle and more primitive and therefore its appeal is wider and greater.

Rhythm and Man

Man, a product of nature, cannot remain aloof to music because tone and rhythm, of which music is composed, have a strong affinity for living organisms. The whole animal kingdom is conditioned to sound and rhythm, and such vital processes as propagation and protection depend upon them. In lower forms of life the vibration sense takes on the job of hearing, a sense which, by the way, man still retains. The compulsion to respond to sound is seen in the evolution of various devices to capture it. The fish, for instance, has a primitive ear, a “lateral line” organ which runs the whole length of its body, from head to tail. This registers difference of pressure of water and thus acts as a warning of the proximity of an enemy or of the presence of prey. All fish produce sounds which we can now detect with sensitive electric devices. Some species produce pure and long-drawn sounds which range nearly an octave.

Many species of insects and birds turn some of their body parts into “musical instruments.” Even external objects are
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utilized by some creatures to produce music. These "instruments" no doubt are intended to attract attention, to arouse emotion, to create a mood and to evoke a response. In a sense it is a form of biological "therapy" which nature practices to safeguard and promote life. Some insects make loud music, so that they can be heard at a considerable distance, as is the case with beetles. The musical sounds produced by various creatures are highly specific, that is, each male animal produces its own tone which is identified by the female. The mother bird uses special signals for her young and the young for the mother bird. Some insects show amazing musical skill. In ancient times certain insects were carried around in cages to supply music for entertainment. The male katydid—a grasshopper species—and the common cricket are great insect musicians. Singing or making music by the birds is well known. They improvise all kinds of instruments. They give us the tone colors discernible in the flute, the drum, the trumpet, and the violin.

In the course of evolution, hearing devices continued to evolve, through the sensitive ear of the mammal, which orients sound in space, to the highly perfected ear of modern man, which while it has not the same range of pitch as the dog's, can distinguish tones more finely and combine them for his pleasure and entertainment. Man, unlike the lizard, does not live in a world of vibrations from which he must scurry away, but has learned to master sound, and turn it to his own advantage, until next to the eye it is the most valuable of his senses. Sound waves to man are not signals of alarm, or gross mating stimuli, but through the intercession of the brain literally convert matter into mind. It runs from vibrations to neural impulses, to sensations, to feelings, to emotions, to aesthetic, spiritual and social attitudes.

The element of rhythm in music enters intimately into the problem of music therapy. Man is essentially a rhythmical
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being. There is rhythm in respiration, heartbeat, speech, gait, etc. The cerebral hemispheres are in a perpetual state of rhythmical swing—day and night. Even the slightest change in the body, such as opening or closing of the eyelids, causes a change in brain rhythm. These brain waves differ in emotional states, fever, intoxication, infections, and such conditions as epilepsy.

The Davises of Harvard some time ago observed “instances in which tones initiated special waves (Beta Rhythm) and also abolished them.” Living in a rhythmical universe adds more responsivity to music rhythm. Man-made rhythm is a replica of cosmic and bodily rhythm. Descartes’ “I think, therefore I exist” perhaps should read “I rhythm, therefore I exist.”

The study of folk legends, fairy tales and the myth—products of the collective unconscious—indicates that man has always attributed great powers to music. Music, according to those beliefs, was so omnipotent that it could restore the dead to life, cure the sick, and even affect the course of nature itself. It is interesting that the opposite of the primitive man—the philosopher—maintained similar beliefs regarding the powers of music. The ancient Greek philosophers were keenly conscious of the influence of music upon social and political life. Plato thought that no change could be made in music without profoundly affecting the policies of a state. Malice, insolence, and their opposites, could be brought about by music, he believed. Aristotle concurred in this opinion.

The study of Greek culture reveals that the Greeks recognized the value of music as mental hygiene. One of the seven muses, Euterpe, was in charge of music prophylaxis and promoting civilization. The therapeutic properties of music were appreciated by the Greeks as well. Apollo, the God of the Sun, exercised a double function—that of God of Medicine and Music, while his mythical son, Aesculapius, was the patron of medicine.
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Objective Approach

In the 18th and 19th centuries, and especially with the arrival of the experimental method, a new orientation ensued concerning the influence of music upon the human organism. An attempt was made toward an objective approach. Interesting reports appeared in Europe and in our own country in which the effect of music upon metabolism, muscular energy, blood pressure, respiration, and pulse was described. Cannon, the eminent Harvard physiologist, believes that music arouses emotions and releases adrenalin and perhaps other hormones. Clinical reports dealing with observations made on groups of mental patients also appeared. All these experiments and observations, however interesting and valuable, failed to take into consideration two fundamental factors, namely, the role of the central nervous system in musico-dynamics and the structural elements of music.

Various brain centers, viz. hypothalamus, thalamus, cerebellum, in addition to the cerebral hemispheres, the master brain, take part not only in metamorphosing tone and rhythm into music, but in giving it an emotional and mental content. The understanding of the anatomy and physiology of these brain centers is therefore indispensable. The hypothalamus exercises influence upon such physiological processes as metabolism, sleep, rhythm, etc. It is connected by nerve pathways with the thalamus and through it with the other brain centers. One can see thus how music can influence the body, that is, via thalamus and hypothalamus.

The thalamus is a subcortical brain center made up of gray matter, lying below the master brain. It is the main relay station of emotions, sensations, and feelings. It is believed that even aesthetic feelings are relayed by the thalamus to the master brain. The thalamus is connected with the master brain
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by nerve pathways, and the stimulation of the thalamus almost simultaneously arouses the master brain. Once the master brain is aroused, it sends impulses back to the thalamus and so a reverberating circuit is set in motion. Now this is an important finding. There are nervous and mental patients who cannot be reached through the spoken word (that is, through the master brain), because these patients are either inattentive, distractible, confused, depressed, hallucinated, or in a state of anxiety which makes verbal contact next to impossible. It is precisely here that music makes itself useful. Music, which does not depend upon the master brain to gain its entry into the organism, can still arouse by way of the thalamus—the relay station of all emotions, sensations and feelings. Once a stimulus has been able to reach the thalamus, the master brain is automatically invaded, and if the stimulus is continued for some time, a closer contact between the master brain and world of reality can be thus established.

Contact through Music

In the management of nervous and mental patients this is important. In order to be able to initiate psychotherapy, the removal of states of inattention, anxiety, tension, and morbid moods is essential. That temporary contact with the patient through music can be established is seen from the fact that patients considerably disturbed or confused will respond to music by either tapping the foot, swaying the body or nodding the head. Such responses are known as thalamic reflexes. When the music tempo is changed one can observe that the tempo of the tap, even in the most confused and disturbed patients, is correspondingly affected. The phenomenon of the thalamic reflex is important in another respect; it can be utilized in objective study of the effect of music upon nervous and mental
patients. Clinical experiences indicate that the mood and the mental tempo of psychotic patients can be influenced more readily by music if a special approach is employed. Thus when a patient is depressed, sad music (in minor keys) will capture his mood more readily than gay music. Gay music may in the beginning even irritate him. Hypomaniacal patients, whose emotional tone is raised and who think fast, talk fast, and walk fast, can be more easily “captured” by music with a fast tempo.

Only after one has worked himself “musically” into the mood or tempo of the mental patient can a shift to a different mood or tempo be made; this, of course, by the employment of special music. This maneuver is known as the “iso” principle. “Iso” simply means “equal”; that is, that the mood or tempo of the music in the beginning must be in “iso” relation with the mood or tempo of the mental patient. The “iso” principle is extended also to volume and rhythm. In a noisy ward, for instance, sometimes the volume of music is raised to overcome the noise.

In clinical work with ward patients, where one finds all kinds and degrees of psychoses, it is important to have some arrangement whereby as many patients as possible can be reached at one time. The practice at Eloise Hospital is therefore to make a survey of the ward prior to the initiation of group-music therapy. Among other things, in such surveys the number of patients, sex, their mean age, the percentage of different nationalities, the number of violent, depressed, and preoccupied are noted. The purpose of the survey is to suit the music to the patients on the ward. Thus, for instance, if there are 15 per cent Poles, 10 per cent Italians, and 70 per cent Americans on a ward, the nationality of the music is proportionately allocated. If there are, for instance, 30 per cent depressed and 70 per cent hyper-active, the music again is proportionately allocated according to the “iso” principle. Where it is convenient, depressed patients can be segregated in one place; similar
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arrangements can be worked out with nationalities, age groups, etc.

Every possible therapeutic property inherent in music should be utilized. The instrument or tone color possesses a given therapeutic property. Its nature and effect should be further studied. Stringed instruments lend themselves better to sad music and should be used in the work with depressed patients in the initial musical attack. Brass instruments are not suitable with patients who are sensitive to noise or suffering from anxiety states. Combinations of instruments can also be used. We have found the trio (violin, cello and piano) a good combination in the work with mental patients.

Order of Presentation

IN ADDITION to the “iso” maneuver, the strategy of “level” attacks is also practiced at Eloise Hospital in an attempt to arouse attention, to modify the mood, to stimulate imagery and association—steps essential in launching psychotherapy. For some time we have pursued the following order in exposing our patients to music: We begin with music in which there is a predominance of rhythm, this because rhythm as known has a strong appeal at the instinctual and primitive level. Rhythm, with its stress, duration, and pause, exercises a specific physiological and psychological effect, which differs from that of melody; the latter is apprehended as an entity, and exercises therefore an entirely different effect from rhythm. Melody is followed by harmony whose integrating effect can be linked with cerebellar influences. The cerebellum, as mentioned, is the center of integration and coordination, receiving impulses from the ear and all peripheral muscles. The “accord” felt in harmony is due to the influence of the cerebellum primarily and to the cortex in the second place. The next music played
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has a predominance of mood—sad or gay. It is intended to catch the mood of the patients and then shift it into the emotional tone desired. This can be accomplished by playing first sad and then gay music. Pictorial associative music is played next to stimulate imagery and associations. Through such music the calling up of various past experiences is facilitated. Music leaves a “memory” not only in the mind but in the emotional sphere, movements, and muscles. It is more easily recalled by the mental patient than anything else, for it is more firmly implanted in his system. Calling up of past experiences means bringing back into the mind of the mental patient basic realities. These bits of realities act as pontoons, bridging the patient’s mind with the outer world. They thus act therapeutically, even if the effect is short-lived. The temporary effect can be lengthened by repeating such music every day. At Eloise Hospital we have daily sessions on some wards in which the sequence, Rhythm, Melody, Harmony, Mood, Pictorial-associative music, is included in the musical prescription.

Prior to the administration of the above recipe, a theme song is played. The purpose of this theme song is to lure and induce the patients to join the group which meets on the ward.

Composers who wrought music naturally did not know that their compositions might be used for therapeutic purposes. There are no musical designs therefore which are purely rhythm, melody, or pictorial-associative, but there are compositions which have a predominance of one or the other element. Thus, for instance, the march is rhythmically dominant, while the intermezzo is melodically dominant. At Eloise we have catalogued musical designs according to the predominance of a structural element. The use of level attacks is intended to affect not only various psychoses, but the same patients on their various mental levels.
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An Experiment with Psychotic Patients

The acute mental patient presents many difficulties in management to the psychiatrist and to the hospital personnel. As long as a patient is acutely disturbed little constructive therapy is possible, and therefore anything that may promise curtailment or lessening of the turbulent state should be welcomed. The purpose of this paper is to suggest a method which might be used alone or in conjunction with hydrotherapy as an aid in quieting disturbed mental patients. Hydrotherapy has been used for many years as practically the only means to reduce the acute excitement of psychotic patients.

Most physicians are familiar with the classical explanations given for the relaxing effects which may be obtained from the use of continuous warm baths and cold wet packs. However, little emphasis in the literature has been placed on the psychological factors involved in the proper usage of hydriatic treatments. Psychological factors accompanying such treatments may be such as to offset any beneficial physiological effects that might otherwise be obtained. One factor that should not be overlooked in the mental hospital, and one that must be guarded against continually, is the development of the feeling by the patient that hydrotherapy is used as a punitive measure and not as a definite treatment. In spite of continual vigilance patients commonly develop this idea, particularly when treatments are given by untrained employees, who may likewise fail to understand the rationale of the treatment.

In an effort to further the beneficial effects to be obtained from the routine use of hydrotherapy, it was decided to try to determine what benefits, if any, were to be obtained from the controlled use of music. Music was accordingly used alone and in conjunction with regular hydrotherapy treatments. It is a well-recognized fact that many individuals even though not
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able to play a musical instrument enjoy listening to various types of music. Music for many people has been an integral part of their lives, and for the psychotic patient certain tunes and words may bring about associations of a familiar nature. Revival of these basic realities might aid in making a turbulent patient more accessible.

Four chronically disturbed schizophrenic women were chosen for special observation. These patients had all been treated for extended periods previously with continuous tubs or cold wet sheet packs, without noticeable benefit in regard to immediate or delayed sedative effect or better ward adjustment. Observations were made and recorded to determine any possible benefits that might result from the use of music when combined with regular hydrotherapy treatments. To have some basis for comparisons the amount of vocal productions and head movements was recorded for thirty-minute periods. This is referred to as “output.” Observations were made for a six-week period, five days a week, two to three hours each day. Two patients were given continuous baths (96° F.), and two were given cold wet sheet packs (55° F.) during the observation periods. All patients were English-speaking and had been considered chronic, inaccessible cases. These patients were treated in the regular hydrotherapy room where other patients were likewise receiving similar treatments. The experimental patients were separated by screens from other patients. The musician, a female violinist, always played behind a screen. The output prior to the treatment, during the treatment, and also after the treatment was recorded. Music was not played until all four patients had been in the tub or pack for a period of about fifteen to thirty minutes. During the first ten to twenty minutes of playing no changes were noted in the patients, and they seemed more or less indifferent and inattentive to the music. Soon it was found that familiar tunes were most effective in centering and keeping their attention. Thus, very
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noisy and upset patients might begin to sing a familiar song with the violin, keeping their output of energy at about the same level but changing from irrelevant, purposeless activity to the directed activity of singing or humming the tune. It was also noted that the effect of familiar tunes extended at times far beyond the termination of the music, as manifested by continued singing long after the music had ceased. Familiar waltzes were found to be the best type of music to use in quieting the patients, but were more effective when preceded by more "lively" tunes which secured the attention of the patient. During the first two or three weeks of the experiment the patients showed more active responses in that there was more singing, while in the latter half of the experiment the patient showed a greater tendency to relax while the violin was played. One patient who previously had talked continually while receiving hydrotherapy slept comfortably after listening to the music for about one-half hour.

A second group of four patients was observed for a period of twenty days, these being quieter patients, all female schizophrenics who were inaccessible and subject to impulsive, combative behavior. These women were of Italian parentage, and had no history of any particular musical background. Observations were made daily and records were kept as in the first group. That is, the amount of general output, such as talking and shouting, was calculated on a thirty-minute basis. The output immediately before hydrotherapy, during the pack or bath without music, and while in the pack or bath with music was recorded. In addition a record was made of the output while music was played, with patients in a dry sheet pack or in a tub without water, but resting on the hammock. As a result of these observations the following changes were noted:

Initially, when a patient is put into a cold wet sheet pack there is a temporary increase in the output, or an apparent stimulating effect which subsequently is followed by a decrease.
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in the output which is more marked when music is added. When patients were placed in dry sheet packs there was also an increase in the output both with and without music. However, after twenty to thirty minutes of music it was noted that the output of the patients, both in the dry pack and the wet pack, decreased in about the same degree, namely 50 per cent, showing that possibly the music alone may have been responsible for this quieting effect. (See Table I.)

**TABLE I**

Average Verbal Output (Calculated Per 30 Minutes for Entire Time of Observations) on Patients Receiving Cold Wet Sheet Packs

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Average Output (per 30 min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Average output (per 30 min.) before treatment</td>
<td>53</td>
</tr>
<tr>
<td>2</td>
<td>Average output (per 30 min.) during pack (without music)</td>
<td>56</td>
</tr>
<tr>
<td>3</td>
<td>Average output (per 30 min.) during pack (with music)</td>
<td>58</td>
</tr>
<tr>
<td>4</td>
<td>After effect of No. 3 (observations begun 15 minutes after cessation of music)</td>
<td>31</td>
</tr>
<tr>
<td>5</td>
<td>Average output during dry pack (per 30 min.)</td>
<td>42</td>
</tr>
<tr>
<td>6</td>
<td>Average output during dry pack (with music)</td>
<td>57</td>
</tr>
<tr>
<td>7</td>
<td>After effect of No. 6</td>
<td>29</td>
</tr>
</tbody>
</table>

Patients receiving continuous baths also showed an initial increase in output above the pre-treatment level. After the initial rise the output later decreased, but to a greater extent when the music was added. These patients after cessation of the music showed a decrease of 37 per cent in output as compared with the output in the pre-treatment phase. It was also noted that approximately the same decrease in output (35 per cent) was obtained by music under these conditions except that the water was removed from the tub, the patient simply reclining in the hammock. (See Table II.)

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TABLE II

Average Verbal Output (Calculated Per 30 Minutes for Entire Time of Observations) of Patients Receiving Continuous Baths

1. Average output (per 30 min.) before treatment ....... 53
2. Average output (per 30 min.) during treatment ........ 58
3. Average output (per 30 min.) during treatment (with music) ........................................ 57
4. After effects of No. 3 begun 15 minutes after cessation of music ........................................ 36
5. Average output during treatment without water in tub 58
6. Average output during treatment without water in tub (with music) ........................................ 41
7. After effect of No. 6 (observations begun 15 minutes after music had ceased) ......................... 27

This observation again raises the question as to the rationale of our generally accepted hydriatic procedures.

Theoretically, when a patient is snugly confined in a wet sheet pack, there is a reduction in the stimuli which arise from voluntary muscular activity, and the restraint of the pack should therefore decrease cerebral activity and make individuals more susceptible to external auditory stimuli. This assumption was somewhat borne out by the fact that a greater decrease in output was noted in the patients receiving packs than in those receiving continuous baths. It may be possible that in contrast to baths, packs facilitate the assimilation of music by decreasing to a greater extent peripheral stimuli.

During the course of the experiments, patients, even those previously very antagonistic, expressed their appreciation of the music and soon grew to expect music with their treatments. In general, the whole atmosphere of the hydrotherapy room was changed for the better.
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Discussion

At the present time our observations are few in number and more study will be necessary before definite conclusions can be drawn. However, the effects noted encourage one to believe that adequate use of music may prove a substantial aid in augmenting the effects of various forms of hydrotherapy. It may also be possible that music will supplant hydrotherapy since it is a more practical, easy, and pleasant procedure. It might also be possible by means of special kinds of music to produce stimulating effects which would aid in centering and keeping the attention of underactive and depressed patients. Music in our experience produced favorable psychological effects on both patients and hospital personnel. Further controlled observations should be made to determine the long-time effects of music, as well as the effects of different kinds of music upon various types of psychoses. These observations are presented merely as a preliminary report because of the unexpected and favorable results. Further work has been planned using a greater number of patients, including all types of psychoses as well as a great variety of music.

Summary

1. Music seems a useful agent in decreasing output of disturbed and inaccessible mental patients, both alone and in conjunction with various forms of hydrotherapy.

2. The use of music with hydriatric procedures tends to prevent the development of a feeling that such treatment is a punitive measure.

3. Music appears more practical than hydrotherapy since larger groups can be treated simultaneously.
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4. Music, particularly familiar tunes, bringing back memories and realities, is a natural substitute for states of phantasy, fear, and excitement.

5. Further observations on the controlled use of music are desirable.

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Chapter Eleven

The Musician's Approach to Musical Therapy

Arnold Elston

Mounting interest and activity in the use of music as a therapeutic agent are clearly manifested by the fast-growing literature on musical therapy. By far the bulk of the writing on the subject aims to impress us with the efficacy of music by citing cases of remarkable cures attributed to its almost miraculous powers. Among others, claims are made that music can promote digestion by releasing digestive juices, act as a sleep-inducing sedative, restore memory to amnesia victims, and improve vision by 25 per cent. Upon probing the validity of such claims one discovers that they not infrequently rest upon but a single case or two reported in a medical journal or hospital bulletin. Often the music used is not specified beyond the general description that it was "popular," or "classical," or folk song. Sometimes these claims are based upon isolated experiments conducted by physiologists, psychologists, and physicians whose knowledge of music hardly exceeds that of the layman. Some of the "classic" experiments, such as those
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of Binet and Courtier, were made more than forty or fifty years ago, when knowledge of physiology and psychology was relatively elementary, and also when the necessary apparatus for exact recording of physiological reactions was lacking. Furthermore the findings in similar experiments are by no means in agreement. Yet many writers on the subject, confronted by all this unreliability and contradiction, repeatedly quote these solitary cases and inconclusive experiments as proof of music's curative powers.

Even when there is fair evidence that music has been instrumental in effecting a cure, the question arises whether this may have been an exceptional case whose success depended upon the patient's idiosyncrasy or upon factors unknown and hence beyond control. Granted that in medical practice too there are cases which owe their success to a unique set of circumstances or to unknown factors, the practice as a whole nevertheless rests upon some degree of scientific control over the conditions involved. But can the curative powers of music be controlled? The answer will be forthcoming only after intensive and exhaustive investigation of all the conditions which involve the use of music as a therapeutic agent.

It is an astonishing fact that the music itself has been the least investigated of all the factors involved. It can hardly be expected that the physiologist and psychologist possess the technical knowledge necessary to an understanding of the specific musical factors which bring about specific bodily and mental reactions in the listener. But without this knowledge there can be no control of these reactions. At present the musical therapist has little knowledge of musical pharmacology, so to speak. He administers his musical materia medica guided solely by hit-and-miss empiricism and subjective reasoning. As long as such practice prevails musical therapy will remain a pseudo-science. Headway towards an intelligent formulation of its problems and the development of a satisfactory technique of
control can come only if the musician enters into collaboration with the physiologist and psychologist. Without this, the practice will continue to flounder about among vague, extravagant theories, and may become a happy hunting ground for quacks and cultists.

The use of music for therapeutic purposes depends upon an exact knowledge of the musical elements, rhythm, harmony, melody, tone color, dynamics, etc., and upon a full understanding of the ways in which these elements in their aggregate effect react upon the listener. The basis for the scientific control of the listener’s reactions can be established only after determining the causal relation existing between the musical effect and the reaction to it. Until the collaboration between the physiologist, psychologist, and musician takes place, the exact nature of the causal connection between the music and the listener’s physical and mental response cannot be specified. One of the first tasks of this collaboration will be to investigate what sort of reactions are produced by the various musical factors, such as a crescendo, syncopation, static harmony, etc. Such investigation will be greatly complicated by the fact that the musical elements cannot be studied as isolated factors. The general rhythmic character of an appoggiatura, for example, is that of a strong or accented tone followed by a weak or unaccented tone of resolution. In the following excerpt from the Rondo of
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Beethoven's piano sonata Op. 10, No. 3, however, the usual dynamics of the appoggiatura is negated by the melody.

The accompaniment brings a change of harmony at the beginning of each measure, whereas the tonality of the arpeggio motive A overlaps into the second and fourth measures, resulting in appoggiature on the first two eighth notes of these measures. Any stressing of the appoggiature would result in a distortion of the motive, which moves from strong to weak dynamically.

We observe here that the normal rhythmic effect of the appoggiatura is counteracted by other factors in the musical complex. This does not mean, however, that the function of an appoggiatura differs in every individual musical work. On the contrary, its rhythmic function is constant, regardless of the configuration in which it occurs, but its effect is variable, depending upon the reciprocal action of the other musical factors. Similarly, the functions of all the other musical factors are constant, but their effect must be evaluated in reference to the music as a whole. Failure to realize this fact has made most of the recent experimental studies of isolated factors, such as interval relationships, pitch, tempo, and modality, of but the slightest value in furthering our understanding of the causal connection between music and the listener's reactions to it.

It is the specific ways in which the musical elements function and interact that determine the nature of the response in the listener. There are, indeed, other factors which must be taken into consideration in choosing music which will elicit the desired reactions. Every listener has his individual taste, his own pattern of associations, his particular degree of receptivity to tonal stimulation. These personal factors largely condition the listener's response and thus present real difficulties to the musical therapist. As will be shown later, however, they are not insurmountable, provided that the therapist possesses an
exact knowledge of the ways in which the musical elements operate.

How will the musician go about determining the causal connection between the music and the reactions produced by it? Let us assume the validity of the general observation made by experimenters in the field to the effect that lively music, such as brisk marches, dances, etc., stimulates heart action and accelerates pulse and breathing, resulting in an increase of energy and prolongation of endurance. Let us further assume that such reactions will be produced in the listener upon hearing the principal theme from the Menuetto of Beethoven's First Symphony, about whose gay and spirited character there will be general agreement. To what specific features in the music will these reactions be attributable? The musician will seek the answer to this question by a thorough analysis of the work.

Such an analysis reveals that the germ-motive $\bar{a}$ is anacrustic, i.e., its rhythm consists of an unaccented up-beat followed by an accented down-beat. Furthermore we note that measures 1-3 are themselves an up-beat to the $G$ of measure 4 and similarly
measures 5-7 are anacrustic to measure 8. Thus the principal down-beats occur on measures 4 and 8. The second half of the theme, beginning at measure 9, has the following grouping of measures: 4-4-2-3-1-1-1-1. It is noteworthy that as the theme progresses to its end the principal down-beats occur at shorter intervals, creating the impression of increased energy. The growing dynamic intensity from “piano” to “fortissimo” and the sharp punctuation of the sforzato accents contribute to this impression. The simple scale-wise motion of the melody also brings these features into greater relief.

An analogy to these anacrustic constructions would be the gathering of momentum of a running start released finally in a powerful leap. An insight into Beethoven’s masterly rhythmic powers is afforded by the extended up-beat of measure 20, charging up even more energy for the veritable explosion which follows. A lesser composer, I suspect, might have omitted this measure and preserved the regularity of the measure groups, but with what loss of impetus and vitality!

The harmony of this example also conveys the impression of increasing animation and power. In the first eight measures only the simplest modulation from the tonic to its dominant occurs. The second half of the theme moves quickly into the subdominant region, touching the somewhat remote keys of E flat, C minor, A flat, and D flat and thereby creating considerable harmonic tension.

Other factors in the music could be analyzed, such as the harmonic rhythm, that is, the frequency of harmonic change, the interval relationships of the melody, the instrumentation, etc. It is hoped, however, that the above brief analysis will indicate the nature of the musician’s investigation. Let us suppose that the musician analyzes a variety of musical works which have brought forth similar reactions to those we have assumed for the Menuetto theme. If he noted that some of these works had a fast tempo, preponderantly anacrustic rhythms, an in-
creasing occurrence of principal down-beats, growing dynamic intensity and harmonic tension, he could then determine experimentally whether music selected by him for these specific features could in turn produce the same reactions. If this proved to be the case the musician could eventually discover the causal connection between the musical factors and the reactions they produce. The basis for a technique of control would thus be established.

In order to illustrate further how the musician would proceed to discover causal connections, let us analyze the opening measures from the Prelude to Act III of Wagner's Tristan and Isolde.

\[
\text{Moderately slow}
\]

Instead of the anacrustic rhythms of the Beethoven Menuetto, here feminine endings prevail. As we have seen, the general tendency of an up-beat construction is to gather up energy which reaches its crest on the down-beat. The feminine ending, an appendage of one or more tones to the down-beat, spends this energy and thus is often accompanied by a diminuendo. (A particular harmony or phrasing may, however, completely alter the characteristic functioning of both anacrustic and feminine ending constructions.) In this example the first measure is an anacrusis to the feminine ending of measure 2.
Measures 3 and 4 repeat the first two. We note next the comparatively enormous feminine ending spanning the last five measures. Just as the increasing occurrence of principal downbeats in the Beethoven Menuetto denoted an increase of energy, here the increased length of the last feminine ending denotes dissipation of energy, whereby Wagner vividly portrays the ebbing away of the hero’s life. In these last measures the tonic F is felt throughout, even after it ceases to sound, for no new bass tone supplants it. Consequently the final chord is a dissonance, E, G, and the implied bass tone F. It is as if there were not sufficient energy left to resolve the dissonant tones. In fact the entire passage conveys a harmonically sluggish and static impression, with but two chords used: F I₄ and I.

We can try an experiment which may help us to realize the physiologically depressive effect of this passage. If we inhale during the up-beats and exhale during the feminine endings, the last feminine ending will convey a strong feeling of relaxation, even perhaps of exhaustion. It would, of course, be absurd to assume that the listener would breathe thus on hearing the music. Yet it is not far-fetched to say that an up-beat is musically equivalent to an inhalation, and a feminine ending to an exhalation. One can often observe in the singer, instrumentalist, and conductor the sharp intake of breath on an up-beat, signifying the same gathering of energy which manifests itself in the music. It may well be that on listening to music, automatic, involuntary breathing responses are brought forth which correspond roughly to the broad impulses of the rhythms. This would explain the observation of physiologists that some music increases the rate and depth of inhalation, while other music decreases the same, so that music can act as a stimulant or as a sedative. Investigation and experiment along the lines indicated here will bring the musical therapist closer to ultimate control of these beneficent powers residing in music.

Will the above quoted excerpts from Beethoven and Wagner
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produce similar reactions in a variety of listeners? Obviously this cannot be the case, since reactions will be conditioned by such personal factors as musical intelligence, taste, associations, etc., which differ widely from listener to listener. The problem confronting the musical therapist is to find music adapted to the receptive capacity of the listener and at the same time capable of bringing forth the desired physical and mental responses.

As yet no direct approach to this problem has been found. Musical therapists reveal their awareness of the problem by favoring the use of folk music in clinics and institutional wards, since this type of music forms a large part of the general musical heritage and is more readily accessible to a variety of individuals. But to release music’s full potentiality, the therapist will have to draw on music of all types, instrumental and vocal, symphonic and operatic, “classical” and “popular.” Here the problem of selection grows acute. A recent popular book on musical therapy contains the following list of music, recommended as suitable dinner music because of its “soothing” or “mildly stimulating” character.

Finlandia ........................................... Sibelius
Italian Street Song .............................. Herbert
The Clock Symphony ............................ Haydn
The Moldau ........................................ Smetana
Symphonic Espagnole ............................. Lalo
Indian Suite ...................................... MacDowell
Symphony in G minor ............................ Roussel

The list presupposes an astonishing diversity of taste. The listener who would find the naive Italian Street Song soothing or mildly stimulating is expected to react in similar manner to the sophisticated and advanced style of the Roussel symphony. Is there any listener, with the possible exception of the compiler, for whom all this music would be soothing or mildly stimulating, or for that matter, would produce any sort of con-
The Musician’s Approach to Musical Therapy

sistent reaction? The arbitrary character of this list will be evident to everyone familiar with the music. Musical therapists cannot prescribe music as the doctor prescribes a pill. The choice of music must depend upon an accurate evaluation of the various conditioning factors of the individual listener. This involves no special difficulties; the musician and music psychologist can readily discover an individual’s taste, his intellectual and emotional capacity, his degree of responsiveness, and so forth.

The musical therapist may therefore find that whereas the Tristan excerpt, for example, acts as a depressive upon one listener, it will leave another listener unresponsive, or perhaps even irritate him. In order to produce the same depressive effect upon the latter it may be necessary to choose music by another composer, or in a less complex style, or from a different historical period. The therapist’s choice will, however, be guided by his knowledge that the listener’s reactions will be dependent upon specific factors in the music. If the therapist has determined the causal connection between certain musical configurations and the depressive effect they induce, he will be able to select music suitable to the taste, associations, and receptive capacity of the listener, music either simple or complex, high-brow or low-brow, pre-Bach or modern, as the case may be, which nevertheless produces the desired reactions. This is possible because the properties and effects of the musical elements remain the same, whether present in a work of the 16th or of the 20th century: a feminine ending denotes the same expenditure of the energy of a principal beat, and produces the same effect of relaxation in us, whether we hear it in Palestrina, Stravinsky, Victor Herbert, or Gershwin. I do not mean to say, however, that the degree of relaxation will be the same. This will, of course, depend largely on those personal conditioning factors of taste, musical training, etc.

From the foregoing it will be apparent that the cardinal prob-
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Problem of the musical therapist is to discover the causal operation of the musical elements. Only after this discovery has been made can any appreciable degree of control over music's curative powers be possible. Should such control be ultimately realized, it is fairly safe to expect that composers will devote part of their efforts to the writing of music with the specific purpose of evoking certain physiological and emotional responses conducive to the well-being of the listener. If that day should come, society will again turn to the composer in one of his oldest, most preeminent roles, that of the exorciser of the spirit and ministrant to health.
Music has been used to comfort sick persons since time immemorial. Only during the past twenty-five years, however, has it been introduced in hospitals, particularly those for mental and nervous diseases. Notable progress has been made in the systematic application of music as a means of occupational therapy and of recreation. In many of these hospitals members of the regular personnel have long been interested in developing various ways of using music; in several, professional musicians are employed to carry on music activities for and with the patients.

What is new is the actually nationwide desire of musicians to give music service to hospitals. In the past five years it has gained unprecedented impetus through the strong appeal of the national war effort. Eagerness to meet the needs of this new kind of audience originated in the desire of many musicians to make an important contribution with their art, and the age-old belief that music has a beneficial effect on the sick seemed

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to show them a way. Hence, musicians by the hundreds, amateurs and professionals alike, sought entrance to the hospitals to bring with their music comfort and encouragement to the men and women who had become incapacitated in the service of their country and were in dire need of all the medical and humanitarian care that could possibly be provided.

This enthusiasm to serve the sick has created two related problems. The first concerns hospital administrators. How, they ask, can we use these musicians and their music to the best advantage? The second is the problem of the musicians: In what way can we make our efforts most valuable to the hospitals?

Music service to the hospitals is being rendered either on a voluntary basis or as an officially assigned duty. Noteworthy as officially adopted music services are two developments: the United States Army Hospital Service has adopted a Program of Music in Reconditioning in Army General Hospitals in Continental United States; and the American National Red Cross has made music a part of its extensive recreational activities in service hospitals. The USO-Camp Shows Hospital Circuit and the Foxhole Circuit, both of which served American hospitals overseas, included musical performances on their programs. Among volunteer efforts of other civilian organizations, the American Federation of Music Clubs and the Civilian Defense Volunteer Offices ranked high with the nationwide musical assistance given to military and civilian hospitals. Finally, the Theater Wing also brought musical entertainment to military hospitals as a part of its general activities program.

The total number of organizations and individuals engaged in hospital music activities is impressive. It includes professionals and amateurs, instrumental and vocal soloists, orchestras, bands, choruses, and musical comedy troupes, some of whom are nationally famous. Many hospital staff members who are musically skilled contribute their music services freely. Where funds are not adequate, music firms often donate instruments
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and materials. So do many civic organizations and private donors. Indeed, musicians and friends of music have shown that they have the musical needs of hospitals at heart.

The systematic application of music as a medically coordinated means of modern hospital treatment is still in its infancy. Serious efforts are being made today by some members of the medical profession to develop in collaboration with musicians a medically acceptable technique for using music in hospital treatment. Such a technique is already well-established in connection with the use of arts and crafts as media of occupational therapy. A great deal of patient and painstaking exploratory work has still to be done to reach the same goal with music.

The following pages stress this need for professional collaboration because it has been found essential for a general understanding of the problem, and for bringing about even such constructive use of music in hospitals as our present knowledge and experience will permit. The subject is today still in the stage of personal opinion and debate. Available data have not been assembled, classified, and evaluated by authoritative medical organizations.

Therefore the principles and practices set forth here are not presented as final conclusions, but as thoughts and suggestions based on practical experience and offered for purposes of information and stimulation.

Practical Integration of Music-Activities Program

Music activities are carried on in different hospitals to a varying extent. Very few hospitals have no music at all. Whether extensive or not, a hospital music program, in order to be effective, needs purpose, organization, and control. These should be the result of a definite guiding philosophy and policy, expressed through capable leadership. They are lacking as yet
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in many hospitals to the detriment of the music activities already being carried on there. What is needed is a practical integration of all these activities into the total hospital service. The proper relation of the music program to this service has to be worked out in all its details.

This requires that the entire music program be organized and carried out under the control of the hospital administration. The object of this control is to make the music program an organic part of the institutional plan of care and treatment.

In addition, the musician put in charge of this program should be given for his technical guidance an interpretation of his work as a part of the total service. Good musicians have creative imagination and intuition that enable them to acquire a full practical understanding of unfamiliar hospital procedures. They need, however, factual information concerning the basic concepts of hospital service and the functional place music is to be given in the institution where they will work. This will eliminate any thinking at cross purposes with the hospital staff. Once this orientation has been given, the musician’s professional adaptability and resourcefulness will greatly facilitate smooth functioning of the music program.

Orientation as to “Treatment” and “Therapy”

The fact that a hospital carries a music-activities program does not always indicate the existence of a clear administrative policy regarding its function. This is confusing to many professional musicians; they would like to know whether music in hospitals is to be “recreation,” “entertainment,” “instruction and performance,” “treatment,” “therapy,” or a combination of some of them. These are not just academic distinctions; different approaches, techniques, materials, and standards are used according to the various musical purposes to be achieved. Perhaps
the musician is told by a member of the hospital staff that the Occupational Therapy Department’s work with the patients includes music, but he may find on investigation that it is different from what he is accustomed to call music. However, the experience may bring home to him his need for understanding the meaning of the terms “treatment” and “therapy.”

According to Webster’s Dictionary, “treatment” means act, manner, or an instance of treating, as a patient, a subject, or a substance, as in processing. The term “therapy” connotes the medical art of healing and is concerned with remedies for diseases. A therapy is a method of medical treatment which has the purpose of reducing or eliminating pathological (illness-producing) biological processes. Colloquially, however, therapy is frequently used in a broader sense to denote various forms of treatment, some of which are medically prescribed and others which are not, but all of which are designed to counteract or terminate destructive processes and conditions favoring such processes.

Some phases of treatment as well as of therapy include the application of educational methods. These are procedures whereby the patient is taught to collaborate with the various efforts of the staff to improve his condition by the use of his own physical and mental powers for definite constructive purposes.

The following description given by Robert S. Wilson of the meaning of “treatment” as applied to social work contains helpful thoughts for the musician who wishes to make his music and himself constructive forces in treatment procedures:

According to our more modern conceptions, treatment begins when the social worker makes the client feel that he is accepted, his strengths recognized, and his ability granted to meet the situation with some supplementary assistance and a clearer perspective on his problem. Treatment occurs when the client “is able to be himself without fear either of condemnation or of indulgence.” He is then
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able to utilize the opportunity to grow and to try out his strengths. It is this giving to the client the opportunity, the desire, and the technique to grow, to make his own decisions, and to gain understanding of his own motives, which constitutes treatment. The proof of the treatment is the absence of the further need for the social worker.

In many hospitals the music-activities program will be considered by the administration as a general aid to care and treatment; in addition, an individual physician may make use of the available facilities by assigning an occasional patient to music activities for definite therapeutic purposes. This does not transform music into a therapy, but it indicates that opportunity and demand for the fullest possible beneficial service that music can render in a hospital are not likely to occur where only occasional or haphazard activities are being carried on.

By the nature of their contacts and work with the patients, all hospital staff members may exert on them a therapeutic influence, whether or not this contact and work are conceived and officially labeled as a therapeutic measure. This, of course, is equally true of the contacts and work of the hospital musician.

Only through extensive medical research will it be possible to develop a body of knowledge and skills, and to evolve a system of coordination and practice essential to defining authoritatively the possibilities and limitations of the use of music as a medical “specific.” Not before such a thoroughly tested body of knowledge and experience has been obtained, and not until qualified musicians have received the technical training needed to apply it under skilled medical control will it be legitimate to use the terms “music therapy” and “music therapist” to denote a generally applicable and medically recognized method of treatment and a professional music specialist.

For the time being, therefore, the writer prefers to define the application of music in connection with the treatment of the sick as that of music being used “in therapy.” This seems a
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more correct and even more inclusive designation of the practice, because of the uses already made of music and of musicians in some of the generally applicable and medically recognized methods of therapy, such as physio-, psycho-, and occupational therapy.

The Hospital Treatment Group

Whatever the scope of function and designation of the musician in charge of a hospital music program may be, as soon as his assignments cause him to enter into regular professional contact with the patient population, he becomes a member of a group of hospital workers whose diverse technical dealings with the patients have one common purpose: to provide them by collective effort with the best possible medical care and treatment.

This team forms a psychological and social circle around the patient of which each member is a source of psychological stimulation. The better the musician and the other members of the staff understand his work as an organic part of the collective effort, the more the patient, who is the center of all measures taken, will benefit from its musical phases.

In addition to this intramural group of hospital staff members the outside population, represented by visitors, writers, speakers, and performers reaching the patient by correspondence, the printed word, radio, and sound reel, is a constant source of stimulation to be reckoned with, particularly when the patient's psychological treatment requires precise conditioning. (See chart on following page.)

From the treatment needs of the sick and the medical methods devised to meet those needs have evolved the various branches of hospital service discussed earlier, each of which is a special contribution to the total system of hospital treatment.
Sources of influences that affect the psychological condition of hospital patients

The practical integration of the music program into these branches of service is first and last a matter of technical understanding and of collaboration between the staff members of each branch and the persons in charge of the music program. This collaboration implies the utilization of the dynamic function of the musical arts in the professional care of the patients through music activities.

The brevity of this presentation does not permit a detailed consideration of the development and function of an integrated music program in action. As long as its objectives and techniques have not been standardized and given general application and
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recognition, the extent, content, and practical value of the music program will be conditioned entirely by the amount of professional interest, ability, and serious collective effort of all the staff members of the institution concerned in making the music program as effective a medium of hospital treatment as local opportunities and vision permit.

From this it follows that the influence of the hospital musician and of his work on a patient is only one variable psychological factor among many. It is clear that the musician, in order to avoid working at cross purposes with his colleagues and to be of real assistance in a unified psychological effort, needs a clear understanding with his fellow staff workers, as well as with the relatives and friends of the patients, of the goals and methods of his work.

Unless a hospital musician is very sensitive to his dynamic relation to the patients and the hospital staff, unless he is sufficiently flexible to adjust himself and his work to the requirements of the institutional environment, he cannot make the best possible contribution to the service. At the same time the musician can only function at his best and make a maximum contribution to the collective effort of the staff, when the members give him all the information and collaboration he needs to fit his work into their procedures of function.

A few suggestions culled from practices that have been tested and found useful in the hospital field will now be given to supplement the ideas presented thus far. They will, it is hoped, be helpful in regulating the major contacts between the various hospital departments and the music service.
THE RESPONSIBILITY for the medical integration of the music program, that is, the adaptation of the use of music and of the work of the hospital musician to treatment procedures, lies with the medical staff.

The musician's job is to execute the physician's indications and report to him and discuss with him the requested observations. From this it follows that the musician should never be encouraged or permitted to undertake the medical interpretation of the patient's response to his prescribed participation in any music activity.

In hospitals where interest in music on the part of the medical staff makes professional collaboration of physician and musician a practical procedure, the following routines are recommended:

1. Preliminary observation of the patient by the staff to determine his responsiveness to and need for music;
2. Medical checking of response of patient to his prescribed participation in music activities.

This includes:

a. Observation by the physician of the patient during his occupation with music.
b. Systematic recording of patient's response in notes of physician and nurses and in reports from musician;
c. Conferences of attending physician, nurses, and musician on musical case and group work.

In hospitals where the physicians do not take an active professional interest in the musician's work, but where he is expected nevertheless to work with patients, the supervisory and
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administrative responsibility for his activity should be assigned to the Department of Nursing or that of Occupational Therapy.

Nursing Service

The coordination of the music service with the nursing service concerns the adjustment of the schedule of music activities with the schedule of the nursing service, the supervisory control of music activities in the wards, the preparation and transportation of patients for attendance at music centers, and the prevention of unnecessary increase in the nurses' work loads and avoidable interruptions of ward and hospital routines.

To accomplish this the following procedures have been successfully applied:

1. Daily clearing by the musician with the supervisor's office of arrangements concerning location and hours of activities and attendance of assigned patients;
2. Routine preparation of patients' attendance lists and regular checking of patients' attendance at music sessions;
3. Regular preparation and comparison of notes on patients' responses in conferences of musician and nurses on music work.

In some hospitals members of the nursing staff take an active personal interest in the institutional music program. Many of them are musically gifted, some have had a good musical education and are experienced performers. They want to keep up with the art in some way or other, and will do everything within their power to further the use of music in the hospital service. They will organize nurses' glee clubs and orchestras and as time and circumstances permit not only support and participate in patients' music activities, but take the lead in organizing and directing them. In some nurses' training schools group singing and other music activities are regular features of the school program.
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Collaboration of a hospital musician with such musically active nurses and students of nursing is helpful in fostering a spirit of understanding and good will between him and the nursing staff, and cheerfulness in the hospital.

Department of Occupational Therapy

Full coordination of the hospital music program with the patients' activities program of the Occupational Therapy Department exists as a matter of course in all hospitals where the music program is an organic part of the occupational therapy program and the person in charge of the music activities is a member of the occupational therapy staff.

In some mental hospitals an extensive music program is carried on which requires greater technical knowledge and experience in leading and teaching music than members of occupational departments possess. Organization and direction of music activities is then entrusted to a professional musician of experience who functions as the administrative head of a special Music Department.

Close coordination of such a Music Department with the Occupational Therapy Department is imperative, so that through routine clearance of patient assignments, schedules, and programs a proper balance in the content and sequences of patient activities in both departments shall result. Joint conferences of directors and staff will prove of great help in integrating these two activities.

Participation of the hospital music director in the staff conferences of the Occupational Therapy Department will greatly further the mutual understanding, appreciation, and collaboration of both related divisions concerned with patient occupation.
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Social Service Department

Except in hospitals having a regularly established music service, a musician’s contacts with the Social Service Department will be only of incidental nature, as will be evident from that department’s function. They may pertain to the musical interests of a patient’s pre-hospital life. The social service worker because of her contacts with the families and friends of patients may sometimes be in a position to ask for instruments and other musical materials for their use.

Chaplain Service

In hospitals where there is a chaplain or a director of religious activities on the staff, arrangements for volunteer music activities are often made through his office. Collaboration of the hospital musician with the chaplain service or with the ministers of the various denominations that hold services in the hospital may consist in recruiting and rehearsing members of the staff and patient population for choral and instrumental duties during the religious services.

Women’s Auxiliary Committee

One of the important functions which a Women’s Auxiliary Committee may well undertake in collaboration with the hospital musician is the responsibility for passing on the musical qualifications of volunteers who wish to render occasional entertainment service.
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Business Office

In many hospitals the musician, even if he is a full-time employee, will have no contacts with the business office; in others he will obtain his materials and supplies from it. In larger institutions requests for materials and supplies are submitted in the form of requisitions which have to be approved by department heads concerned and by the superintendent whose signature is mandatory.

The musician may make his requests or requisitions on the basis of previously arranged budgetary policies and allowances, or his needs may call for funds that must be specially provided. The Department of Purchases and Supplies can be very helpful in securing more and better materials more promptly and economically. Incidentally the music director may find badly needed singers or instrumentalists among musically talented office workers who are sometimes eager to participate in their spare time in the hospital music program.

Organization and Administration of Music Service

Much may be done to further the constructive functioning of music in hospitals by proper methods of organizing the work.

Allocation of Music Activities

The following measures are recommended to insure appropriate space and facilities:

1. Designation of space, such as rooms, wards, halls, and auditoriums to be used for musical purposes, in locations beyond the
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hearing of patients whose treatment and comfort would be upset by musical proceedings and also removed from administrative offices and sleeping quarters of the personnel;

2. Reservation or construction, wherever possible, of special rooms or buildings for concentrated music activities. In the Army hospitals sound-proofed music cubicles are constructed in available buildings or barracks to serve as workshops, at least one cubicle containing a small piano; 3

3. In all these rooms provision should be made for adequate lighting, fresh air, and moderate temperature.

Music Room and Equipment

In every hospital which carries an extensive music program a spacious room should be designated to serve as music office and library, as well as instruction, practice and rehearsal room, and as a storage place for instruments and materials. This room should be sound-proofed, so that the sounds produced inside the room shall not penetrate to the halls. The sound-proofing, however, should not cause the music to sound flat or dead in the room itself. This tends, as bitter experience has proved, to dispirit performers as well as listeners.

Equipment should cover the practical needs of each institution and should include a piano, a radio-phonograph, records and cabinets, music stands, a writing desk, a flat table, bookshelves, closets for instruments, and a sufficient number of solid and folding chairs to seat small groups of choristers and ensemble players.

All equipment should be of standard quality. Although this may require a somewhat larger initial outlay of funds, standard materials will prove in the end more economical and effective to use.

Control and care of all music materials owned by the hospital should be assigned to the institutional music director or, in ab-
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sence of a permanent musician, to another interested and responsible member of the personnel.

Scheduling

ANY more extensive hospital music-activities program should be developed gradually according to a definite but tentative and flexible plan, so that this program can be slowly and carefully built into the service and scheduled according to needs of treatment and administration.

Because treatments are generally given in the early morning hours, unless exceptions are made, group activities are best planned for the late pre-luncheon morning hours, later afternoon hours (in view of rest periods), and early after-dinner hours.

Group activities should be arranged as to time and participation so as to conflict as little as possible with schedules and assignments of other patient-activity units, such as the occupational therapy and work departments. During visiting days and hours group activities should be held down to a minimum.

Sessions with individual patients or with small groups of patients can be arranged on a more flexible schedule than those involving the participation of large numbers of patients. They can be set for any time during the morning, afternoon, or evening when the participants are not needed by other services and it is convenient for them to attend.

The schedule of a full-time hospital musician may require from six to eight hours' service, five to six days a week and three to four hours on one half-day. This will permit one and one-half or two days off duty to be arranged according to local institutional practice. If Sundays and holidays are counted as work-days because of choir and other music services scheduled for.
these days, an equal number of weekdays may be taken as off-
duty days instead.

Such a schedule must make provision for routine sessions
with individual patients and groups of patients, hours for prepa-
ration of lessons and rehearsals, periods for reading and report-
ing, and time for staff conferences.

The length of the activity periods should never outlast the
span of interest and desirable energy expenditure of any of the
participants. The following time assignments have been found
practical, if applied in a flexible manner, with consideration for
the physical and mental condition of the patients.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual music session</td>
<td>20-30 minutes</td>
</tr>
<tr>
<td>Vocal group meetings</td>
<td></td>
</tr>
<tr>
<td>Community singing</td>
<td>30-45 minutes</td>
</tr>
<tr>
<td>Choir rehearsals</td>
<td>45-60 minutes</td>
</tr>
<tr>
<td>Instrumental group meetings</td>
<td></td>
</tr>
<tr>
<td>Regular rehearsals</td>
<td>45-60 minutes</td>
</tr>
<tr>
<td>General rehearsals</td>
<td>60-120 minutes</td>
</tr>
<tr>
<td>Theatrical rehearsals</td>
<td>45-60 minutes</td>
</tr>
<tr>
<td>General rehearsals</td>
<td>60-120 minutes</td>
</tr>
<tr>
<td>Social parties and performances</td>
<td>60-120 minutes</td>
</tr>
</tbody>
</table>

Programming and scheduling should move from the simple
to the complex. It is far better procedure to launch a new insti-
tutional program with one simple activity, such as one weekly
informal musical get-together of a few interested persons around
a piano, than to start off with an ambitious formal program of
choral and instrumental activities that requires the participa-
tion of many persons at all kinds of hours and is difficult to
schedule. Complex activities and schedules should be the natu-
ral results of a slow process of growth. The objectives should
evolve out of a blending of needs and experience.
THOSE IN CHARGE of a hospital music program should be required to keep routine records and reports of the musical proceedings. The purpose is to coordinate the music activities with those of the entire organization and to provide up-to-date information on the progress of the music service. The data thus obtained will permit regular checking and critical review of programs, patient participation, and methods; they will be helpful for the study and improvement of the service.

All entries in records and all reports should be consistently dated and contain two types of information, distinctly separated: (1) factual data, that is, objective statements of facts, (2) subjective observations and opinions.

Separate records should be kept of assignments of individuals and groups, responses of individual patients and groups, schedules and programs, repertory of each music unit, inventory of material on hand, requested, received.

Regular monthly and annual reports should be prepared and directed to the administration. These should contain synoptic digests of the records, outlines of plans, interpretations of needs, and recommendations for improvements. In most civilian general hospitals the scope of the music activities is still limited to occasional entertainments by visiting performers. These affairs require only incidental administrative supervision, preferably by interested and specially assigned staff members.

In hospitals intending to carry a more extensive and ambitious music program, which requires constant musical direction and administrative supervision, the employment of a qualified professional musician is needed to develop more fully the musical resources of the hospital population and facilitate the administrative regulation of the music activities.

Depending on the size of the hospital, the number of pa-
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tients, the patient activities, and other controlling circum-
stances, this musician may be engaged for part or full time.

Status and Service of Hospital Musician

There is a minimum and maximum service that may be ex-
pected from a musician in any given hospital situation. His job
is a practical one of meeting with his music certain human and
treatment needs at specified times. Although one may acquire
some preparatory theoretical information on this subject, the
practical approach and technique—which also involves the dy-
namic qualities of the musician's personality—can only be ob-
tained in actual hospital practice.

Any newly appointed music worker should be given ample
opportunity to observe and learn to recognize attitudes and
methods of other staff members in their dealings with various
types of patients. Understanding the attitudes and methods of
his fellow workers, besides some of their problems and their
need for cooperative support by other workers, will help the
musician to see where he, with his specialty, may become a col-
laborator and also where lie the limitations of his particular
approach.

The musician should be made to understand that the great-
est assistance he can offer is to render services in conformity
with the wishes of the staff members who are administratively
responsible for the work that they want him to do. He should
learn to appreciate that he can make progress in his work only
through regular and faithful service. If need be, it should be
pointed out to him that however limited or insignificant from a
musical point of view may seem some of the services he is ren-
dering or the results he obtains, as treatment they are of value.

No blueprint could itemize all the possible services that
music and musicians may render. Personnel-patient contacts
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are of many kinds, involving a variety of finer shadings and psychological functions. So are the dynamic interactions of music, musicians, patients, and hospital personnel. The more sensitive and flexible, versatile and adjustable the musician is, the more opportunity he will have to make himself and his art useful.

There is more to music and the work and function of an efficient hospital musician than to serve such precisely prescribed and controlled therapeutic applications of music as the general medical insight of today permits. There is an unofficial mission to perform which, although it contributes under certain circumstances to medical methods in the overcoming of pathological processes, has a constructive function of its own: it is, to provide hospital patients with opportunities to enjoy the art of music as a cultural and social interest and occupation in a manner that is entirely divorced in their minds from concepts of illness and therapy. The sheer contact with efficient and sensible musicians and with an art that, like fresh air, sunshine, and flowers, introduces into the sick-room elements of normal and joyful cultural and social living has values which, even when not defined as of specific therapeutic significance, will help to make hospital life for the patient less dominated by the traditional sick-room atmosphere and more pervaded with ideas, feelings, and events that are part of normal social life at its best.

QUALIFICATIONS OF THE HOSPITAL MUSICIAN

Visiting Performers

In many hospitals where music services are limited to entertainments by visiting performers, the character of their musicianship and their personal qualities are of great importance. The visiting performer should master a varied repertory and an
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attractive style of presentation. In his relation to the patients he should be sensitive to their reasonable wishes and not become irritated or unfriendly when his audiences do not behave as he wants them to. Neither should he show any partiality to some and neglect of others.

Whether he is a volunteer or a paid performer he should be businesslike in his relations with the hospital; he should keep his word and not cancel engagements except for serious reasons. If he must stay away, he should notify the hospital as much in advance as circumstances will permit so that other arrangements can be made. He should show deference to the rules of the hospital and have the proper respect for its personnel. Personally, he should show sportsmanship in collaborating and not back out or otherwise obstruct when affairs are not run exactly according to his taste or when he does not receive the attention he thinks is due him. His mission is to make people feel better and not worse; not to obstruct, but to facilitate the smooth running of hospital routines.5

Part- and Full-Time Workers

IN HOSPITALS which include a regular music-activities program for the patients in their scheme of care and treatment, the services of a part- or full-time music worker are needed.

In the survey recently undertaken by the National Music Council on the use of music in hospitals for mental and nervous diseases,6 the question was asked: “What principal qualifications should music workers possess in order that their services may be valuable in hospitals?” Analysis of the replies disclosed that desired qualifications fell into four categories: musical background, personality traits, attitude toward mental patients and hospital work, training and experience in mental hospital work. Although the survey concerned mental hospitals only, the re-
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quired qualifications are essential for all hospital music workers, and will be discussed under the same headings.

MUSICAL BACKGROUND

It cannot be expected that the hospital musician should be equally gifted and experienced in every branch of music activity that is appropriate to hospital needs. He should at least be able to do vocal and music appreciation work, play the piano, and have sufficient technical skill to transpose and arrange scores. In some hospitals the music director is assisted by part-time band and orchestra leaders and piano teachers.

Various categories of professional musicians have been able to develop themselves into versatile hospital music directors by "stretching themselves," that is, acquiring the musical knowledge and techniques that the service demands. In the survey just quoted the following categories of professional musicians were listed: private and public school music teachers, vocalists, voice teachers and choral leaders; pianists, organists, violinists, wind instrument players, band and orchestra leaders.

Wherever active patient participation in music is one of the chief methods and goals of the program, the musician to be employed should by natural aptitude and by experience be an educator. That means that he should be a musician who does not stop at performing music exclusively as a means of self-expression even if this be on an artistic level, but that his natural bent is to discover and develop the musical interests and skills of others, not only for musical ends, but to give their lives more zest and cultural content.

In fact the attitudes, training, experience, and pedagogical techniques of the good music teacher, leader, and recreational music worker are all essential requirements for a hospital music worker. In mental hospitals a public school music teacher can
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do good work, particularly one who is gifted in music activities with adolescents who naturally fluctuate between emotionally charged juvenile impulses and adult aspirations and behavior.

The wider the range of the hospital musician's familiarity with the current American music repertory the better the service he can render. Not only knowledge of standard classical and sacred music is needed, but also of popular compositions, an unparalleled musical medium of cheerful fraternization.

The more inclusive the range of cultural interest of the hospital music worker, the more extended will be his range of constructive contacts with various types of personality among the patients.

Some patients, independent of their chronological age, may have to be approached on a child level with kindergarten songs and dances, simple tunes and rhythms; others will collaborate only with a music worker who, they are convinced, has standing in his profession, knows his "stuff," can perform well himself and discuss with them the beauties of a symphonic poem or the artistic merits of a well-known virtuoso. Fundamental to all the technical qualifications of the hospital musician are his own profound love for music, a catholic and sound musical taste, and ability and inclination to make others share in his enthusiasm for the art in a spirit of good will and good cheer.

In some institutions the patient music-activities program has been organized and is carried on by hospital staff members who do not belong to the music profession, but who have a great interest and sometimes considerable skill in the leading and making of music. These include doctors, nurses, occupational therapists, and other hospital workers. The fact that in some instances these musical amateurs have obtained better results in their work with the patients than some professional musicians proves that good musicianship in itself is not sufficient to do satisfactory hospital work and that other basic personality traits
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are needed to make the worker's musical qualifications effective.

PERSONALITY TRAITS

In order to be an effective hospital music worker one should be physically healthy and emotionally well-balanced and self-controlled. Other-emotional and unstable persons, handicapped by compensation mechanisms, no matter how gifted they may be as professional musicians, should not seek employment as hospital music workers. Work of this character can be accomplished only by mature personalities, experienced in the art of living and having a feeling for and an understanding of the human needs of the patients entrusted to their care.

Inasmuch as the efficacy of the work is either enhanced or hurt by his personal relation to patients and staff, the musician should have a congenial and cheerful temperament so that his influence on his social environment will be comforting and encouraging. Prima-donna and dictatorial attitudes will only cause resentment and frustration. His optimistic disposition should enable him to keep his poise in trying situations. He should have a sense of humor, which helps to break tensions and to make everybody feel a little better in spite of circumstances. Ability to be objective will make it possible to deal in a disarming manner with disagreeable and aggressive persons. He should have patience and tact and show understanding of the other fellow's predicament. His inventiveness and flexibility should help him to master situations where old methods prove to be ineffective. Patients often need moral backing in their efforts. This the music worker may give when he sets the example by his own quiet persistence in a given task. Last, but not least, willingness to collaborate, to work together with others in a joint undertaking, should be a well-developed trait of the music worker's character.
ATTITUDE TOWARD HOSPITAL WORK

The dominant motivation of a musician's desire to work in hospitals should be to make his energies, knowledge, and skills useful in the most intelligent way in the treatment procedures applied for the improvement and comfort of the sick. That requires willingness to work with handicapped persons, and to gain understanding of their needs. It means ability to adjust one's methods of procedure to these needs. The worker's attitude toward the patients' handicaps and limitations should be a positive one: he should not regard them as deplorable obstructions to the attainment of his own musical ambitions and goals, but as challenging problems and opportunities for particularly skillful work.

His job is to facilitate the normal functioning, physically, mentally, and socially, of the patients, to focus their attention on lovely things such as the beauty of a song or the greatness of a symphony, and to help them to free themselves from worries and fears by encouraging them to do satisfying things like singing a song or playing a tune. In all his musical attempts he should remember that he may never sacrifice the well-being of the patient to the attainment through him of musical results. The efficacy of his work in the last analysis will not be measured by musical standards but by medical evaluation in which the patient's response to the music and the worker is judged in terms of physical, mental, and social functioning.

Unless a hospital musician is very sensitive to his practical position in relation to the patient population on the one side and the hospital staff on the other side, unless he is flexible and adaptable and adjusts himself and his work to the modes of work prevailing in a given hospital, he cannot give the best possible service.

The musician's task in a hospital is one that requires team-
work. To be useful at all, his work has to be understood and applied as a link in a chain of treatment services that depend on the harmonious co-operation of many persons, each of whom in his special field contributes to the work of the others in a joint endeavor to further the improvement and comfort of the patients.

TRAINING FOR HOSPITAL MUSIC WORK

From the musical angle the work of the hospital musician is in many respects related to that of the school music teacher and leader of recreational music activities. From the hospital angle it is related to the work of the occupational therapist. It is a skill that can be acquired only by practical experience in the hospitals under proper guidance.

For purposes of vocational training in this work the most desirable apprentice workers will be experienced teachers and leaders of applied music—good musicians, who are successful in working with healthy people and have an insight into the practical life problems of mature men and women. For work in children’s hospitals experienced kindergarten and grade teachers will be the most promising candidates.

It is a deplorable fallacy to assume that a hospital job is the solution of the employment problem of professional music students who, after failing to make the grade as performers, have proved also to be of doubtful value as apprentice music teachers.

Until a musician has gone through a probationary period as a hospital worker, which gives him, as well as the administration, ample opportunity to learn whether he fits in the hospital and the hospital fits him, he should not decide to give up his work and earnings as a teacher and leader in the community and venture into this new field.
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If after some years of satisfactory work in the community as a professional teacher and leader, a musician still feels a desire for hospital work, he should find out if there are any openings. If so, by doing part-time work under proper supervision he would come to a sober conclusion as to whether this field would prove sufficiently satisfying to justify giving up part or all of his previous work in the community.

The number of hospitals having either part-time or full-time paid positions for musicians, though showing some increase in recent years, is still very small compared with those depending upon volunteers. It may be assumed, however, that when the function and use of music and musicians in the hospital service become better understood and further developed, the demand for well-prepared directors of hospital music activities and the number of paid positions will increase. In general, the opportunities for employment of musicians will always be fewer than those in the school field. Professional hospital music work is a rather specialized field; furthermore, the number of schools of all kinds in which musicians are employed is likely to remain far greater than the number of hospitals.

It will be to the advantage of the hospital service and of the music profession that practical training for hospital music work be organized according to the same high and practical standards as the training for the nursing and occupational therapy professions.

To attain this goal two conditions will have to be met: (1) There must be medical research and collaboration between physicians and musicians with full appreciation of each other’s contribution to teamwork that will lead to generally applicable and officially recognized treatment measures. (2) “Standards and curricula for training of qualified personnel [must be developed by educational institutions] on the basis of careful planning and co-operation with hospitals.”

A sufficient body of tested knowledge and skill available in
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the use of music in hospitals and other welfare institutions warrants giving general orientation courses in hospital music in co-operation with hospitals and other welfare institutions. Advanced training in this work has still to be developed as the result of research which should be carried on by scientific methods.

A growing recognition of the need for systematic training is expressed in the attempts of several schools to organize courses in this field. However, until more empirical knowledge is obtained than is available today, the best preparation for hospital music work will consist of the following: (1) In-service orientation of experienced musicians carried on in hospitals by interested and competent staff members. Hospital procedures and a working knowledge of how to deal with patients and patient activities should form the basis of such training along the lines now followed by students of nursing and of occupational therapy. (2) Provision of opportunities for experienced hospital workers in charge of hospital music activities (but not trained and employed as professional musicians) to acquire the particular musical knowledge and skills that they need to become more proficient in the musical aspects of this work.

The vocational training of hospital music workers is a new educational project that should be rooted in and developed from the needs of the service. A definition of objectives, content, materials, and methods for the professional training of hospital musicians, like that for training nurses and occupational therapists, should be arrived at by careful analysis of the practical music work now in progress. Content and methods of training should not be arrived at by a priori scrambling together of already existing music and science courses, which can never provide a coherent basic knowledge and skill pertinent to the practical job to be done.

It is clear that whatever form and content this training may
assume, it should be given on a graduate level and reserved for seriously interested students who have the necessary personality qualifications in addition to training and experience in music, or training and experience in some branch of hospital work with patients.

Vocational training for hospital music work is not a subject for mass instruction. The number of paid positions will continue to be relatively small; hence the number of students will have to be kept in reasonable proportion to job possibilities. This type of vocational training will not yield sufficient revenues in student fees to warrant its development for financial profit. It is one branch of instruction which, to serve humanitarian and non-commercial ends, needs particularly to avoid exploitation in order that it may develop according to scientific methods; hence it should receive philanthropic support.

In this need the friends of medicine and of music may see an opportunity to further the medically integrated use of music in the hospital service.

NOTES

2 Quoted by Dr. Wilson from Ruth Smalley, "Psychiatric Implications for Medical Case Work," The Family (December 1934) 263.
4 For further details see W. van de Wall, Music in Institutions (New York, 1936).
5 A helpful leaflet entitled Music in Hospitals related particularly to volunteer service in military hospitals in collaboration with the American Red Cross has been published by the National Federation of Music Clubs. Copies can be obtained at the Publication Office of the Federation, 11 East Green Street, Ithaca, New York.
6 Published in 1944 by the National Music Council, Inc. Copies can be obtained for 15 cents at the Publication Office of the Council, 338 West 89th Street, New York 24, New York.
Music took a severe beating in World War II, especially during the years 1942 and 1943, when it was treated more harshly than any of the other arts. In spite of this, music came back to a higher level than ever before and attained a broader plane of understanding than it had previously known. And, like many other great advances in the world, all this came about as a result of the hurt and ache in the bodies of men and women.

To understand this mistreatment and recovery, let us review the things that happened to music. During previous wars music received much official attention, was encouraged by most of our great leaders, and was even provided for by tables of organization which assigned a musician to small units and until 1942 provided a band for each regiment. During World War II, however, music was definitely discouraged, and only divisions and Armies were provided with bands. Remember also that soldiers were not permitted to take musical instruments overseas during 1942 and 1943. Those that were taken had to be hidden from the eyes of the inspector or carried as organizational equipment, usually with the mess. This continued until the authorities came to realize what musicians had always
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known, namely, that soldiers want and actually need some form of music besides singing, for our Army is not, and never has been, a singing Army.

What finally changed the attitude of higher authorities and started music back toward its proper place in our Army was probably the first pangs of utter loneliness and despair in the heart of a soldier away from home across the sea. Music, even if only from a poor mouth organ, can often cure such sickness. The second great boost for music came when the wounded men began to fill our hospitals. If the healthy soldier wanted and needed music to keep up his spirits, how much more did the wounded man need it to keep up his morale? The doctors soon learned that it was much more difficult to keep up the morale of a wounded man than that of one who was merely sick or had been injured off the field.

Something Besides Medicine Is Needed

Our surgeons daily performed miracles in saving lives and in restoring injured parts to normal; yet this was not enough. The medical officer could, and often did say, “This man is well; his wound is healed and he should be able to return to duty—but still he is not ready!” Something else was needed. It was finally found in the Army’s Reconditioning Program.

Music played a definite part in this new program, and though it was not used nearly as fully as it should have been, it was a great step forward, for this was the first actual recognition given to music as a definite means to be used in a hospital to help the sick and injured.

It was a great day for music when bands were authorized for general hospitals. It was not because the bands were good—for, in fact, having been created largely from left-overs, they were rather poor—nor because they were of much practical
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value so far as music in hospitals was concerned; but they did represent an entirely new attitude toward music, one that had not been known in higher Army circles before. Bands, of course, have always been very popular in the Army, but they were created largely for marching purposes and to add a bit of color and flash to the usual military ceremonies.

Music technicians were also assigned to general and regional hospitals. These technicians were supposed to be well-trained and well-qualified in the use of music in hospitals, and it was probably true that they actually did more good than the whole band, that is, more good for the patients. They also did a great deal to promote a better understanding between the doctors and the musicians. Unfortunately, the assignment of these technicians and of the bands did not come about until shortly before the war ended. And since the War Department has not been liberal with bands heretofore, it is doubtful if their use will be continued in general hospitals in the post-war period, and we shall have lost an opportunity to carry on complete studies. However, even in a short time, if medical officers will discard their former narrow ideas concerning music and if musicians will throw overboard their false ideas about music therapy, there should be developed some valuable studies on the subject of music in hospitals.

The potential value of sound, rhythm, and music in the healing art has been recognized since the days of man’s most primitive existence. However, in comparison with other advances in medicine, these factors have not been properly evaluated or well used in modern times. There are several reasonable explanations for this:

First, a lack of knowledge and understanding of sound, rhythm, and music in all aspects on the part of the physician as well as of the musician has resulted in the general impression that music is of value only from a cultural standpoint.

Second, musicians, generally lacking in training for scientific
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evaluation, have been prone to believe and foster unfounded tales regarding miraculous cures effected by the use of music, thus creating a wall of disbelief in the minds of most physicians.

Third, the medical profession has held the use of music in medicine in somewhat the same light of amused scorn that it has held psychiatry, there being always a sort of a tongue-in-the-cheek attitude and a feeling that music must naturally be associated with queer individuals or poor relations. Consequently, the use of music in hospitals has been neglected in much the same manner that neuropsychiatry has been overlooked by the medical profession as a whole.

Why Not Use Music in Hospitals?

If Hindu fakirs and witch doctors can produce such remarkable results as have actually been demonstrated before qualified observers by the use of rhythm and music among savages, it is not unreasonable to believe that modern doctors and modern musicians might produce equally startling results in military hospitals, where all patients are fairly young and impressionable, and where personality disturbances are very common.

The greatest cause for not using music properly in hospitals probably lies in the physician's habitual search for organic disease rather than for the internal conflict so common in the soldier, a conflict which leads to functional disorders and which might be relieved by psychotherapy, aided at times by the proper use of music. There is also the fact that when musicians do try to utilize music in connection with the sick there is a great tendency to exaggerate the results. It should be pointed out that it seems to hurt the average physician's pride to see results obtained by the use of anything but surgery, medicine, or orthodox medical procedures. Therefore, he naturally questions any means which fail to fit into his own scheme of treat-
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ment. In addition, the doctor dislikes the musician's usual tendency to show off and occupy the center of the stage. Therefore, the two remain far apart unless a bond of understanding and co-operation can be established. Thus, in order to obtain the greatest benefit from the use of music in hospitals, there must be developed in both the physician and the musician a new understanding of rhythm and music in all aspects, as well as a sympathetic view toward the effects it may have upon the patient.

It is difficult to imagine any patient in any hospital, and especially an Army hospital, who does not associate certain songs or musical numbers with past experiences. And since all such experiences must be either pleasant or unpleasant; the tune will naturally tend to reproduce, at least temporarily, mental associations similar to the original experiences. It becomes at once apparent that great care should be exercised in the selection of the numbers to be used, particularly in neuro-psychiatric wards. Taking this into consideration, it is easy for us to understand why the ward officer and the music officer (if there be such a person) should always be consulted before presenting any program for the first time, so that they may give helpful advice or at least point out the dangers of certain types of selections in relation to the patient in that particular ward.

The ward officer, the ward nurse, and the ward orderlies in military hospitals are in daily contact with the patient for much longer periods than is usual in civilian hospitals. As a result of this, they come to know much more about the intimate details of the patient's life, his family, and his likes and dislikes, and are thus in an excellent position to advise the musician who may be appearing in the ward for the first time. In general, it requires more effort and greater patience to obtain good results in Army hospitals than it does in civilian hospitals, because the patient is there longer, he is farther away from home, and morale seems to gravitate downward faster.
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Which Comes First, Culture or the Patient?

Most musicians naturally consider music as a cultural art, which it really is. After having this viewpoint for years they are prone to carry it into the hospital, and maintain it there even though they should be presenting music solely for the purpose of helping the patient. Their viewpoint is correct when the patient is ambulant, or when he wants to learn, and usually also when he simply desires to listen; this is the time for the musician to select his program or his lessons for cultural worth or educational value, and in so doing, to make the most of his opportunity to raise the level of the patient’s understanding and taste in all forms of music. However, when the music is intended only for the therapeutic benefit of the patient, a different approach must be used. It is obvious that most of the effects produced by music come about as a result of the emotional appeal. Therefore, the benefits that may be derived from music in a hospital must stem from a well-planned program which takes this common emotional appeal into consideration in all its aspects.

To begin with, musicians should show a far greater sincerity of purpose than we usually see in responding to the desires of the patients. By this we mean not only in the selection of the pieces, but also in the discussion which should usually precede them. The musician should not deride the taste or the selection of the patient, nor should he intimate that it is beneath his standard either to discuss or to play what the patient desires. Naturally the musician cannot be expected to play or discuss every piece that a group of patients may request, but he should use discretion in what he elects to play and should try to satisfy the greatest number, taking care at the same time not to use any piece which might be harmful to any single patient. Then, in passing by some of the requested pieces, he must be particu-
larly tactful and avoid a direct refusal to play them; he can indicate that he does not have time, that he does not know the piece (but will learn it), or that too many have requested other pieces.

It has been found that greater relaxation and better understanding—and consequently better results—are usually obtained if there is a brief discussion of the piece before it is performed. If it is to be a technical number (which should seldom be used), there should be a clear explanation that it is a technical number, and that it will not be pretty—and that it will not be long. And then, cut the number short, even if it is necessary to leave out part of it! If a number is requested which the performer does not know, or for some reason feels should not be used at that time, it should not be dismissed completely, but should be discussed briefly, and then used at a later session.

When possible, the musician should know his numbers by memory, and should know them so well that he can stop in the middle and repeat any phrase that may suddenly appeal to the patient. It is quite astounding to see the good effects and relaxation that may be produced in certain types of neuropsychiatric patients by repeating soothing measures or phrases. The repetition seems to act like a gentle massage if properly done. It must be admitted, however, that in some cases it is advisable to play a series of simple, quiet numbers with no discussion, and sometimes without a single word being spoken. Which method to use on a given occasion can be determined only by much experience and training.

The Importance of the Tastes of the Patient

Not only the musician, but also the doctor must show greater consideration for the tastes of the patients and avoid trying to bring culture into the wards when therapeutic results
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are expected. In addition, so far as the patients are concerned, musicians should discard temporarily their previous ideas and opinions regarding good and bad or poor music. This is important because any music which helps a patient or satisfies him is good music. For example, hillbilly music, which is certainly distasteful to many trained musicians, may have been and may continue to be a great source of joy and comfort to many individuals, and for these it is actually great music. The same thing can be said about cowboy songs, popular music, and jazz.

Many musicians have stated that they could not lower their standards by playing popular requests. It is not a question of lowering standards. It is a problem of understanding living people who are in need of help, and of remembering that art should bring pleasure and happiness to the world, and especially to those who are denied some of the usual sources of happiness. Surely such a consideration of the desires of a patient is not a lowering of standards but rather the opening of another door to the character of the performer, another door to a more amiable and reasonable part of his personality.

Some Specific Suggestions

Hospital or ward programs should be planned for not longer than forty-five-minute periods except on the recommendation of the ward officer. This limitation should not be exceeded even for encores. Time passes slowly for bed patients, and the performer should not be fooled by the applause, for patients in Army hospitals, during wartime, will applaud anything, and hold it up to scorn afterwards, and occasionally, during the performance. Programs should not be planned for the forenoons, since most of that time is taken up with nursing and hospital requirements. Afternoon and evening programs should be planned rather early so that patients can obtain the usual
afternoon nap, or relax early in the evening, a procedure which leads to the most beneficial type of rest and slumber.

The volume or degree of loudness should always be considerably less than that which is reached in ordinary concerts, and this applies especially to singers. In fact, the volume should be controlled enough so that the patient can turn away from the music if he desires and still not be too greatly disturbed by it. Too much volume, particularly in singers, often produces a definite irritation that will result in a sleepless night, while the properly modulated volume will generally act as a sedative and bring about an easy slumber. Ward nurses and ward orderlies will testify to this fact many times over. They have stated again and again that neuropsychiatric patients are often relieved of the usual tensions after a short and well-planned musical program.

As would be expected, an orchestra or a combination of instruments is preferred by the greatest number of patients. For a small combination, in a sick ward, a violin and a piano with one or two soft-voiced instruments are best. Of all the instruments the piano is the best liked and the best tolerated. Vocal music, except in the case of the very popular singers, is not received as well as instrumental music. Sopranos are, unfortunately, not very popular. Even some of the great artists are not welcomed. Patients are not soothed or inspired by the high notes which invariably creep, or even burst, into the songs that sopranos use. Sopranos also seem to sing louder than other singers, and this is upsetting to patients. In addition, it has been found that sopranos sing a much higher percentage of operatic numbers than other singers, and, in spite of what the singers may think, very few patients enjoy operatic numbers. They usually produce in the patient the feeling that the singer is determined to display a certain amount of technical ability and skill, rather than to entertain the patient or give him a feeling of contentment and comfort. Another excel-
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A potent argument for singing softly in hospitals is the fact that as the loudness is increased there is a greater chance of singing off pitch, which certainly is detrimental to the patient's nervous system. All singers should restrain the tendency to force their voices when performing for patients.

Classical or Popular Music?

Both classical and popular music are well-liked and are of value in a hospital. The figures obtained from a wide survey conducted by the writer and the Committee for the Surgeon General are about as follows: Popular music, 60 per cent; Classical music, 40 per cent. There is an interesting bit of psychology back of these figures bearing on the subject of music in hospitals. Every quiz or survey that has been made heretofore on preferences for classical and popular music has been conducted by persons who believe only in classical music. The reason for this is that for such individuals the music bears the same relation to their lives that religion does to the parson. They feel that it is their duty to obtain converts. It is easy to see how such surveys can be made to show that the soldiers "really want classical music." The same tactics are not used for popular music because popular music gets along without a subsidy, and the popular music performer or enthusiast does not try to convert everyone to his way of thinking, but generally believes that all music is good and that each person should be allowed to enjoy the kind he prefers without interference or prejudice. No one, of course, would be so foolish as to say that patients in hospitals, even military hospitals, want or need only popular music, and surely no one would urge artists and performers of classical music to attempt to go modern and present boogie-woogie or swing. But it is recommended that such performers cease to be scornful of popular music, begin to use better judgment in con-
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considering the desires and tastes of the patients, and present their numbers sincerely and for the benefit of the patients rather than for culture and self-gratification. Performers of classical music should take a hint from the performers of popular music. It has long been known that players of popular music seem to bend their efforts toward playing the things that bring happiness and satisfaction to the listeners, while performers of classical music seem determined to give the patient something that is good for him.

Music for the Neuropsychiatric Patient

Music when judiciously utilized can do much for neuropsychiatric patients, because certain tunes or words may bring about associations of a familiar nature. It is the revival of these basic realities which often aids in making such patients more accessible for the psychiatrist by building a bridge across which there may be a meeting of the minds. The Army learned some specific procedures in such cases. Much of this type of work was done by Captain Guy V. R. Marriner of the Special Services Division, who was loaned to the Surgeon General and with whom this writer worked intimately in preparing most of the official doctrine on the use of music in Army hospitals.

To begin with, the groups of patients must be small and free from outsiders, especially in the early stages. Usually the piano, played rather softly, is the most acceptable instrument. Small string ensembles are next in line. Vocal music is generally not acceptable at first.

As for the music, it has been found that simple folk songs played on the piano are by far the best and safest in the early stages. These folk songs, although generally unknown to most soldiers, have a quality of being always “just right.” They seem to re-supply, or reactivate the mother-child complex, and
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so offer temporary security and sanctuary, the same sort of comfort, in short, that the child gets when his mother kisses his hurt finger.

A very simple, friendly approach with a short explanation of the age and origin of these folk songs and of how they have given pleasure and contentment to so many generations is often very helpful in getting attention and co-operation from the men. After getting the attention of the patients through these old folk songs, it is generally easy to progress to the shorter melodic numbers of the masters. Long numbers should never be used, even if requested by the patients. Minor keys and accentuated rhythms must be avoided. The music should be kept simple and melodic—and always softer than in other wards.

 Patients should be encouraged to sing familiar songs as soon as possible, for here, as in no other situation, patient participation is important. It is difficult to get patients to sing, and in these wards the musician will learn, perhaps for the first time, that ours is not a singing Army. Obviously, it will be almost impossible to get these patients to sing unless they know the words very well. Therefore some simple song—classical or popular, that has a short range and a melody that is easy for all to sing—will be the best choice. The patients should be given a chance to sing that one song several times, so that the words and the melody will come easily.

Although it would seem that anyone could select a good song for neuropsychiatric patients to sing, the choice is not so easy, for only the psychiatrist knows what is in the mind of the patients. Therefore, the musician should consult him before teaching the words to a song. The best plan is to go over several songs with the psychiatrist so that the performer may have several at his finger tips before starting the day's program. The ward orderly and the ward nurse should also know the words and the music, for the patient may suddenly ask one of them to sing the song. If several patients request a certain number, it
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is well to try to have it ready for the next session, for the patients often get a fixed idea that the performer is going to refuse to play that particular number just to show who is "boss," or to punish the patient. It is obvious that patient participation in general is a vital part of the program of music in hospitals, for a benefit accrues both mentally and physically from the actual playing of an instrument, or from a share in making music of some sort.

Music Activities

Although music has generally been regarded as a recreational or educational activity by the uninformed, it is of definite value in all four phases of the reconditioning program, as indicated by the chart on the opposite page.

All music activities fall into three general divisions: Active participation; passive participation; audio-reception.

Active participation is that in which the individual patient or group of patients makes music by singing or playing. It is the most beneficial of all. Passive participation is that in which the individual patient or group does not actually make the music, but listens to it for some purpose; the patients may wish to discuss later the renditions of various bands and orchestras or to compare the merits of one performer with those of another. This division is second so far as benefits are concerned. Audio-reception may be regarded as that to which the patient simply listens—or classes in which he takes no part. Let us examine in greater detail these three divisions.

Objectives

The objectives of active participation are:

To assist in the social adjustment of the patients. Social
Music in convalescent reconditioning program. A chart showing how music can function in all reconditioning activities.
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adjustment, or self-realization of one’s relationship to other people, is one of the basic purposes of reconditioning. Music is an outlet or “safety-valve,” and while he may be unaware of it, the general physiological activities of the patient are stimulated, and his senses of timing and awareness of good living become more acute. This has a definite and psychological effect on building his morale.

To provide occupational therapy. When medical officers seek special types of exercises as a physical therapeutic modality for orthopedic or plaster cases, there is value in supporting these exercises with rhythmic music, as well as using it as a means of re-educating arm, wrist, or finger skill by playing fretted or small instruments. For chest cases, there is additional value in blowing small instruments.

The objective of passive participation is to assist in the social and mental adjustment of the patient by arousing his interest in the varied musical activities. The utilization of music as a hobby, as differentiated from actual singing and playing, has a much wider application than that of actual participation, because anyone, whether musical or not, can play a part in it and thus derive some benefit from it. For many individuals there are definite physiological as well as psychological responses to such activities. These responses generally contribute to the patient’s well-being.

The objectives of audio-reception in music are:

To give the patients the music they wish to hear, as well as music to which they are accustomed. This is the basic objective of audio-reception. Radio, movies, and records have made this kind of music an important part of the life of the young American.

To supplement educational activities with various forms of music. Some lectures, which are uninteresting alone, can be much enhanced by the judicious use of music. Talks and demonstrations on technique, interpretation, orchestration,
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and other phases of the art of music are in themselves of educational value.

To provide entertainment for all types of patients. Music and entertainment are closely bound together, the music generally enhancing the entertainment.

Program—Participation

A patients' orchestra consisting of patients who can play musical instruments will be a popular and beneficial activity in the hospital, not only for the performers, but also for the other patients. It may be augmented and assisted by detachment personnel, or members of the band, if one is assigned to the hospital. However, it is primarily an orchestra of and for the patients. Participation, rather than musicianship, is stressed. The orchestra should be encouraged to play at hospital activities where other patients can see and hear it. If the orchestra is reasonably proficient, it may be used at dances, radio broadcasts from the hospital, and variety shows, as well as amateur recordings.

There may be patients who wish to form string quartets, chamber music groups, or a small symphonic-type orchestra, in order to play classical or semiclassical music. This desire should be met and encouraged. It is recommended that local music schools, or the music department of colleges be approached for advice and assistance. Small instrumental groups, made up of players of guitars, banjos, ukuleles, or the "small" instruments, are easily formed. They should be given the opportunity to play in selected wards and for general entertainment. Small-instrument instruction is simple and easy. These small instruments, such as the tonette, ocarina, harmonica, and ukulele, are generally very popular with patients. Instruction can best be carried out by means of a chart. With this method, patients
quickly learn to play simple melodies. The Army publication “Ten Minute Self-instructor for Tonette, Ocarina, Harmonica and Ukulele,” should be made available to interested patients. Instruction periods should not last over 30 minutes.

Instruction in voice and complicated instruments may be desired by some patients who wish to begin serious study or renew previous training. Teaching can be done by music technicians, American Red Cross Gray Ladies, talented patients, or by civilian music teachers. All teachers should be indoctrinated in methods of approaching and handling patients. Because many patients who are desirous of serious study are limited to a comparatively short stay in hospitals, it is recommended that all teachers be encouraged to utilize the most modern methods, books, and charts, which are usually obtainable through the Post Exchange. The interest of the teacher should be in what is happening to the patient as well as the quality of the music he produces. Singing is probably the most universal form of musical expression. However, it requires tact and patience as well as encouragement to stimulate and keep patients interested in singing. Leaders of singing groups must avoid singing solos themselves, or showing off by vocal gymnastics. In general, lower-pitched voices are much more acceptable to soldier patients. Marked rhythm in the accompaniment will be of great value in encouraging the men to sing.

Singing with Song Slides and Song Shorts. These are of much value in mass sings, and are well received before movies and lectures. Even an untrained leader may accomplish much with these aids.

Singing in Wards. The Army “Hit Kits” are designed especially for singing in wards. They are easy to use, and are abreast of the times in the selection of songs. In the wards, the singing must be adjusted to the Ward Officer’s schedule. Recording
programs are very popular with patients and serve to bring groups together quickly. Practically every patient has a desire to make a recording of his voice or his musical accomplishment. Group performances can also be recorded. The recording program will not only provide diversion, but will also serve as a measure of accomplishment and progress. It is advantageous to have a portable recording machine so that it can be taken into the wards. Special Services and American Red Cross have supplied recorders in certain hospitals.

Audio-Reception

Outside Talent. Hospital patients are keen in their appreciation of guest performers, both civilian and Army. The American Red Cross can be of great assistance in obtaining outside talent. Whenever possible, such music as is performed in the auditorium or theater should be broadcast to the wards over the public address system. Prior to the performance, it is advisable for the Music Officer, or the one in charge of music, to discuss the selections with the performers, in order that the numbers are sure to be suitable to the tastes of the greatest number of patients. Sincerity of purpose and a desire to please the patients are quickly recognized by the soldier audience.

Recording and V-Disks. Care must be used in selecting the recordings for any program, as the tastes of patients will include all types of music. Regional tastes in music must be kept in mind always. Regularly scheduled concerts of recorded music are popular if they are handled wisely and are well-publicized.

Music in Information and Education Courses. Customs, culture, history, and geography may be integrated with music and made much more popular with the patients. This can con-
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stitute an important part of music appreciation. There must be close coordination between the Educational Reconditioning Officer and the Music Officer on this subject.

Music Appreciation Course. The purpose of this activity is to give every patient, regardless of his musical likes and dislikes, an opportunity to increase his enjoyment and feeling of well-being through listening and discussing the music he likes. It must be remembered that music appreciation does not necessarily mean the study of classical music. Many patients remain away from such activities because they feel that someone is trying to thrust “culture” upon them, when they have no desire for it. One should be sure that the activities include an intelligent presentation of all types of music—and then make certain that all patients understand this. The increased attendance will be a sufficient reward. V-disks, as well as commercial recordings, will supply most of the needs.

Special Music in Wards. “Live” music, where the performer can feel and meet the “tempo and mood” of the patients, is of more value than recorded music. Soft request music is greatly appreciated by some neuropsychiatric patients. The personal element contributes much in such cases, because the patients feel that the music is being created for them.

Radio Programs. There are many fine musical programs on the radio which should be heard by patients. These may be broadcast to those in wards over the public address system. One caution should be kept in mind—no program should be longer than one hour. Too little is better than too much. Patients who desire and are able to listen to longer programs should have an opportunity to do so in some special room provided for this purpose.
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**Military Band Music.** When available, such a band can be of great value in all aspects of the music program. In addition to all the uses of the band as an organization, the members can contribute much in aiding and adding to small instrumental groups or orchestras. The presence and the help of band members will stimulate many patients to get into the small instrumental combinations.

**Music with Calisthenics**

*Strongly accentuated rhythm* in proper cadence, especially in music which is well known, definitely increases the workload limit in calisthenics. Because of this a greater number of exercises will be carried to completion when they are accompanied by properly timed and accentuated music. On the basis of this, three series of recordings have been synchronized with the cadence, rhythms, and lengths which have been established for class 1 and 2 patients by the Reconditioning Consultants Division of The Surgeon General's Office. These are distributed to general, convalescent, and regional hospitals by the Music Branch, Special Services Division, ASF.

**Special Activities**

**Simple Musical Instrument Making.** While technically a craft, this activity does fulfill the objectives of music participation. Improvised musical instruments afford a chance for originality and ingenuity on the part of the patient. The materials for making such instruments are inexpensive and generally available.

**Creative Music.** There may be patients who wish to try to write a song or parody song. Incentive can be given through a
"Song Writing Contest" with prizes being awarded. "Compos-a-Tune," which is a clever device for writing simple songs, is available through Post Exchanges. Advanced instruction in this subject may be arranged for through civilian agencies.

**UNITED STATES ARMED FORCES INSTITUTE (USAFI) MUSIC COURSES (self-teaching courses):**

**EM 600, "How to Sing and Read Music."** This course, through the use of "Barbershop Quartets," trains men to read music. This is issued in book form, with a set of nine 12-inch records.

**EM 616, "How to Listen to Music."** This course, in a series of recordings, is a new approach to music appreciation. The whole course is designed to engage the interest of those desirous of understanding all forms of music.

Text books:

- **EM 601, Harmony.**
- **EM 602, History of Music.**
- **EM 603, Discovering Music,** superseded by **EM 616.**

These books are at college level and should be considered for the patient who wishes to study music seriously.

**MUSICAL QUIZ AND VARIETY SHOWS.** This type of program stresses audience participation. Little preparation and equipment are needed other than a pianist and a good master of ceremonies. The musical variety show may be put on in an informal manner, and selected patients possessing the ability to entertain should be allowed to perform. Musical quiz material may be used for audience participation between the acts of a show. The show may be staged in the form of a contest and prizes may be awarded.

**RHYTHM BAND.** This combination consists primarily of a piano or a phonograph, which provides the melodies and harmonies
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of compositions. These instruments may be augmented by guitar, banjo, ukulele, string bass, saxophone, etc. The rhythm instruments played by patients are drumsticks, wood blocks, cymbals, triangle, bells, maracas, cleves, tom-tom, tambourine, etc. Many patients may have the idea that to play in a rhythm band is childish and elementary. The removal of this idea is important. For instance, it may be pointed out to the group that all music has a definite rhythm or beat, and that the hour will be devoted to the study of rhythmic patterns, during which they will participate in ensemble playing. It is imperative that the correct psychological approach be utilized in this activity. This form of controlled rhythm has value for closed ward neuropsychiatric patients and gives each player a sense of "being a part" of the orchestra. It is important that this activity be controlled by ward officers.

Standard Programs for Different Classes of Patients

The types of programs planned under the participation and audio-reception categories of activity vary according to the condition of the patient. For neuropsychiatric patients in open wards, for example, participation may include utilization of music workshop, patients' orchestra, individual or group vocal or instrumental instruction, small-instrument instruction, singing, record making, music with calisthenics, and musical quiz and variety shows. Audio-reception for this class of patients may include outside talent, band concerts, utilization of music appreciation room, and music in educational activities.

For neuropsychiatric patients in closed wards, participation may include singing in wards, individual or group vocal or instrumental instruction, rhythm band, and special programs. Audio-reception for this class of patient may include selected recordings of classical, semiclassical, folk, or religious music,
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played in the ward on a portable phonograph or over the public address system during occupational therapy periods. Performers playing soft string, novachord, organ, or piano music in the wards may also be utilized.

Many closed ward neuropsychiatric patients have an abnormal response to stimuli; for example, they tire quickly or are irritable and hypersensitive. Loud, shrill music should be avoided; sessions should be short to avoid fatigue. Favorable responses should be watched for and an attempt made to meet awakened interest.

Equipment

Music Workshop—Construction. A music workshop, consisting of soundproofed cubicles, two classrooms, music appreciation room, office, library, and instrument storeroom may be provided by conversion of available buildings. A blueprint, providing a layout for a music workshop, is available upon request from the Construction Branch, Hospital Division, Surgeon General's Office, Washington 25, D. C.

Use. Ward officers should avail themselves of the opportunity to prescribe exercises with instrument playing as a physical and occupational therapeutic modality for orthopedic, plastic, and chest cases. Music officers and technicians should work out music class schedules with the educational reconditioning officer. Patients and hospital detachment personnel should be notified of the availability of this workshop. The music appreciation room should be comfortably and attractively furnished, enabling patients to relax and enjoy listening to music on a radio or phonograph with a wide variety of recordings. Small classes may be held there. Recordings and V-disks may be taken from the room to wards or to the public address master control room for special or request programs. It is recom-
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mended that the music appreciation room contain a good grand piano if possible. Informal concerts for small groups can thus be presented by inviting experienced and well-chosen artists who, by arousing the patients to "participate passively," can assist in the social adjustment of many patients.

Musical Instruments—Procurement. In convalescent hospitals, standard instruments are provided in the special Table of Allowances for the convalescent training program (T/A 8-6T). For nonstandard items, see the paragraph on "FUNDS." The American Red Cross provides small instruments as part of its standard supplies. Additional instruments may be requested from Camp and Hospital Council Service.

Care. There is an instrument storage room in the music workshop where instruments should be repaired and kept in good condition. It should contain shelves and racks for storing, cleaning equipment, extra parts, reeds, and tools for repairs. When disinfecting instruments, a solution of 35 per cent ethyl alcohol and 65 per cent water is used. Wind instruments should be properly sterilized before using. Great care must be taken with woodwinds. Reeds should be used by one person only.

Recorded Music—V-Disks. These are 12-inch plastic, double-sized phonograph records of popular and classical music, recorded by leading artists and organizations of the U. S. A. A package of 20 different V-disks is forwarded to all general and convalescent hospitals once a month from the Music Section, E and R Branch, Special Services Division. It is the responsibility of the special services officer at the hospital to see that delivery is prompt.

Commercial Records. Each hospital should have an adequate stock of all types of music. Classical albums of great symphonic
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works, concertos, sonatas, and operas are invaluable in preparing record concerts for patients. There should also be many records of current popular tunes and old time favorites, religious pieces, and folk tunes.

Visual Song Aids. Mass singing can be enhanced by the use of song slides which project the words of a song on a screen. A USO song slide kit (price $16.95, procurable from the National USO, Empire State Building, 350 5th Avenue, New York 1, N. Y., Attention Dr. Raymond Kendall) is available, for which a projector holding 2" x 2" slides is needed. Patients should be given the opportunity to make their own slides by the following method:

Use India ink on cellophane or onion skin paper.
Print only four lines on any one slide.
Place lettered cellophane between two thin plates of glass, slide size. Bind plates together with paper tape.

Films for Group Singing. Song shorts—these motion picture shorts, each running approximately 8 minutes, feature famous singing stars, and make use of the well-known "bouncing ball" technique to encourage audience participation. Appropriate issues of these films approved by the Surgeon General will be distributed through normal distribution channels to ASF general, convalescent and regional hospitals' film libraries, as outlined in TB MED 145 and TM 8-290.

Army Exchange Equipment, Sheet Music, and Books on Music. The following music equipment is available through the Army exchange officer, who will purchase in accordance with price agreements:

Music instrument method and study books for every instrument.
Choral collections for mixed and male voices.
Music supplies (manuscript and score paper, pens, mouthpieces, reeds, mutes, repair parts, music stands, etc.).
Orchestrations.
Sheet music (also sometimes available on loan from local civilian libraries).
Small instruments (tonettes, song flutes, ocarinas).
"Make-a-Uke," "Play-a-Uke" contain parts, materials, and instructions for building a ukulele; self-teaching course included.
Tune-Dex "V" music. (A small library issued monthly—full chorus in lead sheet form with chord symbol).
Christmas music.
Music stands can be built on the post in the occupational therapy workshop.

Recommendations for purchases of books on music should be made to the hospital librarian (see par. 114, TM 21-205). It is advisable to avoid books of a highly technical nature. "Council Books Series" on music, published by the Library Branch, E and R Branch, Special Services Division, and Esquire's three issues of Jazz Book for 1944, 1945, and 1946 should be added to libraries for the availability of patients.

PHONE-RADIO-RECORDE R COMBINATION. Most hospitals have this instrument. Because it will be in constant use through the hospital, it is recommended that a small portable model be obtained in addition to a large stationary model.

MILITARY BAND. An authorized ASF band assigned to a camp, post, or station is not included in the hospital manning table, except in convalescent hospitals. Many bands have been assigned to or are available for general and convalescent hospitals. At those hospitals having neither an authorized nor volunteer military band available for use, the commanding officer may request the Commanding General of the Service Command for the assignment of an available military band.
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Available Army Music Publications

Distribution of the following publication is made in accordance with section VI, WD Circular 257, 1942:

Army Song Book (music and word edition), a compilation of 67 songs that everyone can sing.

Distribution of the following publications is made in accordance with WD Circular 264, 28 June 1944 and section II, paragraph 4, ASF Circular 199, 30 June 1944:

Training the U. S. Army Song Leader—a handbook prepared for special services officers administering a song leader’s course.
Pocket Guide for the U. S. Army Song Leader—an outline of essential fundamentals, practical hints, and suggestions to aid the soldier in adequate and successful leadership of Army singing.
Ten-minute Self-instructor for the Tonette, Ocarina, Harmonica and Ukulele—an illustrated self-instructor method containing diagrams and an easy system of teaching men to play small instruments.

The following publications can be obtained upon request through channels to service command headquarters, attention special services officer or music officer:

Army Hit Kit—a monthly publication of current popular and favorite songs. Kit issued in continental U. S. contains 1 music copy and 50 word editions.
Bibliography of Songs for Group Singing (including a list of Community Song Books)—a list of suggested song books compiled for group singing, WD Pamphlet 28-4.
Songs of Stephen Foster—the music edition contains music and words of 41 songs, as well as suggestions for arrangement for voices. The word edition contains the lyrics of these songs.
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Star-Spangled Banner—arranged in the key of A-flat for military or dance bands.
Soldier Show Guide Vol. X—certain sections are devoted to material for musical shows and quiz programs.

The following publications are included in War Department Pamphlets, series 28:

Improvised Musical Instrument Guide—a comprehensive study on construction of various types of improvised instruments, including pertinent information as to the actual “how-to-do-it.” Sit down and Play—an attractive handbook on elementary piano playing for the convalescent soldier.

Funds

Post Hospital Fund. Items suggested for use throughout this chapter may be purchased from local hospital funds in accordance with the provisions of paragraph 13, AR 210-50, provided such items are not available from regular supply sources.

Central Hospital Fund. Requests may be made to the central hospital fund when the local post hospital fund is inadequate or whenever additional funds are required for current needs, (Par. 13b(1)(a), and par. 13c(10), AR 210-50.)

Central Post Fund. For use of this fund see paragraph 9, AR 210-50.

WEM Funds for Recreational Equipment. For usage see paragraph 2a and b, 4b(2), 4e, and 5, WD Circular 34, 1945.
CIVILIAN ORGANIZATIONS. The American Red Cross, which provides and arranges with civilian agencies for audio-reception music for patients, has a definite place in the reconditioning program. In the administration of the program it is important that close contact and co-operation be maintained between the Red Cross and the hospital military personnel, but it should be emphasized that the work of this organization lies in recreation for patients. The physical reconditioning, educational reconditioning, and occupational therapy of the reconditioning program are under direct supervision of the medical officers. Other entertainment agencies may contribute also to the recreation of the patients when invited through the Red Cross. Every possible assistance should be given to authorized civilian organizations providing music for hospital recreation.

PUBLICITY. No program can achieve popularity and success without appropriate publicity within the hospital. Attractive colored posters and showcards, designed in a competition offered to convalescent patients, should be made and placed on bulletin boards, drawing attention to the many activities and opportunities in music, all of which are available to patients.

References

The following references to War Department publications are considered basic:

- Section VI, WD Circular 257, 31 July 1942.
- Section V, WD Circular 30, 2 June 1945.
- WD Circular 264, 28 June 1944.
- TB MED 84, 10 August 1944.
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TB MED 145, 5 March 1945.
AR 350-3100, 17 July 1945.
AR 30-3000, 16 October 1944.
AR 210-50, 1 June 1944 and 20 January 1945.
Section I, ASF Circular 210, 30 June 1944.
TM 8-290, December 1944.
TM 21-205, 18 September 1944.
FM 28-5, 31 March 1941.
Music in Industry

R. L. CARDINELL

Music in industry and music in medicine can be considered as separate subdivisions of a single subject, functional music. Functional music is that music which, when properly administered, accomplishes specific predetermined ends other than entertainment or pleasure. The background music used to accompany scenes in motion pictures, opera, the legitimate theatre, and radio is one of the commonest forms of functional music that we encounter.

If we except the popular tunes, favorite and spectacular arias, dramatic and elaborate overtures, finales, dances, and melodies played during the course of a movie or stage production, it is clear that few laymen realize the important role which music fulfills as an adjunct to the exposition of the story. Yet the music that is played to enhance the scene, a seldom-remembered tonal stimulation, causes the emotional reaction of the audience to be appreciably heightened over what words and action alone could produce.

Composers of such music have few rigid rules to go by, and as a consequence there are no standards of evaluation. One composer will do a better job than the next because he has more
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of a feel for the task. When an art or craft is in such form that
rules and precepts cannot be laid down governing its applica-
tion, then innate ability, or genius, becomes a decisive element
in the craftsman-artist. This is the state of affairs which applies
to functional music, with particular reference to music in in-
dustry and music in medicine.

The association of music with work in the form of work-songs
is older than recorded time. The modern concept of music in
industry, that is, music played to people at work for the purpose
of relieving fatigue and boredom, is a comparatively new de-
velopment. In 1915, Thomas Edison experimented with re-
corded music played to factory workers. Nothing seems to have
come of this, however, probably because at that time there were
no adequate sound distribution systems.

In later years, after the development of public address sys-
tems, the idea was tried in several factories in the United States.
Some found it good and retained it. Others found no benefits
and discarded music as a useless expense. In none of the cases
was there enough publicity to encourage a widespread investiga-
tion of the possibilities.

Curiously enough, the thought of using music as an aid to
production seems to have originated spontaneously in most of
the factories that tried it. Several of these plants were engaged
in the manufacture of radio sets, parts, or tubes. It became ap-
parent in testing the finished products by music that a regular
program of music would be a pleasant thing to have. In other
plants the introduction of a music program came as a conse-
quence of some employees’ bringing portable radios to work. In
still others, the music program was the result of a happy thought
or hunch on the part of one of the employees or a member of
the management. In practically every case it was considered,
and rightly so, that the plant was the originator and pioneer of
something new.

In 1938, a report on fatigue and boredom in industry was pub-
lished by a British Government agency. Included in the report was a detailed account of experiments with music conducted in a chocolate factory. The effects of music on boredom and fatigue were measured in terms of the rate of production. It was clearly indicated that music could successfully reduce output dips occurring at the times of day when fatigue was greatest. The resultant effects on total production were of significant importance. The report did not become widely known in the United States until a few years later, when interest in industrial music became widespread.

Just prior to America's entry into World War II, occasional articles concerning the use of music in various factories began to appear in the press. These were written with a view toward reader interest and contained little information of practical value other than the fact that music was successful in the cases cited. As to musical, acoustic, or engineering requirements, very little was said. Many factories, stimulated by the articles into trying music, but not having adequate equipment or music programs, rejected the whole idea as nonsense.

Finally, Professor Harold Burris-Meyer, of the Stevens Institute of Technology, delivered a paper on music in industry before a meeting of the American Society of Mechanical Engineers in 1942. This paper, more than anything else, was responsible for the widespread approval and use of music in industry that followed in later years. It was published in Mechanical Engineering in the January 1943 issue and republished a year later in the Scientific American.

Professor Burris-Meyer told of certain research findings by the Sound Research Department at Stevens Institute. In the search for the effects of auditory stimuli upon man, the industrial use of music had been subjected to some carefully controlled studies in a number of plants. He showed how over-all production had been increased, dips in output curves reduced, absenteeism and early departure of piece-rate employees dimin-
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ished through the use of music. He pointed out that although as a rule any music was better than no music at all, the best results were achieved through music especially programmed for the purpose, with known principles concerning the physiological and psychological effects of music employed. The studies at Stevens on music in industry had been under the direct supervision of the writer of this chapter, but were terminated because of necessity for research of a military nature.

This was the first positive proof, brought to public attention, that music could be a definite aid to production efficiency. The country was in the early stages of war production and anything which could materially assist the process was eagerly sought after. Long before the paper was officially published, news of it had been spread far and wide by syndicated press releases and stories in national magazines and trade journals. A snowball was started which grew with surprising rapidity.

Hundreds of plants tried music and reported benefits ranging up to the miraculous. But hardly any could be absolutely sure of the exact effects, as they could not take the time to set up controlled studies. A survey was instituted, however, by the War Production Board covering 100 war plants around the country. On the basis of opinions received, the bars were let down on priorities for equipment necessary to the production of music in war plants.

Meanwhile, the Office of Production Research and Development of the War Production Board had engaged the writer to continue basic studies on the subject and to act as adviser to war plants needing assistance. Because of instability of conditions and wartime pressure, it became increasingly difficult to conduct studies which were sure to give valid results. The point of diminishing returns was reached toward the end of 1943, and the project was closed. Research results were incorporated in a manual, Guide to Industrial Sound, published by the OPRD in 1944.
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Because of the numerous requests for information on identical problems, the writer prepared a short article, "Guide to Music in Industry," which was published in Factory Management and Maintenance in October 1943. In this paper an attempt was made to lay down the basic principles by which a successful work music program could be achieved.

By this time, the number of factories using music in the United States had increased to an estimated 2,000 to 4,000. Since there was no central agency or clearing house, exact figures are impossible to determine. England, meanwhile, had been expanding the use of music in industry without much fanfare. The principles established by Wyatt and Langdon were put to work at a very early stage of England's war effort. The British Broadcasting Corporation began producing special programs for industrial use, and this practice continued throughout and beyond the war's duration. By 1943 an estimated 8,000 war plants were furnishing music to their employees. This figure represented about 90 per cent of British industry. Nearly all factories were equipped with sound systems as a precautionary measure in the event of air raids. It was relatively simple to introduce music into these systems, either by reception of the BBC broadcasts or by playing phonograph records.

From 1944 to the end of the war, the users of work music increased steadily, though not so sharply as in the sudden rush during the years of 1942 and 1943. It was estimated during 1945 that the number of factories using music had risen to approximately 6,000 in the United States. The figure in England remained about the same as before, since the point of saturation had been reached.

With the approaching end of the war, the question arose whether music would continue to occupy an important position in the industrial scene or whether it would be relegated to the archives of wartime emergency measures. The answer was effectively found in England by circulating a questionnaire to several
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hundred factories. The results showed that more than 92 per cent of those employing music intended to retain it after the war.

In the United States, although no survey was made, a similar conclusion could be reached by observing the number of firms which were preparing to enter the supply end of the business as soon as restrictions were lifted on electronic equipment. The actual end of the war validated the conclusion. The only plants which discontinued music were those which went out of business or temporarily retrenched during the formulation of their conversion plans. On the other hand, hundreds of factories and offices which heretofore had not had the necessary priorities installed music for the first time.

In both countries the majority of programs did not progress beyond the stage of appealing to people’s preferences in music. The general opinion seems to have been that if the factory employees were given the music they wished to hear, it did not much matter how that music was arranged in the program presented. If the employees were pleased, morale was increased, and that was the important factor. Despite Professor Burris-Meyer’s demonstrated success with music programmed specifically for the relief of fatigue and boredom, the functional approach to the task was largely by-passed, with work-music programs taking on the character of radio broadcasts or other entertainment.

The largest supplier of a music service to industry, the Muzak Corporation, with which the writer became associated in 1943, alone held to the line of functionalism. This organization furnishes programs of music over transmission lines to various types of subscribers. Equipment at the subscriber location consists of a high quality amplifier and loudspeaker distribution system to which the program is fed from a centrally located studio. There are branch operations in major cities all over the country which furnish the same programs in each area. The
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music is recorded on high-fidelity transcriptions in the company's recording studios, and it is specially arranged and interpreted for various specific uses, viz., factories, offices, restaurants, precision industry, etc.

All programs are prepared by a staff of experts in New York. Program patterns, recording techniques, and library content are determined by a research department which actively pursues and exploits projects in all fields of science and technology which might throw further light on the subject. Muzak's research activities are greatly enhanced by the fact that all programs are under absolute control and may be studied and compared under a variety of conditions and over large areas of the country.

A recent development of Muzak is the extension of the principles of industrial or functional music into business offices. Among the offices which have been using music successfully for several years are to be found major insurance companies, leading banks, advertising agencies, and publishing houses. The Reader's Digest Association was one of the first of such organizations to install, in 1942, a complete music system.

The resistance to be overcome in developing the field of music in offices is probably deeper rooted than that which existed in industry at the start. It is common belief that music will interfere with the mental tasks at hand. This, of course, is perfectly true, if the music offered is not suitable for the purpose. A recent article points out that studies at Dartmouth and De Pauw Universities indicated that mental processes can be facilitated by music. Several examples are cited of individuals who alleged that music helped their thinking ability. As a matter of fact nearly everyone has encountered school children who consistently study their homework to the accompaniment of a radio program. How much better the work might be if the right kind of programs were available and the youngsters could be persuaded to tune them in!
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Subjective studies in a number of offices have indicated that the benefits to be derived from music by office workers are just as great as the benefits derived by industrial workers. Unfortunately, objective studies determining the exact effects, such as have been undertaken in many factories, are hard to obtain in offices because of the difficulty of measuring output and mental effort. At the present writing, only one of consequence is available.\(^3\)

The music programs played to offices are quite different from the programs played to industry. Industrial programs, as a rule, have been found completely unsatisfactory for the purpose. However, the underlying principles governing the application of work music, viewed from the functional rather than the entertainment point of view, are the same in both cases.

Many of these principles have been derived by translating auditory stimuli into the musical idiom and validating the results. Many others are not too clearly defined at the moment or are in a state of flux because of a paucity of evidence. They will be individually enlarged upon as they are discussed. Despite the fact that the processes of analysis and synthesis have been applied to existing fundamental knowledge, the book of rules which will make functional music an exact science remains to be written.

The first consideration in bringing music and work together must be to arrive at a clear definition of the purpose of the music. What is its primary function? Is it to provide entertainment to the employees? Is it to promote industrial efficiency through relieving fatigue, boredom, or nervous tension? Work and entertainment are not always compatible. The performance of the one or the enjoyment of the other is likely to suffer, since the human mind cannot concentrate upon two things simultaneously. Implicit in this consideration is the concept of degree of concentration in work, which will be discussed further.

The promotion of industrial efficiency would seem to be the
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most logical reason for bringing music and work together. Surely the alleviation of certain unavoidable industrial diseases, namely, fatigue, boredom, and nervous tension, is not incompatible with work. Perhaps a certain amount of entertainment can be added to the prescription, to make the dose palatable. This will depend in large measure on the degree of mental concentration required by the work.

Because industrial music has to be heard under extreme conditions of background noise, the sound systems must be more carefully designed than those used for ordinary public address. The majority of factories which attempted to play music over sound systems built for paging purposes met with failure.

The frequency range in the reproducing system necessary to achieve good music definition is much greater than that required for an equivalent degree of speech articulation. In addition, the broader the frequency spectrum, the better will the music penetrate the background noise. This frequency consideration must apply to all elements of the sound system, from recording to loud-speakers. Any link in the chain which is below standard immediately reduces the performance of the entire system to its own level.

Distortion limitations for music reproduction are much more severe than for speech. Distortion of music leads to annoyance on the listener's part, and this spells disaster for a work-music program.

All work areas must be acoustically well covered by having a sufficient number of loud-speakers placed for an even distribution of sound. Loud-speakers are located in relation to the factory machines so that the music sounds equally loud at all points in the area when work is in progress.

As far as degree of loudness is concerned, the volume maintained should be as low as is consistent with ability to penetrate the noise of the factory machinery. If the music is too loud, it becomes a focus of attention. To fulfill its functional purpose,
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music must avoid being a continual source of distraction from the normal business operation.

Since the sciences of acoustics and electronics are well-established upon well-defined principles, no further space is given in this chapter to elaboration of the equipment requirements. Suffice it to say that the engineering which goes into the design of an industrial sound system must be of the highest order, and each installation must be individually considered.

The program which is to be transmitted to people at work is the center of a multitude of conflicting theories. Most of these arise from the concept that music’s primary purpose is entertainment. This is a school of thought that has many advocates and is promotionally effective. Despite its vigorous support, the entertainment approach severely limits the scope of music in industry. It denies the principle of functionalism. Whether allegedly or not, it does so in fact, because functionalism can only be accidental otherwise. If the functional approach is adopted, entertainment is brought into the picture only to the extent that the demands of function require.

In the functional approach, musical selections are classified according to their degree of stimulation. Stimulation is here used in its strict sense and includes the function of soothing. Classification, at the present time, is far from exact.

Investigation has shown that a maximum of two and a half to three hours of music in any eight-hour work period is the correct amount to use for the most beneficial results. The effects of the music increase in proportion to the amount of music used until this point is reached. After that, the effects diminish as more music is added until, with continual music during the work spell, the effects return to the no-music starting point. The employees become conditioned to rejecting the music to the same extent that the machinery noise is rejected.

The music is not all played in a single dose. A period of twenty to thirty minutes at a time appears to be sufficient for...
obtaining the desired reaction. Therefore, playing periods of this length can be distributed throughout the day at the times where they will be most effective.

As basis for the placing of these playing periods, and also their general character, the functional approach demands the use of fatigue curves. The normal average fatigue curve of the factory is determined, showing the extent and variation of fatigue on an hourly chart. Music is placed to counteract the points of fatigue just prior to and during the time when the fatigue peak is setting in. The degree of stimulation is determined by the character of the music used.

A digression is in order here concerning the phenomenon of fatigue. Ever since music in industry started, fatigue and boredom have been lumped together and used synonymously. A possible reason for this assumption is that outward manifestations of physical fatigue, mental fatigue, and boredom are nearly the same. Although scientific understanding of these conditions is far from perfect, and very little is known concerning the effect upon them of mental attitudes, it is reasonable to assume that each would require different treatment. Diseases are cured at the source, not by attacking the symptoms.

In industrial locations where boredom is the chief ailment to be combated it has been found more effective to use shorter playing periods at regular and more frequent intervals. This practice helps to mark the passage of time, which appears to be a powerful aid in the relief of boredom induced by monotonous, repetitive tasks.

The fundamental structure of a musical group is derived from its stimulus function. Each selection is assessed relatively for its stimulating quality or mood. Experience has shown that maximum stimulation is achieved when selections are arranged in order of ascending mood. The effect is analogous to starting a car on an icy road. Gradual acceleration is more effective than racing the wheels.
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A number of factors operate on the choice of actual selections used within the groups. Considering the functional purpose of stimulation, all music that is depressing in character is automatically ruled out for industrial programs.

All music used is selected for its ability to penetrate the background noise. Dynamic range must be limited sharply. Otherwise loud passages are too loud and soft passages become lost. Much of this limiting can be done in monitoring the selections as they are played. However, sudden crescendos and sforzandos often elude the best of operators.

For the most part, the music used should be non-attention-getting. Such arrangers' practices as abrupt changes in key or rhythm, loss of melodic line in background figures, vocals, and highly complicated modulations draw the attention and are to be avoided where the function is the relief of fatigue. That they may be permissible in programs for the relief of boredom is not inconsistent with previous reasoning.

Work which gives rise to boredom is mostly monotonous and repetitive. The degree of concentration required is extremely low. In many cases a distraction is looked upon favorably and does not interfere with work, which becomes almost mechanical. Pleasant music provides a vehicle for wandering minds, forestalling moodiness and worries which might otherwise occupy them. It is suspected that vocals used in this case may be valuable because of their empathic appeal. Entertainment here becomes of relatively greater importance than stimulation. Approached from this viewpoint, entertainment becomes a part of the functional approach since it is entertainment which performs a specific purpose.

In all industrial processes, the degree of concentration required is far below human capability. That means that the employees can and do pay attention to the music from time to time. Entertainment, though relegated to a position of sec
ary importance in earlier discussion, must not be overlooked or the programs will not be acceptable to the audience.

The entertainment needs of the programs are met by constructing the musical groups of various types of music in accordance with patterns determined by the listeners' preferences. Of course, all selections have previously been screened for the factors already enumerated.

Preference ratings for music types are most easily determined through questionnaire surveys. It is important to consider not only preferences but dislikes and indifference as well. It has been noted that objections are registered much more vociferously than praise in connection with industrial music programs.

The Muzak Corporation makes extensive preference surveys among the employees of the firms serviced. Through this means it has been possible to set up music preference patterns in such categories as geographic location, age, sex, occupation, and education.

Although the foregoing discussion may lead to the conclusion that a separate program must be worked out for each installation, enough common denominators have been found to establish a nominal number of program patterns satisfactory for all requirements of functional music to date.

This, then, is music in industry as it is today. A great deal more is known about it than was known in 1940. Relatively speaking, functional music is about in the stage of development that electricity was in at the time of Faraday. Something is known of its laws of operation, but a great deal of research remains to be done.

The time has arrived to concentrate more upon the "why" than upon the "how much" type of study. Many tools of research still await development and a certain amount of musical thinking needs revision.

Music must be redefined in terms of its basic elements. The effects of these elements and their combinations upon man in
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his various types must be studied. More studies must take place under a variety of conditions: conscious and subconscious listening, performing work for wages and performing set tasks in psychological laboratories. The effects of music association and recall upon the findings must be evaluated. These are only a few of the many research studies that must be pursued before man can use music as effectively as he now does electricity.

The paucity of fundamental knowledge of the effects of music on man belie such poetic catch-phrases as “music is a universal language,” or “music hath power to soothe the savage breast.” They may be true in specific instances but cannot be applied broadly. No one has written the grammar for music as a language, and there are many compositions which are anything but soothing.

In the late 1930’s when investigation of music in industry was seriously undertaken, there was frequent reference to books purporting to give the inside information on “musical therapy.” The progress of the war, with its increasing numbers of wounded veterans, brought about a renaissance of popular belief in the powers of music for healing, instigated by the startling successes of music in the field of industry. A slight reversal of the information-seeking trend took place, and many who were involved in music in industry were asked for assistance by those who wanted to use music for the sick. Though it could not supply definitive answers, work in music in industry at least made available methods and approaches to the problems involved in music in medicine.

In the research programs to come, it would appear that both industry and medicine can be of mutual assistance. Fundamental information on the effects of musical elements and forms on man’s physiology and psyche must be obtained before music can be effectively put to work to accomplish predetermined ends. The chores will be the same or similar in medicine and industry. The functional use of music, applied in both the
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rehabilitation of the sick and in the task of adjusting the normal individual to his work, can pay enormous dividends in human values.

NOTES

1 S. Wyatt and J. N. Langdon, Fatigue and Boredom in Repetitive Work (1938).
3 The Use of Music in Life Insurance "P" (Muzak Corporation, New York, 1945).
Chapter Fifteen

The Development of an Experimental Psychology of Music

CHARLES M. DISERENS

During the past one hundred years materials have been accumulating for a systematic and experimental psychology of music as distinct from musical aesthetics and criticism. Psychology, traditionally a division of general philosophy and often referred to as mental philosophy, has advanced to the rank of an organized science vying with physics and biology in the use of laboratory methods and the claim to exact results. Psychology has also been departmentalized into a number of fields determined by the methods employed, by purpose, or by convention. Among these fields the psychology of art in general and of music in particular has been cultivated with considerable success since the time of Fechner and Helmholtz, the two great pioneers in this study. There is at present a quite systematic psychology of music which has been built up largely on the basis of generally acceptable experiments. The previously existing body of aesthetic theory and criticism was founded on general experience and rich but casual empirical observations sub-
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jected to a theoretical and sometimes poetic or romantic interpretation. It served, however, as a point of departure for the experimental aesthetics of Fechner, who was chiefly concerned with visual forms, and in less measure for the auditory and musical researches of Helmholtz, although the latter relied primarily on exhaustive investigations of the nature of auditory stimuli and of the anatomy and physiology of the ear. With Helmholtz a definite, if circumscribed, experimental psychology of music appeared, the embryo, so to speak, of the well-organized body of materials which we now possess. Since his day much research on music has been carried on by exact experimental methods, and where this was impossible, by such approximations to laboratory experiments as case studies, questionnaires, or systematic clinical observations in the instance of ill or mentally abnormal persons subjected to musical influences. In short, our experimental psychology of music has been elaborated from researches carried out in the scientific spirit.

Meanwhile the use of the genetic and historical method of research became common to most fields of investigation, resulting in interesting suggestions from Charles Darwin himself and from some of his followers on the origins of music. These suggestions not only served to guide experimentalists in their researches but led some to extend such researches to the responses of the higher animals to music. The use of the genetic method also resulted in a fruitful series of experiments on the development of musical ability or its component functions at various stages of childhood or among races and groups of mankind representing different levels of cultural evolution. The genetic viewpoint also directed experiments and statistical enquiries such as Galton's, designed to show the nature and limits of musical inheritance. Thus many researches in the psychology of music are at one and the same time experimental and genetic in method, and it often happens that a group of purely experimental studies acquires further meaning in the
light of a genetic interpretation. The experimental psychology of music may be defined as the study under controlled conditions of observation of the production and perception of musical stimuli as well as of every variety of response to such stimuli, with the assumption, moreover, that musical stimuli may be comparatively simple elements such as single tones or chords, or complex patterns and even complete musical compositions. Or, more briefly, the experimental psychology of music consists in the investigation of responses of all kinds to music under strictly controlled conditions of observation.

Strictly speaking, an experiment is the testing of a causal hypothesis or theory in which all factors are controlled except one or possibly a group of factors assumed by convention to operate as one. The amount and kind of experimental control exercised are variables of experimentation and may be inadequate in some of the older experiments in psychology. This is true of some of the researches, even recent ones, cited in our study. It is true of certain of the studies based on interviews and questionnaires as well as those relying on the unskilled introspections of radio listeners, industrial workers, and others concerning their responses to music. Yet the partial control of observation achieved in such extensive statistical studies, especially if compared with objective records of some kind of improvement or with industrial output, makes these studies of the mass effects of music of considerable value. The enlightened common sense of scientists accustomed to work in the experimental spirit may be trusted to draw the line between the credible and the incredible. Repetition of a disputed experiment is always possible, and even a defective experiment may point the way to a better one. We make these observations at this time to justify the inclusion of some experiments on the industrial and therapeutic value of music in which the degree of experimental control actually achieved may not satisfy the experimental psychologist or the academic theorist, but which
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nevertheless are of great interest to the physician and industrialist, and perhaps even to the average musician, as proof that music is not a mere aesthetic luxury but an adjunct to economic well-being.

Viewed in a comprehensive fashion, then, the experimental psychology of music as at present constituted is founded on pure psychology, musical aesthetics, physics and in particular acoustics, the physiology and anatomy of the auditory apparatus and the cerebral centers of control, anthropology, ethnology, genetics, and in the case of vocal music, phonetics and linguistics, as well as upon such practical necessities as the organization of society enforces upon every science—in brief, the need of making a practical contribution.

The beginnings of such an experimental psychology of music appear as early as the fifth century B.C. in the work of the Pythagoreans, who invented the monochord or sonometer, apparently our earliest psychological laboratory instrument, and determined the relation between musical tones and the lengths and tensions of vibrating strings. Pythagoras clearly grasped the relation between simple ratios and musical intervals as noted in perception and could have gone on to found a simple psycho-physics, some two thousand years in advance of Fechner, but he became lost in the attempt to reduce all kinds of qualities to quantities and to resolve the whole world into numbers. Analogous experiments were possibly made at about the same time in India and China, since these ancient peoples possessed definite musical scales, but no definite tradition exists, and the work had no influence on the development of music or musical psychology in the West.

Later Greek philosophers such as Plato, Aristotle, Aristoxenus, and Polybius offer many empirical observations and theorize boldly as to the influence of the Greek musical modes on individual and political conduct, and this is also true of Confucius and his followers in China. Among a people ad-
dicted to experiment, especially in Greece, such observations might have led to fruitful researches on the effects of ancient music.

It is believed that certain Greek cities were accustomed to use music in some one or two modes and reject others, and that certain ancient authors ascribed the general characters of the citizens to the influence of the modes adopted. Imagine how valuable it would be to have a survey of the political influence of musical modes in Greece comparable to Aristotle's work on comparative political constitutions of the Greek states.

The experimental approach was indeed increasing in Alexandria but had not been reapplied to the study of music; with the rapid decline of ancient civilization, however, the experimental approach gave way to otherworldly interests or to purely practical activities of social and political readjustment. Experimental method was to remain in eclipse for a thousand years.

Beginning with the Renaissance, the rapid development of experimental physics, anatomy, and physiology, including a considerable number of researches on acoustics and on the anatomy of the organs of audition, prepared the way for the first comprehensive treatment of the conditions and laws of musical sensitivity presented by Helmholtz in his classic *Sensations of Tone*, first published in 1860. But this would not have been possible without the detailed analysis of the nature and properties of sound in general, dating from Newton and carried on by physicists and mathematicians such as La Place, La Grange, and especially Fourier, whose theorem that "a non-pendular periodic wave of any kind whatever may always be resolved into a series of pendular waves" was of particular importance. This, with the principle of resonance determined by general acoustics, was a point of departure in Helmholtz's work, and in conjunction with his knowledge of the detailed anatomy of the inner ear, it enabled him to formulate experiments and
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offer interpretations of results which are often definitive and always command respect.

In the great work of Helmholtz mathematical analyses of sound waves, physical properties of sound, sensory attributes of tones and tone complexes, and a detailed account of the anatomical and physiological functions and structure of the ear are brought into relationship and given systematic interpretation.

The contribution of Helmholtz may be appreciated when it is realized that, as Seashore states, "every phase of vocal or instrumental music, artistic or inartistic, every emotional touch as actually expressed and conveyed by the musician can be represented in the four attributes of the sound wave; namely, the frequency, the amplitude, the duration and the wave form." In short, all music is a matter of sound waves which may be photographed and of sensory receptors and effectors which may be studied in detail by the anatomist and physiologist.

Helmholtz confined his study to musical sensations and the conditions of their origin and variation. By experiment he resolved the tones of musical instruments into their partials, explained timbre, and appeared with equal success to explain the consonance and dissonance of musical intervals in terms of the co-operation and interference of their partial tones. He was able at the same time to deduce his results from the general theory of resonance. Rival theories of consonance and dissonance based rather on analyses of psychological experience than upon experiment or deduction from the objective nature of the stimuli were afterward offered by such eminent students as Stumpf, Kulpe, and Lipps. Most of these are fusion theories, but the authors rarely agree on the criterion of fusion. Most of them do agree, however, on the order of consonant intervals proposed by Helmholtz. Later investigators, including several Americans, have shown that judgments of consonance and dis-
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sonance are affected to some extent by such factors as position of a musical interval in a sequence, total context, training, habituation, and cultural and historical convention.

On the whole, most of this work was directly stimulated by Helmholtz's researches, and these, together with his pioneer work on the receptor mechanisms of the organ of Corti, must be regarded as the greatest single contribution concerning the primary data of musical psychology.

Since music, however, is in essence a sequence of tones rhythmically arranged, a part of the effect of music must be ascribed to our awareness of sequence and the nature of the rhythm experience, which also seem to be primary data. The study of the psychological effect of tonal sequence, melody, melodic form, and internal factors of relationship, has been pursued mainly along theoretical lines. Such experiments as have been made seem to suggest that the psychological effect of melody is based on some kind of unity of ideal motion, or on incipient or overt motor phenomena, the peculiar quality of such unity depending on variation in the order and physical properties of the tonal stimuli.

As for rhythm, although an extensive literature exists, it does not primarily deal with musical rhythm. The basis of rhythm is the appreciation of regular intervals between sensory presentations of any kind or between recurring groups of such presentations. The most important experimental studies are concerned with the perception of time intervals, length of pause and of presentation, and principles of grouping. Rhythm is like a wave or vibration in time and is analogous to the structure of a tonal stimulus in space. Apparently an absolute lack of rhythm is difficult to find in nature, but is rather a breakdown of perception than an objective condition, and frequently the apparently arhythmical becomes rhythmical to a trained perception after habituation or perhaps by some kind of configurational act creating a sudden unity in the variety of successive
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presentations. Thus Myers found savages reacting correctly to drum rhythms which European auditors were unable to perceive. Nature being full of periodicities and our bodies exhibiting a series of natural physiological rhythms—heartbeat, respiration, recurrent bodily tensions and relaxations—it has been supposed that our pleasure in musical and other rhythms is based on the degree to which they harmonize with and facilitate the natural rhythms of our behavior. The student of the subject will find a wealth of experimental as well as historical material on the subject in the work of Bucher. Basic contributions to the strictly experimental study of rhythm were made by Münsterberg and Meumann.

The study of the effect of music or of the elements of music on ideation is complicated by some confusion between cognitive states, ideas, images, and simple affective states. Of course all of these may appear in the complex awareness of the auditor, but while simple affective states, mere pleasant or unpleasant feeling-tone, may be a primary and constant result causally related to the music which seems to arouse them, the associated ideas or images may be merely accidental. Indeed, the consensus of opinion among experimentalists cited by Schoen is that musical imagery is never specific. A musical composition often arouses imagery, but this by nature varies as widely as do the personalities of the auditors. The effect of a common cultural tradition as to musical meanings and conventional expressions may impose a general resemblance on imagery aroused by a given musical composition in people aware of these conventions. But within this very general resemblance there is no specificity of the concrete image or of its particular relationships. As Schoen well says, “music per se cannot paint a picture or tell a story.” In spite of the elaborate accounts of symphony librettos connecting one section of a musical composition with a storm at sea, another with a serene moonlit night, a third with a peaceful rural scene by twilight, no such exact corre-
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spondence exists. Even with the suggestions at hand the listener realizes them in an infinity of different ways.

The possibility that music, and even certain of its elements by themselves such as tones, intervals, and rhythms, may bear some invariable relationships to more general cognitive tendencies and meanings of a non-imaginal nature is not excluded, and several promising experimental approaches have been made to this problem.

Since Galton called attention to the phenomenon and carried out statistical researches on it, much attention has been given to “colored hearing,” which occurs in many human beings, apparently varying in frequency with race and perhaps with climate. In colored hearing, or chromesthesia, a fixed relationship exists between sensation of tone—musical tones, and the vowels of speech—and a simultaneous awareness of color sometimes indistinguishable from a true sensation. This relationship, however, seems to be arbitrary, varying from individual to individual. Many such cases have been studied experimentally by Galton, Binet, Claparede, Flournoy, Katz, and others. Interpreting such empirical data in terms of an occult, theosophical tradition, a famous composer, Cyril Scott, compares the diatonic scale to the seven colors of the solar spectrum and suggests a color scale of the following character for the scale of C: C—red, D—orange, E—yellow, F—green, G—Blue, A—indigo, B—violet. On the basis of some such equation as this, color organs have been invented and attempts made to translate musical compositions into displays of changing colors.

Official science, however, demands more than theory, occult or otherwise. And psychologists have found no evidence of such exact and invariable relationship. Still, some progress has been made. According to Schoen, “the most recent and probably the most thorough study of color music is reported by Karwoski and Odbert.” Although they found “no direct relationship be-
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tween color and music which held for more than a small number of subjects,” they did find certain general relationships of photisms of light, color, form, and line to certain aspects of music. These relationships recurred constantly, suggesting causal connections. Thus increased brightness accompanies rise in pitch or more rapid tempo. Graceful lines accompany smooth musical passages, while jagged lines accompany staccato and syncopation, and for some subjects the position, direction, and area of photisms vary with variation in musical aspects.

In a more recent contribution on the role of form in visual response to music Karwoski, Odbert, and Osgood report the responses of 100 subjects on the underlying correspondence between form polarities and music paired and selected at random. The reports revealed a large amount of agreement in the resemblances indicated as well as in the relations found in the visualization of photisms. There was, however, considerable disagreement as to the reasons offered for similar responses. Such results, nevertheless, indicate that certain general directions in ideation are intrinsic to musical forms, that music may bear a relationship to general ideas, though not to specific images. The relation to musical thinking and creation is apparent, as are also the results of another recent study reported by Willmann. In this study musical themes from selected composers were analyzed and then presented to the subjects along with four geometrical designs, namely, a square, a circle as a base topped by three sine curves, a thin saw-toothed form, a lightning-like, narrow form. The object was to match the musical theme with a geometrical form. The subjects succeeded more often than mere chance would permit of, so that here, as in the previous experiment, there seems to be something intrinsic to musical form affording precise if very general direction to cognitive process, perhaps even at a subconscious level. Similar data from younger subjects are offered in a report of Omwake that for children patterns of tones and musical selec-
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tions are significantly related to geometric patterns and colors. Pointing in the same general direction, since it suggests the determination of meanings by objective aspects of musical form, is the study of Watson, who gave a test of musical meanings to a variety of individuals from the sixth grade up to college and graduate students. Watson concluded that musical meanings are determined by factors in music itself and not by subjective judgment, and that ability to discriminate between musical meanings is a special ability, perhaps of a more general character than musical ability, since the same data seem to show that musical understanding is more closely related to musical enjoyment than to musical ability, perhaps because enjoyment insures interest and attention to music, and as a result a superior grasp of total form.

If after the manner of some of the older associationists we regard simple affective states or feelings of mere pleasure and its opposite as each a kind of simple idea, then there is considerable evidence that several aspects of musical form, as well as form as a whole, are closely or perhaps invariably connected with such ideas. The pleasant and the unpleasant, however, do not seem to be ideas in any sense, but rather emotional nuclei around which an indefinite number of specific feelings, emotions, and sentiments are built up. Feelings of simple pleasure and displeasure are perhaps the most primitive form of consciousness and most closely allied to the mere formless sentence which many psychologists assume as the point of departure in subjective evolution. Experimental studies of the effects of music upon our feelings confirm in part common experience and ancient tradition as to the effects of high and low pitch, varying intensity, different rhythms, and major and minor modes on our affective consciousness. Before discussing modern experimental data on these matters we shall review briefly the motor and other purely corporeal effects of music, since these constitute, so to speak, the objective body of af-
fective processes as contrasted with the various states of affective consciousness which accompany them and are referred to as pleasure, displeasure, and as specific emotions, sentiments, and moods. Every modern theory of affective processes recognizes this relationship. Simple pleasure and displeasure are probably connected with changes in the direction of general or local bodily metabolism as well as with overt or incipient movements of approach or withdrawal.

An emotion involves not only this general reaction but also a general pattern of internal muscular and glandular changes, and an external motor pattern as well. A mood probably represents an emotional set along the lines of some such complex pattern, while a temperament may be a hereditary tendency or readiness to develop certain of these affective patterns or sets to the relative exclusion of the others. Such motor and glandular phenomena are, of course, the result of sensory stimulation, and all sensory and even ideational stimulation may involve at least incipient motor response.

The early students of musical responses, such as Helmholtz, quite properly limited themselves to the sensory and ideational aspects, since these are most important in understanding and creating music. In some cases, and always in the case of infants and the higher animals, considerable motor effects are noted. Indeed, in the very young infant and the animal the motor effects are the only clue to the presence of a sensory response. Such objective effects constitute a part of the raw materials of emotion, and it was natural that a certain number of investigators, chiefly European, should begin the experimental study of the motor aspects of response to musical stimuli as an interesting problem in itself. This early group included Binet and Feré in France, and several eminent Russian and Italian physiologists. In America, Lombard, Gamble, and Shepherd conducted a few experiments of the same kind. In a paper on “Reactions to Musical Stimuli,” the writer has summarized
this early work on the influence of music on physiological functions such as circulation and respiration, on general electrical conductivity of tissues, on fatigue, and on general vibratory effect on the body as contrasted with the specific auditory response, as well as the effect of musical stimuli on certain externally observable reflexes such as the knee jerk, and the rate and accuracy of performance in certain skills.

In a subsequent work he has presented this material with additional experimental studies along the same general lines. Further studies of this material are offered by Washco. The general conclusions from the earlier experiments were as follows: Music (1) increases bodily metabolism; (2) increases or decreases muscular energy or rate of expenditure and may thus influence the onset of fatigue as measured by either output of work or subjective feeling; (3) accelerates or retards respiration and decreases its regularity; (4) produces marked but variable effects on the pulse, blood pressure, and the distribution of the blood as indicated by plethysmographic measure of the volume to limbs, brain, etc.; (5) lowers the threshold for sensory stimuli of different modes and is sometimes associated with photisms, possibly due at times to hypertonicity of the ocular muscles; (6) results in a change of electrical conductivity and modifies action currents in the body. Music, therefore, tends to excite many of the physiological conditions required for the genesis of the emotions as interpreted by the James-Lange theory and the more modern theory of Cannon, which corrects and completes rather than sets aside the older theory.

The writer's experimental studies indicated, in addition, that music (1) tends to reduce or delay fatigue and consequently to increase muscular endurance; (2) has no definite effect on precision of movement unless the rhythm is adapted to that of the work; (3) speeds up such voluntary activities as typing and handwriting; (4) increases the extent and therefore probably the energy of reflexes employed in writing, drawing, etc.;
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appears to increase normal suggestibility in its auditors, a fact utilized by Mesmer, who employed music in his hypnotic séances, and even by primitive medicine men; (6) seems to reduce the extent of certain visual illusions, probably by serving as a distracting factor; and (7) seems to produce a shift in normal preferences for both chromatic and achromatic impressions, the change being toward the blue end of the spectrum and the white end of the brightness series.

The experimental literature on the feeling effects or affective consciousness of listeners deals with its influence on moods, the feeling value of melody, pitch, loudness, tempo, and the major and minor modes, and with musical preferences insofar as these are based on pure feeling of enjoyment, as usually happens in the judgments of the musically untrained, or in those who have had but a moderate amount of training.

Beginning with the effect of the simplest elements, it suffices to recall that demonstrations of the production of a conditioned fear in infants prove that mere intensity of auditory stimulus tends to produce fear and terror at the outset of life and may continue to do so in the attenuated form of awe, foreboding, or a sense of being overwhelmed or hypnotized, which adults of varying culture experience in listening to the tom-tom or a cathedral organ. Common experiences with infants as well as statistics of infantile reactions gathered by child psychologists give a clue to the permanent emotional significance of pitch. High pitch is irritating and productive of restlessness. Low pitch is soothing and quieting.

Timbre or tone color varies with the number, character, location, and energy of the partial tones accompanying the fundamental tones of different musical instruments. The same tones or tunes seem to differ in emotional significance when played on different types of instruments such as wind, string, or percussion, and such instruments tend to enter largely into activities where certain types of emotional response are expected
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or even cultivated. Thus the horn and trumpet accompany hunting and war and supposedly stimulate confidence, excitement, and audacity. The organ furnishes the most effective religious music. Flutes, pipes, and stringed instruments enhance or create a dreamy atmosphere for courtship ceremonies or for love in the quieter moods. But all this is traditional, perhaps conventional, although it does suggest the interest which might attend specific experiments on the emotional value of various musical instruments. The investigator might find that certain instruments definitely possess superiority due to such factors as timbre and range. There do not seem to be many definite experiments of this kind, however, with the exception of certain studies by Gundlach, who notes that the tone qualities of musical instruments are of great significance. "The brasses are triumphant and grotesque, never melancholy, tranquil, delicate or sentimental"; the woodwinds are "mournful, awkward, uneasy, never brilliant or glad." 17

The human vocal apparatus is, of course, the most remarkable and the earliest of all musical instruments, and speech and song, which are in origin allied, so that even speech is in some degree musical, have been investigated in great detail by students of phonetics and in particular by investigators of the structure of the human voice in speech and song. The voice is now recorded graphically by means of an oscillograph which permits of leisurely analysis of every aspect of the vibrations involved and their correlation with emotional states aroused in auditors or felt by the singer or speaker. Fine researches in this field have been carried out by Seashore 18 and Schoen 19 who have experimentally studied and established the importance of the "vibrato," a recognized character "of every effective singing voice," and perhaps of the greatest orators as well. In this work contact is established with the psychology of phonetics and speech. The rhythm and tempo of music probably influence the emotions by tending to arouse the movements
and activities associated with them in the ordinary routine of perception. Rapidity suggests energetic activities and the attendant states of tension, excitement, and exhilaration; slowness suggests dignity, calm, and all states accompanying more solemn or leisurely activities; while intermittent or fluctuating tempos or rhythms suggest an alternation of states.

The traditional correlation of cheerful and solemn emotional responses with major and minor modes is still a matter of dispute. The early studies of Valentine and Danzfus attracted the attention of many researchers, Valentine’s results contradicting tradition, while those of Danzfusz confirm it. Two modern experiments by Heinlein and Hevner seem equally contradictory, although not strictly comparable. Heinlein experimented with major and minor chords, and concluded that in general there was no fixity of feeling tone intrinsic to a given chordal combination. Hevner used ten short musical compositions with versions of each in both major and minor modes. These ten selections were played in both modes to 205 subjects who recorded the emotion conveyed with the aid of a standard word list of descriptive adjectives. The results confirmed historical tradition. For the minor mode the melancholy, mournful, gloomy, depressing quality stood out as of greatest importance, and then the plaintive, yearning, longing quality. For the major mode, the greatest importance was attached to such adjectives as happy, sprightly, cheerful, joyous, gay, and bright, and in less measure to playful, graceful, quaint, and fanciful. Since Hevner experimented with complete musical compositions, her results seem the more convincing.

It is interesting to learn that from the psychoanalytic standpoint Montani asserts that with the minor mode are associated the feelings of suffering, chastisement, and pain which characterize reactions to the castration complex! Another psychoanalyst, Mosonyi, tells us that there is evidence that music in its original form arises from pain as an irrational expression.
of a powerful instinct inhibited in other directions. Primitive music is often in a minor mode, which would therefore seem to be a natural expression of pain and melancholy.

Several very recent experimental studies throw light on some other aspects of musical emotion. Rigg declared that there are certain characteristics of music which suggest different emotional qualities, and describes an experiment in which five musical phrases varied in different ways were presented to listeners who reported their reactions. He finds that emotional value is a function of the total musical pattern. A fast tempo is associated with happiness, staccato with agitation or gayety, minors with sadness, simple harmonies with joy.

Moods are emotional states of considerable duration, and the most extensive study on the influence of music on such relatively stable emotional conditions was carried out by Bingham from 1920 to 1923.

In a preliminary study Bingham used 589 musical selections of varied type. Three experts in introspection, two of them musicians, the third a lover of music, served as listeners and recorded their impression of emotional effects produced by the phonograph records of the selections. A standard mood change chart was filled out. The 589 selections split into three groups: (1) selections of marked but extremely varied effect; (2) selections with little or no effect; (3) selections which not only produced marked effects but affected every listener in substantially the same way. The experiment proved that the real character of a musical selection can be established by actual trial and that the title of a musical selection is often misleading. It is clear that emotions and moods are at least partially and perhaps for the most part a function of the objective features of the music, in short a response to objective musical form.

In subsequent studies directed by Bingham data were obtained from 20,000 persons who reported on the mood effects produced by 290 phonograph records of vocal and instru-
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mental selections. These individuals varied in age, sex, race, general education, amount of musical training, and interests, and came from all over the United States. In spite of all these factors making for diversity in appreciation of the merely associative aspects of music, there was remarkable consistency in the results. The conclusion from these 20,000 responses was, in the words of Schoen, "that a musical composition not only produces a mood change in the listener, but that it also induces a markedly uniform mood in a large majority of the members of an audience."

Additional evidence on the uniformity and consistency of the affective influence of music was furnished by Hevner, who studied the feelings of many groups of college students recorded on checklists of descriptive adjectives as they listened to musical compositions. Hundreds of compositions were studied by this method. Within these college groups, less varied to be sure than the general population, but presenting considerable differences in amount of musical training, consistency in the recognition of musical meanings appeared.

In the most recent study of this kind Campbell presented folk songs and classical selections to 103 college girls who recorded their impressions on checklists. The majority agreed on gayety, joy, sorrow and assertion. There was some confusion as to yearning, tenderness, and calm, and little agreement on the subdivision of these moods. The author believes that a useful classification of emotional patterns expressible by music is now possible.

On the whole, no finding of experimental musicology seems more certain than this correlation of many musical compositions with definite moods.
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NOTES

1 G. T. Fechner, *Vorschule der Ästhetik* (1876).
6 H. Münsterberg, *Beiträge zur Experimentellen Psychologie* (Freiburg, 1889-92).
9 F. Galton, *Inquiries into the Human Faculty* (1883).
16 A. Washco, *The Effect of Music upon Pulse Rate, Blood Pressure and Mental Imagery* (1933).
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Conclusion: Art the Healer

MAX SCHOEN

In this book a number of scholars in the fields of music, art, history, medicine, and anthropology have attempted to present under one cover the literature on the use and value of music as a therapeutic agent. Numerous phases of the subject, historical, theoretical, experimental, and practical, are touched upon in one or another of the preceding chapters, with the exception of the general question why music should excel the other arts in healing virtues. A discussion of this topic must be in the main speculative, since experimental data are at present too scarce in number and inconclusive in results for the construction of a scientifically plausible theory. Until such data become available it may nevertheless be profitable to do some thinking on the problem by searching for clues in the field of theoretical aesthetics. Surely, music benefits the healthy as well as the sick mind, with the difference that its effects are more obvious in the latter than in the former case. Furthermore, the healing virtues of music can derive only from the medicinal influence of art in general, with those of music being more powerful because, for various reasons, music possesses in highest degree what all the arts possess in common. So these con-
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eluding remarks will first inquire into the nature and function of art in general and then investigate the art of tone to see in what way or ways it meets the aesthetic need more effectively than any other of its sister arts.

Art as Adjustment

The most promising approach to an understanding of the role of art in human life is to view it in its widest context as a spirit, a vision, a conception of reality, of which the special arts are the most vivid embodiment or expression. What this spirit is we can discern most clearly if we raise the question Why art? Why beauty? and search for the answer realistically, functionally, in terms of the sort of adjustment to the environment that it represents.

At the level of bare existence, of biological survival, man's adjustment to his world does not differ basically from that of subhuman creatures. Man learns to know his environment by general experience, by the mere fact of being alive, as does every animal; but because his environment is the most varied and his brain the most highly developed, his learning covers the widest range of experiences in the most thorough and effective manner. Man is, therefore, the most fully alive of creatures by possessing in greatest abundance that which all creatures possess in common.

But this is not the whole story of human life, for man can learn by choice as well as by necessity, and what is even more significant, he can enrich his knowledge of the outer world by a knowledge of his own self. By being a self-conscious creature, he can turn his attention upon himself, and be critical, discriminating, in what he knows, in the way he acts, and in the manner he works. This is creative living, which has produced
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the scientific way of knowing, the moral way of acting, and the artistic manner of working.

It is obvious that the scientific way of knowing and the moral way of acting arise from man's desire to see his physical and social worlds truly by seeing them as harmonious wholes, that is, by establishing the principles that operate behind specific events; for it is only in harmony that the human mind can be at peace with itself. But what is the source of the artistic way of working? The quest for what sort of harmony does it represent?

Since art is identified with the beautiful, as science is with the true and morality with the good, the harmony which is art is to be sought in the nature of beauty, in the sort of experience it is, in the need from which it arises, and in its relationship to the true and the good.

The Common Ground of Aesthetic Theory

Modern aesthetic theory, or the concern with the nature and function of art dissociated from ethical, political, or religious implications and applications, came to the fore in the Renaissance, the period in the intellectual and cultural growth of man described by Walter Pater as

a many-sided but yet united movement in which the love of the things of the intellect and the imagination for their own sake, the desire for a more liberal and comely way of conceiving life, make themselves felt, urging those who experience this desire to search out one and then another means of intellectual or imaginative enjoyment, and directing them not merely to the discovery of old and forgotten sources of this enjoyment, but to the divination of fresh sources thereof—new experiences, new subjects of poetry, new forms of art.¹

The numerous views on art to be found in the annals of art criticism, philosophy, and psychology since that period differ
in detail to such an extent that they produce the impression of being not only contradictory but even confusing. In their main features, however, they fall into two groups: those which look upon art as being a concern with architectural or rational form, and those which lay stress upon its organic or imaginative nature.

The conception of art inherited by the Renaissance goes back to Plato and Aristotle. Art meant the production of beautiful things, the beautiful being the mathematically proportioned, the rules for which were to be discovered by observing nature rationally. The artist's aim was to produce an ideal form, a form of geometric proportions, an idealized object of nature, the only question being whether this ideal form was to be general, a form of forms, in keeping with the Platonic view of reality, or individual, a form inherent in things themselves, following the Aristotelian interpretation of nature. This is the view of beauty known as Classicism, since the artists of classical antiquity were supposed to have attained perfection in the rational construction of beautiful objects.

The classical emphasis on beauty as intellectual form and its production by mathematical rules was met by the romantic spirit of the Renaissance with an increasing insistence on the right of the life of feeling, of the imagination, to serve as the source of art. The only rule of art was proclaimed to be that of inspiration. Denis Diderot, one of the first and most vocal of the spokesmen of the movement, called upon the artist to let life teach him art, and to learn what life is by observing what is going on about him in the streets, market places, and homes. Art belongs to imagination, to feeling and taste, rather than to reasoning, while its business is to afford us moments of happiness, of delight, by teaching us to see, feel, and understand. The enjoyment of a work of art arises from an immediate, direct feeling for the object, and not from a reflective judgment of its properties. Beauty is, then, a quality of experience
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rather than a property of things, and therefore no rules can be prescribed whether for its production or its apprehension. The uniqueness of an object of beauty lies in the fact that it is an appearance, a semblance, a something felt to be real rather than actually real, or as Kant described it later, “nature is beautiful only when it appears as art, while it yet appears to us as nature.” Beauty is subjective; it is a feeling for the form of a thing; it is not a reasoned judgment of its structure.

Modern aesthetics is dominated by this subjective view of beauty, with some theories stressing pleasure as its criterion, and others the nature of the reality that is experienced in beauty.

The pleasure theories of beauty are occupied in the main with an examination of how aesthetic pleasure differs from ordinary pleasure. George Santayana finds the earmark of such pleasure in its objectification: or a pleasure that is felt to be a quality of the object, like its color, size, and proportion. Ordinary pleasures we refer to our body, since they are the pleasures that arise only when some particular sense organ is stimulated by some object. But there are other instances, he points out, when the process of perception may be pleasant by itself, because of the delightful way in which the elements of experience, like colors and sounds, were associated and projected, and produced the concept of form and substance. In such instances “we have a pleasure intimately bound up in the thing, inseparable from its character and constitution, the seat of which in us is the same as the seat of the perception.” 2 Aesthetic pleasure arises, then, when the perception of an object is itself delightful, or, as Grant Allen described it, when we experience “the maximum of stimulation with the minimum of fatigue or waste.” 3 Art facilitates normal functioning by arranging colors and sounds for their pleasurable effects, and by so doing calls attention to the aesthetic quality of things. Just as play is the facilitated, and therefore pleasurable, functioning of our
muscles, so art means the spontaneous operation of our senses of vision and hearing. It is the high virtue of art that it calls our attention to the pleasures inherent in the mere act of sensory awareness, or, in the words of Emerson, that “if eyes were made for seeing, then beauty is its own excuse for being.”

Henry Rutgers Marshall advances a different criterion of aesthetic pleasure, consisting in its fullness and relative permanence. Our common pleasures are evanescent, and the more intense they are the sooner do they wane because of their simple, specific nature. But it also happens that several such pleasures occur together, when a relatively permanent pleasure is attained. This is aesthetic pleasure. We call a pleasure aesthetic when it “appears to be permanently pleasant in revival, i.e., in the reflection that is necessary in an act of judgment.” 4 That is, we call an object beautiful when we judge that the pleasure it has given us is capable of revival in memory. And we judge it to be such because of the initial mass of delights it gave us. Our pleasure is objectified if we are absorbed in the object, because of the stability of the aesthetic object to which the usually fluctuating personality is unaccustomed.

The question has also been raised by some writers concerning the attitude toward or the sort of attention paid to an object in which aesthetic pleasure arises. The distinction has been drawn between intellectual and contemplative attention. Intellectual attention seeks information about an object; whereas contemplation centers on the object itself, and for its own sake. It is in contemplation that aesthetic pleasure arises, for it is then that we “taste” the object. Thus, in the words of C. J. Ducasse, “Any object is to be called beautiful when, or in so far as, the feelings which one obtains in the aesthetic contemplation of it are pleasurable feelings.” 5 In other words, feeling for a thing becomes aesthetic feeling when it is sought for its own sake, when the feeling for the thing is enjoyed as a feeling. It is such a feeling that leads to the production of a work of
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art, in which the feeling is expressed or objectified. A successful art work is one that invites aesthetic contemplation.

Feeling expressed for expression's sake is also the criterion of aesthetic pleasure for Bernard Bosanquet. Such feeling is stable in that it does not of itself pass into satiety; it is relevant, since it is looked upon as a quality of the thing of which it is the feeling; and it is common property, for its value is not diminished by being shared. Because the feeling is embodied, expressed, objectified, it is transformed, becomes a new creation by taking on permanence, order, harmony, meaning, and value. Likewise, the object in which the feeling is embodied is no longer that of real existence. It is now an object of imagination, and valued only for what it is in itself as the embodiment of a feeling. Aesthetic pleasure, then, is pleasure in the object itself, pleasure localized in the object, versus pleasure about the object, or pleasure resulting from the fact that the object has satisfied some consciously felt bodily need. When aesthetic pleasure is experienced, the object of it is called beautiful.

But what is this pleasure a pleasure of? What aspect of the object is experienced in beauty? What is the reality present in beauty? That it is not a scientific or ethical reality is obvious. What reality is left?

In beauty, says Santayana, we experience essences as distinct from facts. An essence is present when "I no longer look in order to understand, but only to see." This means that an essence appears whenever the beauty of an object arrests the attention. "The most material thing, in so far as it is felt to be beautiful, is instantly immaterialized, raised above external personal relations, concentrated and deepened in its proper being, in a word, sublimated into an essence.

Henri Bergson also calls the reality of beauty an essence, which he terms the essential nature of things, their individual uniqueness, their perfection. This perfection is experienced
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only in intuition, which Bergson defines as "a kind of intellectual sympathy by which one places oneself within an object in order to coincide with what is unique in it and consequently inexpressible." 9 Intuition is thus opposed to analysis, a process in which the uniqueness of things is lost by reducing them to the elements they have in common.

Benedetto Croce defines intuition as initial activity of the mind in the course of which sensation, the formless stuff of knowledge, is invested with form. The formless stuff of knowledge is matter, which comes to us from without. Mind clothes this matter with form and thus produces the world of concrete, individual forms. Intuition is, therefore, active, which is the same as saying that it is expressive. Now works of art are the products of this expressive activity of mind, and all intuition is therefore art. What we call a work of art only collects intuitions "that are wider and more complex than those which we generally experience, but these intuitions are always of sensation and impression." 10

That beauty is the direct, immediate response to form, to what is experienced as the objectively present, in contrast with the fruits of intellectual reflection about the form, has also been accounted for in somewhat more realistic, psychological terms than those used by Santayana, Bergson, and Croce. Clive Bell 11 defines form as that which remains of any experience when it is divested of all its meanings and associations, or its significance as a means to an end. This residue consists of an organized impression of lines and colors. Art, says Bell, is significant form, or form that conveys to us an emotion felt by the artist for a natural form. The experience of significant or feelingful form is, therefore, the aesthetic emotion. The reality which art reveals is that of a world of pure forms.

What we find in art, says I. A. Richards, is experience of unusual organization, and therefore of striking clarity, as compared with that of ordinary experience. The reason for this is
that the artist has greater vigilance or sensitivity to sensory events than does the common man. The art work, when aesthetically perceived, gives us the feeling “that the accidental and adventitious aspect of life has receded, that we are beginning again, that our contact with actuality is increased.” 12 John Dewey likewise accounts for aesthetic experience in terms of fullness or clarification. Any experience becomes aesthetic “when the material experienced runs its course to fulfillment,” when it is a rounded-out experience, as, for instance, a piece of work satisfactorily finished, a problem successfully solved, a game played through. Such an experience, says Dewey, “is a whole and carries with it its own individualizing quality and self-sufficiency.” 13 Any experience becomes aesthetic whose energies have order and whose changes have form. And it is this change from the ordinary fragmentary flow of experience that gives us the enjoyment we call aesthetic, the enjoyment that comes from a moment of vivid living.

What, now, is art? What is the reality experienced when beauty is present and gives us aesthetic pleasure? What are the points of agreement between the classical and romantic views of the realm of the aesthetic?

First of all, both agree that the reality of art is a unique one, a reality that differs from practical, scientific, or ethical experience. The practical, scientific, and ethical raise questions about things in the interest of action. Their concern is with what things imply, with conclusions about things. The interest in things is for something that lies beyond them, something that is to be concluded about them. The reality that is sought is not what is directly present, but what can be found by reflection concerning it. In the practical this reality is an act, a physical response to the thing. In the scientific and ethical it is a principle, a generalization, as a guide to action. In the aesthetic, on the other hand, the world of things is experienced for what they are in themselves as things. Here attention does
not go beyond what is immediately present to sense. In short, aesthetic experience is experience of forms, whereas practical, scientific, and ethical experiences are experiences of ideas about forms. In the aesthetic an idea of a thing is identical with the thing itself; in the others the idea of a thing is readily distinguished from the thing.

Where classicism and romanticism part company is that for the former the art work is an intellectual form, while for the latter it is a natural, organic form. For classicism beauty is an improvement on nature; for romanticism beauty is nature. For both, however, beauty is a feeling for form, and it is in the fact that art belongs to the life of feeling, upon which it produces a unique effect, that the secret of its healing powers is to be found.

What this effect is we shall see most clearly by examining the difference between ordinary and aesthetic enjoyment.

We experience enjoyment when our personality is re-created, renovated. Such renewal of the personality can be of two sorts: it can be a restoration or a rejuvenation. Enjoyment as restoration is a coming back to the old, usual self, to the normal harmonious functioning of our body. Hence, the enjoyment of restoration arises from the removal of a disturbed, unbalanced state. Thus we enjoy drinking when thirsty, eating when hungry, sitting down when weary. Now it is noticeable that in each of these conditions we value the object of experience—the water, food, chair or couch—as a means to an end, and that our interest in these objects arises from a conscious interest in ourselves—that they satisfy a consciously felt need. What we value is not the thing, but what the thing implies, what it is good for.

But there is an enjoyment of rare quality when something strikes us with delight and wonder without our having deliberately sought it in the interest of satisfying some felt need. Such enjoyment is free of any pressure, of any compulsion from
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within our body or from external forces, and it affords us a moment of enhanced, heightened, exhilarated living. It is a higher harmony between ourselves and the environment, a higher adjustment, since it begins with the normally harmonious personality which is raised above its usual self. This “above-ness” consists in a state of self-projection, of self-forgetfulness, when the person having the experience becomes identified with the thing he experiences, reposes in it, and knows a moment of respite from the seeking, questioning, and calculating self of practical, scientific, and ethical experience.

Now this aesthetic feeling, this feeling for a thing versus feeling for oneself in relation to a thing, can only be feeling for what a thing is as a form, as an immediate, direct impression, and not for anything about the thing, its implications for action or knowledge. The artist is the person who is so highly sensitive to natural forms that they arouse in him a drive to present them as such, to give embodiment to his feeling, and who thereby enables us to see or hear what we are prone to miss in what has been so aptly called by Ludwig Lewisohn “the hot hour of experience,” the hour when we do not see what we are looking at, or hear what we are listening to, because we do not look mainly in order to see, or listen mainly in order to hear. By creating art works, and thus “lending his mind out,” the artist opens our eyes and ears to an aspect of reality the contact with which is a purgative for the soul.

Music Among the Arts

Music has been called the most imitative of the arts by Aristotle, the most moving of the arts by St. Augustine, and the purest of the arts by Walter Pater. These three characteristics account for its being the most healing of the arts.

“All men agree,” says Aristotle, “that music is one of the
pleasanter things,” and that it “is pursued, not only as an alleviation of past toil, but also as providing recreation.” But it also has a nobler purpose, in the influence it has over the character and the soul. And that men are so affected by music is proved by the power which the songs of Olympus and of many others exercise, for beyond question they inspire enthusiasm, and enthusiasm is an emotion of the ethical part of the soul. Besides, when men hear imitations, even unaccompanied by melody or rhythm, their feelings move in sympathy. Since, then, music is a pleasure, and virtue consists in rejoicing and loving and hating aright, there is clearly nothing which we are so much concerned to acquire and to cultivate as the power of forming right judgments, and of taking delight in good dispositions and noble actions. Rhythm and melody supply imitations of anger and gentleness, and also of courage and temperance and of virtues and vices in general, which hardly fall short of the actual affections, as we know from our own experience, for in listening to such strains our souls undergo a change. . . . No other sense, such as taste or touch, has any resemblance to moral qualities; . . . but even in mere melodies there is an imitation of character, for the musical modes differ essentially from one another, and those who hear them are differently affected by each.14

It is obvious that in calling music the most imitative of the arts Aristotle means that it is the most expressive, and that it is an expression of emotion. Music is, then, the most feelingful of the arts, and whereas Aristotle does not stop to tell us directly why this is so, he suggests the reason when he remarks in connection with speech that “mere sound is but an indication of pleasure or pain.” 15 This is known to be true, for every animal with a vocal mechanism produces sounds when emotionally aroused. Furthermore, sound is also the most efficacious means for exciting emotion, as witnessed, for example, in the common phrase “jumping out of his skin” at a sudden loud noise. Whenever and whenever there is emotion there is sound or an impulsion to make a sound: the child weeping or screaming in pain or anger, the adult whistling, singing or humming, the
mother crooning, and the lover expressing his love in melodic language. Some sort of music is present on every emotional occasion, whether one of mourning or rejoicing, and even among primitive peoples music was invariably utilized as the means for arousing and allaying strong feeling. The initial response to sounds which we hear under normal circumstances is likewise a feeling. A visual experience, for instance, means at once some object. Even a single color is usually a color of some object, and it is the object we are aware of more than the color itself. To a sound, on the other hand, we respond at first as a sound, and it is only in reflection that we connect it with its source. Visual experience arouses feeling indirectly, the feeling being not so much for the sensory elements of the experience as for the object they constitute. In auditory experience it is the sound itself we respond to directly rather than the object that produces it, and our response to the sound is always a feelingful one, whether pleasant or unpleasant. Even the distinction we draw between a noise and a tone is in terms of feeling, for it is an unpleasant sound that we call a noise.

From the common use of music to excite as well as to soothe emotion, we may gather not only that there must be a close connection between music and feeling, but also that music is the art of feeling par excellence. This is a conclusion that finds incontestable corroboration in experiments on the feeling effects of sound, from single tones to complete compositions. 16 When people are instructed to listen to a musical composition and report what it did to them, their accounts begin most often with the phrases: “It made me feel,” “I felt like,” “It gave me the feeling,” and similar ones. Following are a few typical reactions to a variety of selections:

“A restful feeling throughout, like one going downstream while swimming. I wanted to throw myself back and be carried along.” “A great feeling of happiness; followed by expansion in-
side, leading to great excitement and breathlessness of a moment.”

“I had a feeling of sorrow and dissatisfaction with everything. It gained on me. All the time I was trying to get the better of this feeling, but it wouldn’t leave me.”

“Sadness. An unsuccessful but constantly renewed attempt to throw off the burden of sorrow. A life of possibly more than usual melancholy with a ray of hope and happiness brought in unwelcomely.”

“A death and the heavy sorrowing of friends, a sorrow too deep for tears, which soon finds relief in tears. This changes to a feeling of loneliness and resignation which is beautiful. It is the covering of a sorrowful heart with a smile.”

The results obtained from experimental researches on the physiological effects produced by sound stimulation provide further evidence of the emotional significance of music. These results show that the effects are all of the nature of those bodily processes that are typical of strong emotion, namely, change of heartbeat, pulse, blood pressure, deeper and faster breathing, and increased muscular tension. Thus, the experiments of Godiel, the first scientific worker in this field, showed that sound stimuli caused more rapid contraction of the muscles of the heart, a rise or fall in blood pressure, and respiratory changes. These results have been confirmed by all later studies.

Even in experiments in which the subjects were asked to find a pictorial, dramatic, or narrative content of a musical composition, the reports show that, whereas the listeners vary enormously in their accounts of what the music is alleged to express, all the descriptions are of highly emotional situations. Thus, B. J. Gilman obtained the following results from four persons who were instructed to discover the dramatic story of Chopin’s Ballade in F major, No. 2:

“Two happy lovers are sailing over smooth seas; the ship is attacked by pirates, who are beaten off. A fierce storm arises; the
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ship bearing the two lovers is destroyed; and after the storm the sun shines again upon the sea somewhat calmed."

"The piece naturally suggests a murder. It opens with a picture of the assassin creeping slowly along, and you hear the shrieks of his intended victim when he is brought face to face with his slayer. Here the music, now shrill, now deep and low, seems to mingle cries and groans as the deed is committed and the man finally dies."

"The thumping and haste of the latter one-third or one-half were nothing to me but intolerably disagreeable noise, quite meaningless. The first uniform segment of the piece was delicious noise, of which the only dramatic suggestion was the passage through life of a rather rich-minded, sober and patient sort of man, with one leg shorter than the other."

"Extremely beautiful, especially at first. Early part suggested monastic life, as it should have been, in the middle ages. Then war sweeps over the country and demolishes the monastery. An effort is made to reconstruct the old life but the attempt is not finally successful. The life then becomes confused, mingles with the cruel movements of cruel times, and ends in physical or moral battle. At the last moment occurs a recollection of earlier peace."

Music is also the most moving of the arts because sound moves us most widely; it moves all our senses, our muscles, and our minds; it moves us all over.

Experimental results show that the reverberations of an auditory experience include all our sense organs. Single tones are not only soft and loud, but high and low, bright and dark, rough and smooth, sweet and sour, cutting and caressing, large and small, heavy and light, hollow and full. We speak of the color of a tone, and the association of the different keys with certain colors and brightnesses is a common experience. In one experiment the subjects described the major intervals of the diatonic scale in terms of taste and touch. The octave felt like
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smooth ice cream or smooth molasses or polished glass; the seventh like a green persimmon and like fine sandpaper; the sixth like a juicy fruit; the fifth like a clear soup; the fourth like whipped cream or ripe cantaloupe, the third like a ripe but not juicy fruit, the second like corn flakes.

The major second has also been described as being dark, warm, quiet; the major third as comfortable, pleasant, warm, sober; the fourth as positive, definite, energetic; the fifth as clear, smooth, hard, thin; the sixth as fresh, lively, bright, lovable, soft, clear; the seventh as ugly, empty, hard; the octave as pure, fresh, bright, and clear.

The muscular effects of music are not limited to its rhythm, for even a single tone has been shown to cause a change in muscular tension, and we know from personal experience that noises are generally straining and tones reposeful, while low tones are relaxing and high tones tightening. Some of the intervals of the scale are felt to be static, others dynamic, and a melody we experience as a movement, a pull towards a satisfactory end, in which each tone, each interval, each motif, each phrase, pulls towards or suggests its successor. A melody is a series of tensions and relaxations. Music moves vertically and horizontally, slowly and rapidly; it strolls and runs, jumps and walks, climbs and descends.

Intervals, motifs, and melodies also do what speech does: they connote, denote, and emote. They express ideas, describe situations, and create moods. Intervals and motifs have been reported to issue calls, to plead, to cry out, to express yearning, to ask a question, to make a declaration or a reproach; to describe an act, such as withdrawing fretfully, hiding, climbing, stepping forward vigorously, gliding along, painfully climbing; to picture incidents, such as happy frolicking on a green meadow, girls dancing in a meadow, an approaching storm, the movements of a bird rising from the ground; to describe some personality trait, in such terms as colorless, dull, fiery, earnest, secretive; to
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express a mood, such as joyful, solemn, melancholy, happy, bitter.

Studies on the effects of musical compositions as a whole also indicate this power of music to move us all over. Chopin's *Ballade in F major*, No. 2, pictured a love scene for one subject, a murder for another, and monastic life for a third. His *Funeral March* from the “*Sonata Op. 35*” evoked nineteen different dramatic situations in that number of listeners.

Music thus proves to be the most effective of the arts on two counts: it moves us most deeply and most widely. But the crucial fact about music as regards its therapeutic value is that it moves us most purely. It is by virtue of this characteristic that music has been called the measure of the arts by Walter Pater. As the purest of the arts it is also the most reposeful and thereby the most beneficial in its effects on the emotions. Let us see why this is so.

Pater writes that “*All art constantly aspires to the condition of music.* For while in all other works of art it is possible to distinguish the matter from the form, and the understanding can always make this distinction, yet it is the constant effort of art to obliterate it.” Art is “always striving to be independent of the mere intelligence, to become a matter of pure perception, to get rid of its responsibilities to its subject or material.” And it is “the art of music which most completely realises this artistic ideal, this perfect identification of form and matter. In its ideal, consummate moments, the end is not distinct from the means, the form from the matter, the subject from the expression; they inhere in and completely saturate each other; and so to it, therefore, to the condition of its perfect moments, all the arts may be supposed constantly to tend and aspire.” 17

What Pater is saying here is in keeping with what we concluded from the survey of the history of aesthetic theory; that art belongs to the life of feeling and that the feeling is for the form of what is experienced more than for its matter or subject.
Feeling for subject is the ordinary feeling, the feeling that drives to action. We have a feeling for an object as a chair or bed when we are tired and want to rest. Feeling for form is a feeling of repose. The feeling is intense but it is a feeling that identifies us with the thing; we become one with it and live in it.

Now this feeling of repose in tension is much more prone to come to us from music for at least two reasons.

In the first place, since music is the most profoundly feelingful and also the purest of the arts, it also creates the most reposeful condition when heard as music, as a tonal form. A musical composition is a tonal body, and nothing else. Its content or subject is its form and its form is its content. In any other art we can ask and answer the question as to what the form is a form of. We can give the subject of a painting, a piece of sculpture, a drama, a novel, and even of a lyrical poem. But the only subject of a melody is its effect as a melody on the listener, the impression it makes upon him as a direct, immediate experience. Music as such is devoid of intellectual content, so the feeling it arouses is altogether feeling for form, and feeling for form is reposeful feeling.

Second, even if a content is found in the music, it is bound to be a subjective one, a content chosen by the listener and therefore congenial to him and reposeful. The content is the peg on which the listener hangs the mood of the music, and will therefore be as pleasant to him as is the mood. In any other art the mood is as likely to be created by the subject as by the form, and even when created by the form it will be somewhat influenced by the subject. In music this cannot happen; for even when the listener is informed of the composer's extra-musical intention he either ignores it or does not take it seriously.

The uniqueness of music as an art, the one feature to which its superior therapeutic value is due, can now be summed up in the paradoxical but nevertheless true statement that it is at once
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the most intimate and the least intimate of the arts. It is the most intimate by being the most feelingful, and there is nothing that belongs to us more, that is more ourselves, than a feeling. But since music is devoid of intellectual subject, the feeling loses its ordinary intimacy while retaining its intensity, for it is only a feeling for subject that we can refer to ourselves. Hence, whereas it is true that all the arts objectify feeling, and all of them are therefore healers, music objectifies feeling most completely by doing it most intensely and most purely, and for this reason possesses healing power in highest measure.

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13 J. Dewey, Art as Experience (1934) 35.
14 Aristotle, Politics, VIII, 1339b.
15 Ibid. I, 1253b.
16 For a full account of this topic see Max Schoen, The Psychology of Music (1940).
17 Pater, Renaissance 140-144.
The references listed below are not intended to be exhaustive of all research and opinion in the vast field of music and medicine. They are intended to be representative of four phases which are of special importance for their historical value, their contemporary significance, or both. Overlapping in some cases is inevitable, but for convenience in using the list the references have been broadly identified by marginal numerals with the following phases: 1) The effect of music on man and its value as a therapeutic agent; 2) The industrial and occupational use of music; 3) Health and disease in musicians; 4) Medical men who have loved music.

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Dr. George W. Ainlay, now practicing medicine in West Los Angeles, holds degrees in music from Nebraska Wesleyan University and the University of Nebraska and his M.D. from Nebraska Medical College. Violinist, pianist, and composer, veteran of World War I, and investigator of the effects of music on the vasomotor functions, on the motor-secretory system, and on neuropsychiatric patients, he was peculiarly well-fitted to emphasize in World War II the importance of music in medicine. Entering the Army in 1940, he served first overseas; in 1944 he was attached to the Surgeon General’s Office as Chief of the Publications Section and Assistant Chief of the Training Doctrine Branch. As adviser for the Committee on the Use of Music in Hospitals he was responsible for the publication of TB MED 87, in which was formulated the doctrine of the Medical Department on the use of music and sound in military hospitals. After a term of duty in the Philippines which lengthened to a total of five and one half years his period of service in World War II, he was released from the Army in January, 1946, with the rank of Lieutenant Colonel. He writes with authority of the practices which he himself developed and which were put to the test in the military hospitals of the nation in wartime. Now in time of peace he recommends the establishment of Departments of Music in Medicine in the universities of the nation.

The techniques employed by Dr. Ira M. Altshuler as Director of Group and Music Therapy at Wayne County General Hospital in Eloise, Michigan, have found wide application in mental institutions in this country and abroad. A graduate
in medicine of the University of Berne, Switzerland, and a post-graduate student in psychiatry and neurology at Harvard Medical School and the University of Michigan, he has introduced new concepts in the treatment of mental patients by linking music with the anatomy and physiology of the brain and with psychology and psychopathology. He is a Fellow of the American Psychiatric Association and a National Diplomate in Psychiatry. He holds memberships in the Detroit Federation of Musicians, the Detroit Philosophical Society, the Wayne County Medical Society, the Michigan State Medical Society, the Michigan Society of Neurology and Psychiatry, the Michigan Academy of Arts and Sciences, and the Maimonides Medical Society. As Chairman of the Subcommittee on Music Therapy of the Music Teachers National Association he wields a deserved influence among the workers in musical therapy of that organization.

Born of Armenian parents, ARMEN CARAPETYAN received his earlier musical education at the Conservatoire in Paris. He continued his studies in this country and was graduated from Harvard University with the degrees of A.M. and Ph.D. Until the past year he was Director of the Institute of Renaissance and Baroque Music in Cambridge, Massachusetts, and Editor of its organ, the Journal of Renaissance and Baroque Music. These interests he has now reorganized and developed, in connection with the American Academy in Rome, into the American Institute of Musicology in Rome and its publication Musica Disciplina, subtitled A Journal of Studies in Mediaeval and Renaissance Music. He writes from a rich background of research in the musical history of his chosen period.

To his discussion on music in industry Mr. R. L. Cardinell, holder of a degree in mechanical engineering from the Stevens Institute of Technology, brings the experience of three years' association with the Sound Research Department of that Institute. There he conducted the first controlled studies ever
made in this country on the use of music in industry. His research was continued during the recent war in the office of Production Research and Development of the War Production Board, and it is continued now in his position as Director of Research of the Muzak Corporation. He writes from a background not only of engineering skill but also of non-professional devotion to music, chiefly in the fields of composition, conducting, and concert piano work, over a period of more than twenty-five years. He is a Fellow of the Acoustical Society of America.

For over fifty years the name of Frances Densmore has had deserved recognition in everything connected with the music of the American Indians. After a thorough training in music in Oberlin, Boston, and Chicago she first turned her attention to Indian music in the year 1893. Her field work began with the Sioux in 1901, when she wrote down their songs by ear; from 1907 on, under the sponsorship of the American Bureau of Ethnology and the Southwest Museum of Los Angeles, she recorded the songs by phonograph as she heard them among the various Indian tribes. Throughout she has had the unqualified support of the Smithsonian Institution, and many of her recordings are now preserved in the Smithsonian-Densmore Collection of the National Archives. Her field work has extended from British Columbia to Florida and has included California, Utah, Arizona, Texas, Oklahoma, Mississippi, the northern plains and the woodland regions; its reputation has traveled to Cuba, Mexico, Brazil, Argentina, Peru, England, France, Italy, Russia, and Greece. A list of her publications was printed in the Journal of Musicology 4 (Dec. 1945, as of Fall and Winter, 1942) 103-109. She received the 1940-1941 award of the National Association of American Composers and Conductors for service to American music, was elected a Fellow of the Washington Academy of Science and the American Geographical Society, and is a member of nu-
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merous musical societies and consultant to several national organizations. She continues to write on Indian music from her home in Red Wing, Minnesota.

From the very beginning of his graduate studies CHARLES M. DISERENS had been concerned with the effect of music on behavior. This interest took full shape in the dissertation entitled The Influence of Music on Behavior which he presented in 1922 for the Ph.D. degree at the University of Cincinnati. The interest has been continued through the years in the various articles on the subject which he has contributed to psychological journals. He is a member of the American Association for the Advancement of Science, the American Psychological Association, the Midwestern Psychological Association, the Ohio Academy of Science, and the American Society for Aesthetics. As Associate Professor of Psychology at the University of Cincinnati he specializes in historical, genetic, and motivational psychology.

ARNOLD ELSTON, now Assistant Professor of Music at the University of Oregon, holds his M.A. in Music from Columbia University and his Ph.D. from Harvard University. He has had additional training with Rubin Goldmark, Anton von Webern, Walter Piston, Nadia Boulanger, and Arthur Fiedler, and has enjoyed the privilege of three years’ study in Vienna. Although his chief interest is in musical composition, he is awake to music’s usefulness in practical application, and in the summer of 1945 he served as co-ordinator and lecturer for a course on music therapy offered at New York University. He has been guest lecturer at several institutions. His honors include the Naumburg Fellowship in Composition at Harvard, The Mosenthal Fellowship in Composition at Columbia, and the Beams Prize in Composition at Columbia.

Illustrious among medical men in this country who have made of music their avocation is Colonel Fielding H. Garrison. Graduated from The Johns Hopkins University with
the degree of A.B., he entered the service of the Surgeon General's Library in 1891 and obtained his M.D. degree in 1893 by night work at Georgetown University. For over forty years the Library and the medical profession of the country had the benefit of his vast bibliographical knowledge in the editing of the Index-Catalogue, the Index Medicus, and the Quarterly Cumulative Index Medicus. His best known work, also bibliographical to the core, is his monumental Introduction to the History of Medicine, the first edition of which was issued in 1913. His publications, totaling 235, are listed by Dr. C. F. Mayer in the Fielding H. Garrison Memorial Number of the Bulletin of the Institute of the History of Medicine 5 (Apr. 1937) 382-403.

Apart from his work in the Surgeon General's Office during World War I, a period of service in the Philippines from 1922 to 1924, and his duties at the Welch Medical Library from 1930 to the time of his death in 1935, his entire career had been identified with the Surgeon General's Library. Throughout, whether in attending concerts, in listening to recordings, or in playing the piano himself, his greatest relaxation, his constant love, was music. His own essay in this volume and the article by F. L. Tietsch in the memorial number mentioned above are sufficient evidence of the influence which music played in his life. But the files of the Army Medical Library reveal one touching episode not generally known. In a letter written to a friend in 1927 he related that on a pious visit to the graves of Brahms and Beethoven in the Capital Zentral Friedhof in Vienna he had bribed the sexton to chop off for him a sprig of box. "This and my visit to the dwelling place of Brahms in Karlsgasse," he wrote, "are among my abiding memories."

In the forefront of American composers, conductors, and music educators stands Howard Hanson, Director of the Eastman School of Music in Rochester. Trained musically first by
his mother, and then successively at Luther College, the Institute of Musical Art in New York, and Northwestern University, he taught for several years at the College of the Pacific and in 1921 received the coveted award of the Prix de Rome. He was the first Fellow in Music to study at the American Academy in Rome on the basis of that competition. Returning from there to assume his duties at the Eastman School, he has been vitally active ever since in behalf of American music. His compositions, ranging from symphonies, concertos, and operas to chamber music, suites for piano and organ, choral works, and songs, have been performed by leading musicians in this country and abroad. He himself has conducted with the major orchestras of the world. He has received outstanding honors, including the Pulitzer Prize on May 1, 1944, for his Symphony no. 4, but no less is the honor due him for his unceasing encouragement of students of music through the Eastman School and through such organizations as the National Association of Schools of Music, the Music Teachers National Association, the National Music Council, and American Composers’ Concerts. He is fully equipped to present a musician’s opinion on the emotional connotations of music.

Charles W. Hughes, Assistant Professor of Music at Hunter College, has specialized largely in chamber music throughout his career. Holder of the degrees of B.S., M.A., and Ph.D., he obtained his advanced training in music at Columbia University, the Institute of Musical Art, in France with Nadia Boulanger and Paul Dukas, at Haslemere with Rudolph Dolmetsch, and in England. He has been active in the formation of chamber music groups and performs in them on the viola, the viola da gamba, and the recorder. Interesting avocations include botany, ornithology, and a collection of colonial implements.

As Associate Professor in the Department of Classical Studies at the University of Michigan Bruno Meinecke is ably fitted
to present the relations between music and medicine in Greek and Roman times. Violinist, pianist, organist, composer, and conductor, he has a thorough musical background, and even before the writing of his doctoral dissertation, which was a study of tuberculosis among the Greeks and Romans, he had made the history of ancient and medieval medicine his particular field of research. Holder of an A.B. degree from the University of Tennessee and a Ph.D. in Latin from the University of Michigan, he has taught both music and classics at several midwestern colleges and is a member of numerous classical organizations. He has the gratification of seeing his love for music repeated in his son Tristan, who is a composer in his own right.

Brought to this country as a baby and educated in the schools of Elmira and New York City, Dr. Paul Radin returned to Europe in 1905 for two years of study in Munich, Berlin, Prague, and Florence. In 1910 he received his M.D. degree from Columbia University. His career in the field of anthropology has included teaching at the University of California, the University of Chicago, and Cambridge University, fellowships at Columbia, Harvard, and Yale universities, ethnological duties with the Smithsonian Institution and the Geological Survey of Canada, and research among the Indians of the Great Lakes, California, and Southern Mexico. He has contributed to technical and learned journals numerous articles on aboriginal religion, social organization, linguistics, mythology, and anthropological theory. Similar subjects are treated in the books which since the year 1914 have issued at regular intervals from his pen and which now number more than twelve. Dr. Radin is at present Visiting Professor of Anthropology at Kenyon College.

Since 1925 Max Schoen has been Professor and Head of the Department of Education and Psychology at the Carnegie Institute of Technology. Receiving his earlier training in Aus-
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tria, he was graduated from the College of the City of New York with the degree of A.B. and from the University of Iowa with the degree of Ph.D. His definitive work in the field of music and of the arts in general has won universal recognition among educators and among all those concerned with aesthetics. He is a Fellow of the American Association for the Advancement of Science, a member of the American Psychological Association, and Managing Editor of the Journal of Aesthetics and Art Criticism.

As Curator of Rare Books at the Army Medical Library Dorothy M. Schullian has handled many old and precious volumes relating to music and medicine. Holder of an A.B. degree from Western Reserve University and a Ph.D. degree in Latin from the University of Chicago, she studied in Rome from 1931 to 1932 as Ryerson Fellow of the University of Chicago and from 1932 to 1934 as Fellow of the American Academy in Rome. She is a member of the American Philological Association, the Archaeological Institute of America, and the Mediaeval Academy of America; her particular fields of research include medical incunabula and early manuscripts and their contributions to the medical history of the ancient, medieval, and Renaissance periods.

Dr. Henry E. Sigerist, eminent in this country and abroad as a medical historian, came to the United States in 1931. Born in Paris, he had studied at University College in London, the University of Zurich, where he obtained his M.D. degree, and the University of Munich; he holds an honorary degree from the University of Madrid, his D.Litt. from the University of the Witwatersrand, and his LL.D. from Queens University, Ontario. From 1932 until July 1, 1947, he was Professor and Director of the Institute of the History of Medicine at the Johns Hopkins University and Editor of its Bulletin of the History of Medicine, and earlier served in similar posts at the Universities of Zurich and Leipzig. He has been guest-
lecturer at numerous institutions in this country. He is a Fellow of the American Association for the Advancement of Science, a Corresponding Fellow of the Mediaeval Academy of America, a member of many national and international scientific and historical societies, and the author of numerous works on the history of medicine. In 1933 he received the award of the Karl Sudhoff medal. Dr. Sigerist has recently retired to Switzerland in order to devote his full time to the writing of a comprehensive History of Medicine.

Born in Amsterdam and educated at The Hague and the University of Leipzig, Willem van de Wall was connected with various symphonic and operatic organizations in Germany, Russia, and England before coming to this country in 1910. These interests he continued here with the Metropolitan Opera Company and the New York Symphony, but by the year 1917 he had decided to give his full attention, apart from his duties as harpist with the U.S. Marine Band, to the social function of music. His ideas soon attracted the attention of the Russell Sage Foundation, and through the intervening years to the present time his services have been requested by such groups and institutions as the Bureau of Mental Health of the Commonwealth of Pennsylvania, Columbia University, the New York Adjustment Service, the American Association for Adult Education, the University of Kentucky, the Carnegie Corporation, and Louisiana State University. He has specialized in music activities for inmates and personnel in mental hospitals, schools for the mentally deficient, correctional schools, reformatories, prisons, hospitals for the criminally insane, schools for the blind, hospitals for crippled children, and general hospitals. He is at present in Germany as Head of the Adult Education Section, Education Branch of the Internal Affairs and Communication Division, Office of Military Government for Germany, U.S.

Dr. Alfred H. Whittaker received his M.D. degree from
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Ohio State University in 1918 and his early experience as a surgeon at Roosevelt and Bellevue Hospitals in New York. Since then his career has been centered in the city of Detroit, where his interest in occupational medicine and surgery and his sense of civic duty have been of inestimable value to the community. He is Vice President of the American Association of Industrial Physicians and Surgeons, Fellow of the American College of Surgeons and the International College of Surgeons, Lecturer at the School of Occupational Therapy of Wayne University, President of the Detroit Historical Society, Vice President of the Citizens Housing and Planning Council of Detroit, and Director of the Community Chest of Metropolitan Detroit.
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