

LIGHT, HEAT, AND ELECTRICITY

"A fool's bolt is soon shot."—Old English Proverb.

No doubt the first agents of treatment used by man were those which could be had through simple adaptations of things natural. The application of heat and cold, rubbing and massage, and the use of water and of sunlight are as old as man himself. In the aphorisms of Hippocrates one reads of the uses of such methods; even at that time sound observers seem to have realized that these agents may act for good or for evil.

"Heat is suppurative," says one aphorism, "but not in all kinds of sores; but when it is, it furnishes the greatest test of their being free from danger. It softens the skin, makes it thin, removes pain, soothes rigor, convulsions, and tetanus." But again, "Heat produces the following bad effects on those who use it frequently: enervation of the fleshy parts, impotence of the nerves, torpor of the understanding, hemorrhages, deliquia, and along with these, death." And in commenting on the latter aphorism, Galen and, still later, Celsus, said: "By 'heat' is meant 'hot water' or a 'hot fomentation.'"

Massage, too, was practiced in the earliest times. Anthropologists and ethnologists have described the practice as it exists among savage peoples today, and accounts are found in primitive medical texts. It is repeatedly referred to in the folklore of all nations, particularly in the tales of the Arabian Nights. Such massage included not only simple rubbing, but

also pinching and kneading, later classified by French and Swedish investigators with technical terms.

ANCIENT PHYSICAL THERAPY

The ancient Egyptians, the Greeks, and the Romans were firm believers in the health-giving powers of the sun's rays. Indeed, Herodotus asserted that light must be regarded by the physician who knows his business as a means of repelling illness and as a subsequent aid to recovery. There were sun rooms in the homes of all the well-to-do Romans, not glassed-in sun parlors facing north, as in our apartments today, but large central spaces, open to the sky and to the sun itself.

Humphris tells us that the first use of electricity in healing took place in the time of Tiberius, some twenty years after the death of Christ, when a physician named Scribonius Largus made use of the raja torpedo fish for rheumatism and for headaches. The electric rayfish and the electric eel of Brazil are said to be able to convey a considerable shock. Scribonius Largus was, however, known chiefly for the scope of his writings, as his name no doubt indicates. His recommendation was based, apparently, wholly on empiricism. Much the same sort of reasoning assigned unusual virtues to mixtures of drugs of foul smell or of nauseous taste. The results commonly are the proof of the power of suggestion.

Of the birth of the Röntgen ray and of the finer electric apparatus of our modern times, accurate descriptions are easily available. From the primitive observations of the past have arisen these remarkably complicated devices that have made necessary increased knowledge by the physician of physics and of chemistry, of physiology and of biology, and that call for a finer discrimination in their choice and in their application to disease than it has been necessary to accord to many of the drugs used in medicine.

The knowledge of physical therapy which forms the basis of the considerations here presented is not derived from personal observation of the devices used in physical therapy, from an intimate study of their effects on animals or on patients, or even from their actual trial on my own physical

constitution—a body inured to punishment by the trials of numerous toothpastes, breakfast foods, condensed, dried, and powdered milks, or other samples conferred on editors by earnest manufacturers and a progressive advertising department. Such statements as are here made result from the reading of innumerable manuscripts submitted by aspirants for fame in the field of physical therapy; from the reviewing of a considerable number of major *opera* that have emanated from the pens of physical therapeutic scribes, some obviously, some possibly, some ostensibly, and some not likely in the employ of concerns producing apparatus; from conferences with many specialists in this growing field, and, finally, from an attempt to apply to the assembled information what is known as editorial judgment—a thing sometimes called by cynics the result of a disordered digestion.

The use of outdoor sunlight and of baths is not an exceedingly costly procedure and it is doubtful that anyone ever spent a great deal of money on these methods of healing. The moment personal attention and intricate apparatus come upon the scene, however, there is introduced the question of financial outlay. It is pitiable indeed that many a sufferer who should have devoted his funds to the securing of proper nursing attention and of suitable residence in a sanatorium should have spent considerable amounts on manipulation by untrained hands or hands trained to unscientific performance, or that the necessary money should be devoted to the purchase of extraordinary lights or electrical devices that are found shortly on the scrap heap.

VIOLET RAYS

The credulity of mankind in regard to such apparatus is astounding. It is now beginning to be generally known that the short rays at the end of the spectrum are invisible. Nevertheless, they are badly named. True, they are in the violet zone of the spectral colors, but the mere attachment of the word "violet" to these rays causes innumerable people to believe that any violet-looking light is ultra-violet ray. Not long ago, I stopped briefly in a chain drugstore where a

statuesque blonde was demonstrating to two prosperous looking business men a new device which she called the "sun ray lamp." It was merely an ordinary bathroom heater with a violet colored bulb in the place where the usual heating element resides. She said to these two interested observers, "Gentlemen, this gives you the real violet ray." And when they answered with the usual American response, "Is that so?" she said, "Yes, and besides the bulb is medicated." Just why this second announcement should have been so convincing I have never been able to understand, but they paid their money and got a useless piece of apparatus for it.

I have seen a bald-headed barber in a barbershop waving a purple colored incandescent bulb around the head of a bald-headed man while solemnly telling him that these ultra-violet rays will cause the growth of hair. There is not the slightest evidence that ultra-violet rays applied to the head of a man with hereditary baldness will do anything but tan the skin or burn it. Certainly they do not grow hair. Nevertheless, a great syndicate of hair-growing shops for men has been built up with this notion.

VIBRATIONS

Then, too, thousands, or actually hundreds of thousands, of people have been shaking their systems into insensibility with electric belts that produce vibration, with the belief that such vibration was conducive to health and longevity. One old judge put his belt around his head to shake off a headache and instead shook loose the retina of his eye so that he developed blindness. Another corpulent business man so agitated his midriff as to bring about perforation of a gastric ulcer.

There is danger in physical therapy unwisely used, perhaps danger beyond almost any other medical methods. There is, indeed, in this field merely the beginning of scientific study notwithstanding some hundreds of years of practice.

SCIENCE VERSUS EMPIRICISM

The proper evaluation of evidence regarding the use of new methods in the treatment of disease is difficult. The patient is anxious to be well, the physician wants to see him cured or at least benefited as promptly as possible, and his friends and relatives constantly endeavor to encourage him, regardless of their actual belief as to the state of his illness. The result of this continuous positive suggestion is to lend to any method of treatment that may be employed a credence that is perhaps not its actual due. Few physicians—and, indeed, few scientists—can resist the hyperenthusiasm that is likely to follow a first successful result. The paths of the history of therapy are bestrewn with the wrecks of new cures that sailed forth as the last word in therapeutic achievement. Mental, manipulative, natural, mystical, spiritual, and other cures have been brought forth by apostles of healing and vaunted as the secret for the solution of all the problems of healing that have confronted the physician since the earliest times. But when the apostle died, or when the primal faith that animated his followers disappeared, the cure went the way of the apostle.

Now, physical therapy has been more subject to misunderstanding of its efficacy in varied conditions than has any other form used by the scientific physician. The potency of the placebo depends only on the mental suggestion and on the personality of the man who administers it. His contact with the patient is not direct. The contact of the chiropractor, the osteopath, and the religious healer consists usually of the direct laying on of hands. Few physicians of experience fail to realize the importance of such immediate relationship to the patient. If more physicians took the trouble to make thorough examinations of their patients, never failing to examine the chest after the clothing had been completely removed from the upper part of the body and using auscultation, percussion, and palpation, which are fundamental to physical diagnosis, there would be fewer failures and many more persons satisfied with the care of their physicians.

SUGGESTION IN PHYSICAL THERAPY

Without doubt, powerful suggestion is conveyed by the use of any intricate or striking mechanical method. The use of electricity, including the direct application of the current, the galvanic apparatus, pocket batteries, and all the assorted forms of waves supplied through more intricate mechanisms, as well as the use of electricity to produce heat and light, is a striking therapeutic procedure. The late—but not too late—Albert Abrams well knew the value of intricate apparatus for impressing the patient and, even more, for impressing the uncritical physician. His first venture, spondylotherapy, carried with it a physically intensified suggestion; and those later Goldbergian evolvments, the oscilloclast and the biodynamometer, were impressive in their complexity, even to some competent physicians.

Regardless of the fact that the underlying basis for many physical methods never has been thoroughly established and, indeed, is not even yet perfectly understood, the official organ of the American Electrotherapeutic Association only recently said: "The various irregular cults have also worked out in some instances methods that have sometimes succeeded where the rank and file of the medical profession have failed." The editorial referred to cites particularly the treatment of sacro-iliac strain, recommending, first, adjustment and, secondly, the application of electricity. On what basis does the editorial presume to say that displaced vertebrae once adjusted remain adjusted, unless held in place over long periods of time by methods of fixation? Who has proved that ligaments that are relaxed will resume their functions when the supposed luxations are properly replaced? Who has made the scientific studies, using the Röntgen ray and all the other methods known to modern science, by which even an iota of truth can be attached to the claims of chiropractic and, indeed, to most of those of osteopathy? Granting that there is a modicum of truth in the claims of the latter cult, what scientific organization will be willing to admit that half-educated and incompetent men with no thorough un-

derstanding of the human body and its mechanisms should be privileged to apply any single form of therapy or diagnosis?

THE DANGERS OF SYSTEMS AND SPECIALTIES

If medicine is to be partitioned off into a series of specialties and cults practiced by men who have learned only one organ of the body or only one system of diagnosing and of treating disease, medicine as a science is bound to fail. No part of the human body can be detached and treated as separate from the organism as a whole. This danger threatens all the forms of physical therapy. It was no doubt enthusiasm for a single method that caused an editorial writer in the official organ of electrotherapy to say that "physical therapy will ultimately be recognized as of greater value than all other therapeutic methods." This concentration on an "all or nothing" policy in the treatment of disease must inevitably lead to preposterous and exaggerated claims, and ultimately to the detriment of scientific practice. Physicians have watched the inroads made on the practice of medicine as a single science. They have noted the attempts of optometrists to parcel off the eye as their particular field; of cosmeticians to assume the right to treat disorders of the skin and to request legislatures to grant them power to remove moles, warts, tumors, and other excrescences; of chiropodists to assign to themselves the complete care of the feet; of chiropractors and osteopaths to make the field of manual manipulation their exclusive purview; and of some of the specialists within the ranks of medicine itself to assign all important functions to the teeth, to the lungs, or to other organs of the body. The time has come to call a halt on geographic warfare within the human body, and to look on it as a "united states" that will be at least as firmly consolidated as the forty-eight individual constituents of our government.

If electrotherapy could point to a past that was free from the faults that have marred the progress of drug therapy since the earliest times, it would need no caution as to the future. But what has become of the hundreds of galvanic

apparatus that struck amazement to the hearts of trembling children led into physicians' offices some twenty-five years ago? Where are the little electric batteries that formerly occupied the showcases in the drug stores? Indeed, what has become of the claims for high voltage Röntgen rays in the removal of deep-seated malignancy? What a brief period it required for these claims, vaunted as the last word in the control of cancer, to resolve themselves into a method used only in apparently hopeless cases! The judgment may be premature, but it is based on scientific studies made in well recognized institutions for the study of human diseases.

PHYSICAL THERAPY PROMOTION

There was a time when the medical scientist, having completed his education in the field to which he wished to devote himself, opened his office, began teaching in a medical school with which he had affiliated himself, undertook the care of patients in legitimate hospitals, and left it to the recognition of the public to advance him to the limit of his merits. Today, modern, high powered business methods applied to the practice of medicine have pointed the way to cults and to the hyperenthusiastic practitioner for promotion of his particular plans. All the forces of publicity are directed toward urging on the public the peculiar advantages that are claimed to accrue to single methods. The high priest of the peculiar system does not hesitate to instruct his followers in promotion of the system by all the arts and crafts—mostly the crafts—of salesmanship. There are physical therapists who believe that "high frequency" means the treatment of eighty patients a day. Again, organizations are established, not for study and investigation or for the promotion of knowledge in relation to the growth of any department of medical science, but primarily for the securing of public acclaim through the organization, rather than through the individual. The multiplicity of medical organizations is evidence of the fact that in some instances they are not established with investigation and study as their main objects. Consider in this connection the society called the

Association for Medico-Physical Research. In its meeting, one program is devoted entirely to the claims of the now discredited Abrams method; another, to the exploitation of methods for the treatment of cancer, not one of which is established on any sort of a sound foundation; and still others to the promotion of systems of practice that should meet with nothing but the scorn of all who consider themselves honest and ethical practitioners of medicine. One finds here names of men known as faddists, who have discarded scientific rationality. One, without regard to the established facts of science, insists that a rice diet will prevent and cure cancer. Another promotes the treatment of cancer with a serum, regardless of the fact that carefully made investigations have revealed the failure of his method. There is G. E. Harter of the Defensive Diet League of America, who has collected a lot of miscellaneous aphorisms and peculiar concepts concerning food into a system and who has inveigled dentists of this country to his support with the idea that it is the duty of the dentists to establish the food habits of the nation. Among this miscellaneous crew of peculiar faddists appear the names of some physicians whose places on the program apparently represent an attempt to camouflage, with a sort of medical aristocracy, the fallacies that occupy the major portion of the program.

BASIS OF PHYSICAL THERAPY

The results of physical therapy seem to depend on many factors. Without doubt, rays of light have many and varying effects on the human body. Attempts have been made to separate them into effects of the light itself on the tissues and into chemical effects. Electricity has the power of acting through the heat that may be produced and, perhaps, through some effects produced by the current itself not yet determined; indeed, the mechanism is no better determined than is that of immunity in general. Electric stimulation no doubt has the power to act on nerves and on muscles, producing visible motive effects; and with such effects come mechanical changes. Is it not time that intensive study be applied in an

analytic manner to determine to just what extent the benefits observed from the various electrotherapeutic measures are due to physical changes in the tissues, to mechanical changes in the tissues, to the power of suggestion, and, perhaps, to other factors of which we know nothing? Until some adequate basis on which the methods may rest is determined, no one can call such methods truly scientific. We have in physical therapy various methods of producing heat in the human body. There is the heat produced by friction; the heat produced by the external application of light, of hot water, or of other heat-producing methods; and the heat produced within the body by diathermy, by the direct injection of heating material, or by the use of methods that will draw unusual quantities of blood to a certain point. In the evaluation of any form of physical therapy, who shall say to what extent the thermic factor alone is responsible and how far the other factors that have been mentioned have a part to play?

The numerous devices for effecting the production of heat, external or internal, for the body unquestionably vary in their potency and in their mechanism. How is the individual physician who knows little or nothing of the physical basis of electricity and, in fact, who knows little or nothing of any physics at all, except in the use of the term as it applies to castor oil and cascara, to have any actual knowledge of these so-called modalities?

Drug products are compounds of chemical substances and may easily be separated into their individual ingredients. Scientific pharmacy has already made sufficient progress to warrant the statement that these ingredients will or will not do what is claimed for them. But when one is confronted with a large box beautifully trimmed with nickel plate and glass, the interior of which is a mass of wiring, spools, coils, gages, screws, nuts, and what not, and is told that, properly applied, this apparatus will cure pneumonia, neuritis, lumbago, eczema, dysmenorrhea, falling of the uterus, and falling of the palate, who is to tell one whether or not the machine will actually do all that is claimed for it? When the