THE PLACE OF PHARMACOLOGY IN THE MEDICAL CURRICULUM.

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MEDICINE has as its ultimate aim the prevention or cure of disease: the practical aspect so far dominates every other that not infrequently it is termed the healing art; indeed, it is difficult to think of medicine as other than something connected with treatment. Nor is it necessary to refer back to many decades of medical history to discover that it was then nothing but a healing art, a system of recipes, of panaceas, of rituals, sometimes priestly, sometimes philosophic, but all devised to combat the symptoms and signs of ill health.

In their beginnings physiology and pathology, which now form the scientific basis of medicine, were merely natural history, their facts were empirical, they were independent entities set apart from other knowledge, for a science is independent in proportion as it is imperfect. When these sciences passed from simple observation to deduction and experiment they naturally attracted the more eager minds in medicine, and the text of the writings of the nineteenth century deals with changes in structure and function. Treatment was neglected, the old shibboleths were discarded, and there was nothing with which to replace them. One important result of this open scepticism of the value of treatment was the growth of systems of treatment, like homoeopathy, and the rush of an ever credulous public to irregular practitioners. The textbooks of the period told with considerable precision what was happening in the body during disease and what was likely to happen, but no word as to how to prevent it; treatment was dismissed in a few curt lines. This state of affairs was unavoidable; there was no specific treatment, there was no science of treatment, for such a science could only come into existence when physiology and pathology had reached some degree of precision. The science of treatment or pharmacology is therefore relatively new; it includes knowledge of all kinds dealing with the treatment of disease or alleviation of suffering. It is the climax of physiology and pathology, devised to subserve a practical end, and forms an important part of the great biological topic of the influence of conditions on the living organism.

To state that the future of medicine lies in pharmacology may sound fanciful, but it is certain that the most hopeful of all signs of the progress of medicine of to-day is to be found in the progress of the science of treatment. Few drugs now exist the mode of action of which is not understood, and the goal is not so far distant when it will be possible to introduce into the animal economy a factor which will exaggerate or retard the function of any tissue or collection of cells in the body, leaving the others unaffected.

At one time hopes ran high that the chemical structure of the molecule might indicate action, an idea by no means new since Paracelsus directed chemistry into new courses by stating, "The real object of chemistry is not to make gold but to prepare medicines." During the last fifty years most laborious researches have been conducted to this end, so to modify the molecule that it may conform to some required action. But the mystery remains as mighty as ever. It is not improbable that subtle energy factors binding the molecule—factors not displayed in a formula—control the action: certain it is that drug action is not determined directly by chemical combination with body constituents, but rather by delicate physical processes such as those of adsorption, solution, and surface tension. Chemists have not yet determined the requirements of the molecule even for the production of colour. On the other hand, slight alteration of a molecule already complicated and with a known action has led to the production of many useful compounds, and not infrequently we may foresee the type of action which will occur under such special conditions. Considerations of this nature have led to the synthesis of the new local anaesthetics, antiseptics, antipyretics, diuretics, tropeines, and many others.

The general outlook and significance of drug therapy was led into new channels when it was revealed that the animal body elaborates its own drugs, stores them generally at the seat of formation, and does them out to the tissues to meet the needs of the economy. Some of these drugs are of the

nature of true crystalline alkaloids; thus adrenaline is formed in the suprarenal glands and thyroxine in the thyroid. Some others, the properties of which we know something, have yet to be prepared in a pure form: for example, the ovary and pituitary body each contains some drug invaluable to the animal. Pituitary extract of animals exerts a wonderful tonic action on the uterus: for several years the physician has employed this substance in his clinics to contract the uterus. But now it is revealed to us that pituitrin manufactured in nature's laboratory is the drug used by nature to contract the uterus. Ovarian conditions determine its liberation; the ovarian drug is set free in the circulation, it causes the liberation of pituitrin, and the uterus is affected. Can a more convincing example be offered of the inner meaning of drug actions? The normal functions of the body are regulated at least partly by these natural drugs, and it has been suggested, not without reasons, that all functionings are of this nature and that the object of a nerve supply is to localize the liberation of the active drug in the neighbourhood of the nerve terminations.

The patients whom the physician of to-day is called upon to treat may be divided into two groups: (1) Those suffering from active disease, excess or deficiency of one of the natural alkaloids, poisoning by improper food, or poisoning by micro-organisms or their products. (2) Those whose tissues are functioning badly because of scars left by previous active disease; this group includes many paralyses, joint troubles, and cardiac disease. To cure an old scar is difficult, though much may be done to render the patient's life tolerable and useful: the pity is that the scar stage is ever reached. It is with the first group that the hopes of medicine and the future of pharmacology principally lie. Already it is possible in many instances to destroy the causal agent of some diseases, but not, we believe, by the direct action of the drug on the causal agent. The organic compounds of arsenic have no marked effect on the spirochaetes of syphilis in the test tube, but they destroy them in the body; emetine does not kill the amoebae of tropical dysentery except in the human body. A still later production of the laboratory is a derivative of trypan-blue which destroys trypanosomes in the body of both men and animals: the introduction of this substance into medicine initiates a new era in trypanosomiasis and promises the opening up of vast tracts of tropical Africa now prohibited to man by sleeping sickness and to animals by the bite of the tsetse fly (nagana), and by other forms of trypanosome disease. The attack by drugs on bacterial diseases lies in the future: ethyl-hydrocupreine administered to men in appropriate doses destroys the micro-organisms causing pneumonia, and even the drawn blood of patients so dosed will destroy these pneumococci. This is as yet our only instance of specific drug therapy in acute general bacterial disease, but it proves that the problem is not insoluble.

These facts show that pharmacology cannot be taught with any value until the principles of physiology have been attained; also, so intimately is it concerned with pathological processes and clinical medicine that to divorce it from them is to lose much of its value. Taught as a science complete in itself, pharmacology becomes all but valueless to the student of medicine. Its proper place in the curriculum is during the first year of clinical studies, when laboratory work can be supplemented by clinical demonstrations. With general pathology and bacteriology it should form the connecting link between the science and art of medicine; such an arrangement might do much to destroy a system of watertight compartments, for each branch of medicine is mutually dependent on the others.

Nevertheless, science alone does not make the good physician; too great stress can hardly be placed on the fact that it is not the disease but the patient who is treated. Sympathy, understanding, a knowledge of life and men, are of no mean value to those who aspire to treat the sick, and I for one should regret the day when my revered juniors, imbued with all the sciences, treat their patients with no other considerations than those laid down in the manuals of experimental pharmacology.