METHODS OF PRECISION IN MODERN MEDICINE.

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In discussing the subject of miracles, John Ruskin stated to a group of scientists, philosophers, and clergymen in a London Meeting that he always expected miracles to happen. Like John Ruskin, the great masses of the people are still unconvinced of the reign of law. They believe that many things just happen and that much may be attributed to luck. This is particularly so when it concerns diseases, their recognition and management. The thesis, therefore, that I wish to defend is:

First—During the past few years the methods of physics, chemistry, and biology have been applied to the solution of medical problems with the result that medicine is approaching more and more to an exact science and consequently a successful art. As a corollary to this proposition, I believe that it follows logically that since these methods of exactness require the use of special instruments and special technique, their application requires the cooperative work of several trained men. It is no longer possible for any one man to master and use all of these procedures. It follows, therefore, as second conclusion, that medicine is no longer a one man art. No man can practice this art alone. Third conclusion and one of equal importance is that after all of the scientific methods have been applied in the evaluation of the patient or in the evaluation of his several organs, there still remains the problem which is the most important of all, and that is the bringing together of all accumulated data, assign to each its proper value, give it a final interpretation and above all, determine what should be done. This is the work of the internist.

It was Josh Billings, many years ago, who made the assertion that it is not ignorance that afflicts us, it is knowing so much that is not so. This is true in all branches of thought.

Self criticism is one of the first signs of progress in any branch of thought.

In our most advanced medical groups, self criticism has become very apparent, with the result that every department of medicine is being re-examined and re-valued.

At the present moment there is scarcely a large educational institution in America, that is not making a re-survey of our knowledge of the organs of the body and their functioning, with the purpose not only of determining what their duties are, but also to establish means and methods of estimating these functions. Modern medicine is not so much concerning itself with the administration of drugs as it is to find out exactly how the several organs function, what they contribute to life and defense, and what the causes are that disturb this functioning and how to remove the cause.

Medicine like religion and politics, has it's fundamentalists and modernists. The fundamentalists are those trained under older methods, who have reached their maturity, and who have developed a great personal capacity for meeting the problems which confront them daily. They view with scorn the introduction of newer instruments, such as the electro-cardiograph for measuring the functioning of the heart, the various laboratory methods that assist in the diagnosis of acute and chronic diseases. They assert with much confidence that these new fangled procedures stunt the physician's mental growth and prevent his developing that individual clinical ability which is so much needed in medicine.

The modernists, however, continue diligently in the developing of new methods and new procedures which enable them to do earlier in life and with much greater accuracy what the old fundamentalists could do only after years of experience.

These modern methods of precision have lead to results which are nothing less than startling in their accomplishments. That modernism is justified, I wish to prove to you by pointing out:

First—What it does for accuracy in diagnosis, and

Secondly—What it has achieved in the matter of treatment.

Under the first title, I shall select a single organ or pair of organs with which you are all familiar, namely the integrity and capacity of the kidneys. This problem may be approached in five different ways. In other words, we have available five entirely different methods of testing which may be applied. The first of these is the examination of the eye grounds or retina. It is not infrequent that the first signal of a kidney damaged, is recognized by the competent oculist.

The second method of approach is one of the oldest in medicine, namely, examination of the kidney excretion. This is so well known that it need not be elaborated. A third method of approach is the determination of kidney functioning, and since the kidneys perform a number of functions, we have a group of tests rather than a single test. For example, we may test by means of a high protein diet, the capacity to excrete urea, and other nitrogenous substances. By another diet, we may determine the capacity to concentrate the urine, by still another, the capacity to eliminate water. And finally, by use of a dye, the general functioning capacity of the kidneys. This latter is known as the phenolsulphonephthalein test and has a particular value to the surgeon.

A fourth procedure is the use of the cystoscope. By the use of it, we are able to determine the kind of material which is being delivered. By cystoscoping each kidney separately, we are enabled to secure secretions of each kidney separately, and we are further enabled to determine the functional capacity of each kidney separately.

The fifth method is determining the renal anatomy and renal physiology by use of the x-ray. This enables us to determine the presence of renal stones, frequently renal tumors, the size of the kidneys, presence of cysts, and sometimes the presence or absence of pus or other fluids in the renal pelvis.

Sixth we have a court from whose decision there is no appeal, it is the chemistry of the blood stream. The witnesses are the several substances which are normally present there in small amounts. It is the kidneys' duty to evict all above a certain number of milligrams. No guessing is needed, these substances are determined and the kidneys acquitted or proved guilty of incompetence. With the exception of the examination of urine, all of these have been developed in recent years, and by their combined use, we are enabled to survey and estimate the structure and function of the kidneys with an accuracy that certainly closely approaches that of the other modern sciences in solving other problems. What we are doing for kidneys we are beginning to do for other organs.

Can modernists show an equally gratifying progress in the treatment as compared with the recognition of disease? I believe it can and I shall mention but two triumphs to confirm the statement.

First—The use of the hormone, Insulin in the treatment of diabetes is not surpassed in its far reaching results by any other single modern discovery. It is not a medicine. It is supplying to the patient with diabetes, a ferment, a hormone, a necessary substance which his own organ cannot produce. What is the result? An almost immediate relief from distress, a return to health, a capacity to perform his regular duties, and above all, instead of confronting an early death, he now has prospects of living to the fourth, fifth, or sixth decade. Instead of being a burden to himself, a victim to every mild infection that comes his way, an impossible surgical risk, he can face the world like a man, and live in the hope of seeing many years of happiness. In other words, the use of Insulin coupled with diet which has also been developed by modern science, has added millions of years to lives of human beings.

A second triumph of modern biological chemistry has a somewhat narrower field, but is no less dramatic. There come to every large contagious hospital, victims of diphtheria, who have been neglected by virtue of ignorance, indifference, or poverty. They are usually received in a dying condition. Either they are found bleeding from the mouth or nose, or their necks are girdled with lumps. In either case, death is an equal certainty. During the past year, at the City Hospital at Cleveland, the blood chemistry of these patients, was studied with great care. It led to the discovery in all of the victims that the blood sugar was extremely deficient, amounting sometimes to one-fifth of normal. Since the blood sugar is a necessary food for muscle tissue and especially for heart muscle tissue, the conclusion was reached that it might be of service to these hopeless victims to administer a solution of sugar intravenously. This was immediately tried with the result that out of 80 cases, 44 were saved.

I know of nothing more dramatic or more inspiring in all history, and yet the adoption of a litter of skunks by a mother cat received one thousand times more publicity.

By the free use of the methods of precision developed in chemistry, physics and biology, medicine is becoming a precise art with a mathematical foundation. Personal equations are diminished and the recent student stands, as it were, on the shoulders of the fathers.

These methods of precision require special trained physicians (not merely technicians) in each fundamental branch. Consequently medicine is no longer a one man job but requires the cooperation of several. This is particularly true of personal health surveys, health surveys which require the recognition of disease in the very incipiency. The one man health survey is of small value.

The greatest advances made in treatment have come through applied biochemestry as noted above.

Since diagnosis and treatment can no longer be carried out by one man alone the medicine of the future must be more and more an institutional function.