

The Clinician, His Patient and Medical Science

STEVENS T. NORVELL, JR., M.D.*

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Alpha, Omega and Alpha are the initial letters of the principle words in the motto of the Honor Medical Society. This motto may be translated: "To be worthy to serve the suffering". This is the high ideal towards which we want to aspire. It is a lofty goal, for our sights have been set for us by our predecessors.

How may the clinician be worthy to serve the suffering? I want particularly to consider the role of the physician in the world of medicine which is being rapidly altered by the impact of science.

It has been said that half of all the scientists who ever lived are living still. The world has never seen anything like the present expansion of knowledge—instead of an advance, it has become an explosion.

There have been other periods in history which have shone brilliantly: the Fourth Century B.C. and the period of the Renaissance. But the 20th Century may prove to be the most exciting and fruitful era yet in human history—if we are fortunate not to destroy ourselves with our exploding science.

One can "prove" almost any thesis, if he starts off with the right definitions. I'll try to be fair, but my prejudices may show. First of all: "science"—this comes from *sciens, scientis*, the present participle of the verb "to know", and is, therefore, "the knowing". To me, this is a systematized collection of information and well tested hypotheses, wherein the variables are all potentially knowable and measurable. The data can be verified, the hypotheses tested, and the variables measured by all observers. Thus, there is built up a collection of observations and explanations, the truth of which one can be more or less confident. Among the branches of science I would include physics, chemistry, anatomy, embryology, genetics, bacteriology, and probably pathology. I would probably not include psychology, and I would certainly not include so-called "social sciences", economics, management, human relations plumbing or basket-making.

In any case, I think if we use any degree of restraint in how broadly we define "science", then clinical medicine is certainly not a science, but a practical art. For purpose of this talk, I would like to define the clinician as a physician, practitioner, or doctor, whose primary task it is to deal with patients.

The Greek word for physician "Iatros", is Ionian in origin—Ionian was the language of philosophy and medicine—and meant "an extractor of arrows". A man who could pull out arrows must have been a very useful person to have along with the army when one decided to sack Troy or wage war on some other city-state.

*S. T. Norvell, Jr., B.Sc., M.D., F.R.C.S.(C), Assistant Professor of Surgery, Dalhousie University, Halifax, N. S.

In the time of Hippocrates, and in the centuries before him, physicians were craftsmen, often itinerant, with a social status about equal to that of carpenters or minstrels. They were practical and useful people.

These glimpses into the past may serve to remind us of the humble origin and essentially practical nature of our art.

When I emphasize the practical character of clinical medicine, I do not in any sense depreciate the pursuit of learning for its own sake, or the search for new knowledge or the formulation of theory. The able physician, like the able scientist, has always been a man who makes careful observations and then records and reflects upon what he has seen.

Let me read you a case history: "The master of a large ship mashed the index finger of his right hand with the anchor. Seven days later a somewhat foul discharge appeared; then trouble with his tongue—he complained he could not speak properly . . . his jaws became pressed together, his teeth were locked. Then symptoms appeared in his neck: on the third day opisthotonos appeared with sweating. Six days after the diagnosis was made he died".¹

I think any physician today will recognise this quotation from the Hippocratic collection as a clear and accurate description and feel a kind of clinical kinship with the author, whoever he may have been.

The Hellenic physicians did not make their observations in an intellectual vacuum. They thought a good deal about what they saw, and they developed theories to explain the nature of health and disease. They were interesting theories, even if they did not correspond to our present concepts. The clinical pathologist of today might be rather unnerved if the requisition, sent to his laboratory with the specimen of serum, were to request an estimation of *phlegm*, *blood*, *black bile*, and *yellow bile*. (We would want these values expressed in terms of milliequivalents per liter, of course.) Yet the Greek concepts, that health is due to a balance—and disease to a disequilibrium—of humours finds its modern analogy in our present ideas about homeostasis, electrolyte balance, and "the endocrine orchestra".

The physician cannot be a scientist insofar as he serves the suffering by dealing directly with patients. I am not talking at the moment about those occasional individuals who manage to play two separate roles, clinician and scientist; I very much admire such versatile people, but they are, unfortunately, rare. The clinician can and should make accurate observations, draw reasonable conclusions after due thought, be competent in his art, be versed in the relevant basic sciences, and be aware of the advances being made by his scientific colleagues, but he cannot be a scientist.

The first reason for this limitation on the physician is that he cannot subject hypothesis to experiment within the clinical situation, nor can he know or measure all of the variables. He may ascertain the accuracy of his observations with laboratory confirmation or at operation or autopsy. He can work out ideas and develop techniques in the experimental laboratory and utilize them for the benefit of the patient. He can collect masses of data regarding the efficiency of various modes of treatment and subject them to statistical analysis—such studies, while they may or may not lead to correct conclusions, are almost always so complicated by multiple variables, lack of true controls, and bias in case selection, that they appear rather clumsy and ill-conceived to our colleagues in the sciences. There is a mathematician in a certain Western Canadian university, who is approached from time to time by a physician with a

freshly collected batch of clinical data and asked to assist with the statistical work, so that some matter may be illuminated or some point proved or disproved with all the facts and figures. One day, when he was unusually weary, he asked his colleagues from the hospital, "Are these real statistics, or medical statistics?" You are all aware of how difficult it is to accumulate a sizeable series to demonstrate the natural history of an untreated disease—the basic control in any study of treatment, because the physician is always morally bound to place the welfare of the *present, individual* patient above all other considerations.

Unfortunately, there is a second reason why the clinician can seldom be a scientist—that is, "one who knows"—in the same sense that his colleague in the laboratory can be. The scientist, after his broadly general training is completed, is often free to narrow his focus to whatever degree is suitable for the problems at hand. The capable clinician may also be very knowledgeable about a disease or technique or a field of special interest, but the emphasis in his daily work must be altogether different. No matter how specialized he may be, he must not lose sight of the whole patient, with his multiplicity of physical and emotional variables. Medicine, like science, is expanding at a phenomenal rate, but the problem continues to exist just as much for the specialist as for the general practitioner. In other words, the clinician cannot specialize himself out of the obligation to be a bit of "an all-round doctor".

The basic scientist, for whom medicine is centered about diseases or techniques or areas of study which do not deal directly with patients, serves the suffering by his sheer competence. And, of course, he serves better still if he adds to this: the role of investigator and teacher.

And what of the clinician? How does he serve the suffering? Medicine for him is patient-centered. He must of necessity be a generalist and his knowledge diffuse. To my mind, this necessity is both the burden that the clinician must bear and, at the same time, the joy and opportunity of clinical medicine. Whether you choose to serve in this way is largely a matter of temperament.

The clinician serves the suffering by dealing with the individual patient and with the exigencies of here and now. He may advise or prevent, he may relieve anguish or pain, he may establish a stalemate with disease, and occasionally he may affect a cure. The most he can ever hope to achieve is a prolongation of useful life. But the battle is always lost in the end, since the ultimate corrected mortality statistic is exactly 1.0 per person.

Clinical medicine is frustrating. Over and over the physician runs into problems which he cannot solve—a diagnosis not clear or a therapeutic dilemma. Sometimes I find that the fault was in my own ignorance, and this is quite humbling—and educational. Sometimes, after obtaining all possible help from others who may be experts in the field, one must conclude that a clinical problem is insoluble with our present state of knowledge. This too, is humbling and educational for the physician—and often tragic for the patient. But these situations are also our opportunities. Like clinicians for countless generations before us, we are challenged to observe and to think about what we see.

In 1849 Thomas Addison noted that his patient, who had bronze-coloured pigmentation of the skin and suffered weakness, weight-loss and finally death, had at autopsy destructive lesions of the adrenals. Before that time, no one supposed that

the adrenals had any function at all. They were supposed to be a kind of developmental error or useless fetal kidney. Addison must have thought about his clinical and pathological observations, because he collected ten more cases², and largely as a result, endocrinology was born.

A physiologist showed that animals cannot survive after removal of the adrenals³;

A clinician differentiated medula from cortex⁴;

An anatomist observed secretory granules in the medullary cells⁵;

A clinician observed that adrenal extracts raise the blood pressure⁶;

An a biochemist extracted epinephrine⁷.

This interplay of discovery by clinician and basic scientist continued (and continues today) as the steroids of the cortex were isolated, identified, synthesized, modified, and put to clinical use.

During the American Civil War the standard treatment for a compound fracture was amputation of the limb. It was barbaric, but the only alternative to death from sepsis. (I imagine that someday the treatment of malignant disease, by the extirpation of organs, will be looked back upon as equally barbaric.) In 1864, Pasteur, a French chemist, showed that fermentation is due to micro-organisms from the air. A year later, Lister, then Professor of Surgery at Glasgow and deeply concerned about the problem of wound infection, decided that the clinical situation was too urgent to await refinements of theory. He drew crude analogies, and knowing that carbolic acid was used to prevent putrifaction of sewage at Carlisle, he applied a carbolic acid

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dressing to a compound fracture and then to other wounds; he developed a whole antiseptic technique and the incidence of lethal wound infection plummeted. While British surgeons were slow to accept the new method, certain European surgeons were quick enough to appreciate the value of Listerism. Richard von Volkman, Professor of Surgery at Halle used to close his operating rooms for three months at a time in order to clean up the sepsis on his wards, and he was among those who were quite prepared to accept the new and largely empirical technique. Fortunately, important hospitals on the European continent were attached to universities. Now it was the turn of the basic scientists to work on the problem, and with their help, aseptic surgery was developed.

Note again the interplay of ideas from scientist and clinician. Consider also: the clinical trial arising out of the patient's immediate need, the theory becoming fully developed after the initial fact.

This process by which clinical observations or urgent clinical need precipitate or participate in a chain of discovery, has happened over and over again, and I do not believe that it has suddenly stopped. The occasional instance of a successful transplantation of a kidney into a recipient with terminal uraemia—and we are hearing about more of these in the past two or three years—is an excellent example of the way in which clinical exigency sometimes precedes and impels the final elaboration of fundamental understanding.

Perhaps I've painted too grim a picture of clinical medicine, and I don't want every young doctor here immediately to revise his plans and take up a basic science. We don't always work in the dark. Most of our patients get better, partly because most diseases are self-limiting—and partly because our predecessors have left behind



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of rich heritage to assist us. I think most clinicians find a great deal of satisfaction—and this is something I had to discover for myself after leaving medical school—in trying to establish a diagnosis by talking to the patient and by using eyes and ears and hands and a few simple instruments. There is also something rather fascinating about trying to solve problems in which there are unknown quantities. Then, too, there is a good deal of pleasure in working with people—as I say, it is mainly a matter of temperament.

The clinician, while not a scientist, is a kind of privileged spectator at the arena of discovery. He sometimes acquires ideas, he may occasionally contribute, and of course, he has a magnificent view. I conceive of the clinician, in an age of science, when clinical medicine is continually feeling the impact of science, as a kind of advocate for the patient—a generalist who can represent the patient in obtaining the benefit of the best knowledge available from specialists and basic scientists.

How can the clinician be worthy to serve the suffering? Each of us has his views, and I can only give you some of mine, without meaning to moralize too much. He should—first of all—be a competent generalist. Secondly, he should have a field of special interest, whether he is a general practitioner or a specialist. He should try to distinguish, as honestly as he can, between what he knows and what he doesn't know, between what is probably true and what is possibly true. He should seek advice as frequently as he thinks he needs it, from other generalists, from specialists and from basic scientists. He should try to keep abreast of advances and to assess whether new ideas might be of help to his patients, while at the same time being reluctant to part with older methods which have proven useful. There are times when he should call the attention of the basic scientist to the problems which need to be investigated—while pure research may lead to unexpected advances, it does no harm to urge the scientist a bit by being the patient's advocate. He should investigate a little or a lot, at whatever depth suits his capabilities. And if he is fortunate enough to have the opportunity, he may also teach.

This is quite an ambitious program and few will be able to achieve all of these objectives fully. The important thing is to set the goal high and to aspire toward it.

FOOTNOTES:

- 1 Hippocrates: Tetanus. In Major, R. H., *Classis Description of Disease*, 2nd Ed. Charles C. Thomas, 1939, pp. 147-148.
- 2 On The Constitutional and Local Effects of Diseases of The Suprarenal Capsule, 1885.
- 3 Brown-Séquard, 1856.
- 4 Vulpian, Physician at La Sâlpêtrière, 1856.
- 5 Henle, 1865.
- 6 George Oliver, physician at Harrogate, 1894.
- 7 Abel, 1899.