The Naturalist Tradition in General Practice

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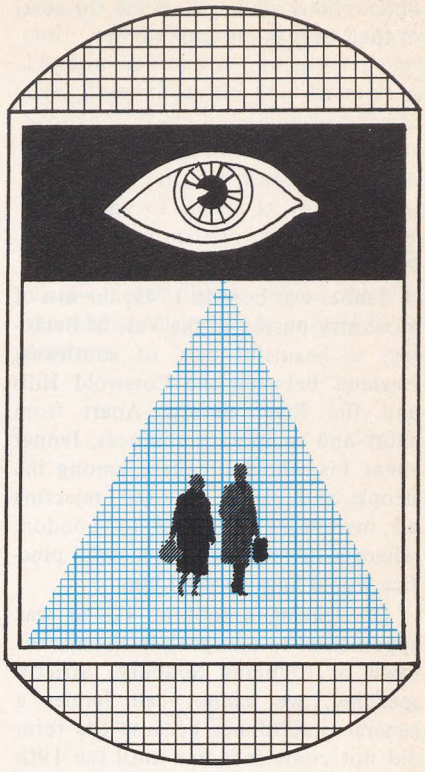

For me there have been two great satisfactions of medical practice. One has been the depth of human experience which, as physicians, we are privileged to have. The other has been the satisfaction of observing patients with illnesses of all kinds, in their own habitat, and over long periods of time. This is the kind of satisfaction experienced by all naturalists.

I would claim that observation of the natural history of disease is *the* basic science of medicine. Nowadays we use the term "basic science" for what Abraham Flexner called the laboratory sciences. There is no harm in this as long as we do not mean that the laboratory sciences are more fundamental and more scientific than the science of clinical observation. Chemistry and physics can explain ill health and abnormality in living organisms. Abnormality, however, has first to be defined and described – and this can only be done by clinical observation. Knowledge of the natural history of disease is fundamental to accurate prognosis and to rational therapeutics. Suppose, for example, people with schizophrenia were found to have a biochemical abnormality. This discovery would have no significance without the clinical description of a category called schizophrenia, and a knowledge of its natural course and outcome.

Medicine, like other branches of biology, is predominantly an observational science. The observations are made by clinicians, who are the field workers of medical science, just as the field naturalist and field anthropologist are the field workers of biology and anthropology. To say this is not to deny the importance of experiment in biology or medicine. In these sciences, however, an experiment usually follows and derives from a long period of observation. The distinction between observation and experiment is in any case artificial. The laboratory scientist and the naturalist both use experiments: one creates his own experimental conditions; the other uses the slow and massive experiments of nature.

The clinician, then, has much in common with the naturalist. "Naturalists," wrote John Ryle,[1] "hold certain attributes in common, notably the desire to establish the truth of things by observing and recording, by classification and analysis." Like the naturalist, the clinician makes careful observations of his/her patients, classifies their illnesses into categories, then follows them to their conclusion.

To this science of medicine, general practice has made, and continues to make, a distinguished contribution. The general practitioner has advantages as an observer which are shared by few other physicians. The general practitioner can follow illnesses from their beginning to their termination, even if the course is of many years duration; all variants of illness, from the mildest to the most severe, can be observed; and the physician can, if he/she chooses, observe patients in their own natural habitat. I would like, therefore, to illustrate my theme by describing the work of three general practitioners, all notable contributors to medical science, who made their

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observations while practicing for most of their lives in one community.

Edward Jenner[2]

Jenner was born in 1749, the son of a country parson in the Vale of Berkeley, a beautiful part of southwest England between the Cotswold Hills and the River Severn. Apart from short and temporary absences, Jenner spent his whole life here among the people and places he loved, rejecting all invitations to come to London, where a lucrative and successful practice would have awaited him.

On leaving school at 12 he was apprenticed to a surgeon in the market town of Chipping Sodbury. Strictly speaking, we cannot call Jenner a general practitioner because the term did not come into use until the 19th century. However, the precursors of the general practitioner were already in existence in the persons of the country surgeon and apothecary. Both of these terms described a social role rather than a particular function. The surgeon and apothecary both served as general medical practitioners and in due course they merged to form what the *Lancet,* in the early 1800s, called the "general practitioner."

After a seven-year apprenticeship, Jenner spent two years in London as the first pupil of John Hunter, the great comparative anatomist, who had recently settled there and had begun to build his famous collection. As a boy, Jenner had already shown the interest in nature which was to be the foundation of his great discoveries. In Hunter he found a kindred spirit, and this period was the beginning of a lifelong friendship and collaboration in the study of nature. While in London, Jenner also worked for the botanist Joseph Banks sorting, mounting, and classifying material collected by Banks on the voyage of Captain Cook's *Endeavour.* So well did he do this that Banks offered him a position on the proposed voyage of the *Resolution*: an offer which Jenner turned down in order to return to practice in his native Berkeley.

The correspondence between Jenner and Hunter shows the breadth and depth of their interest in nature. "I shall be glad of your observations on the cuckoo," writes Hunter in one letter, "and upon the breeding of toads: be as particular as you possibly can. If you can pick me up anything that is curious and prepare it for me, do it, either in the flesh or fish way." And in another: "I received yours, as also the cuckoo's stomach. I should like to have a few more of them for I find they do not all show the same thing. If possible, I wish you could remove the cuckoo's egg into another bird's nest and tame the young one to see what note it has."

Jenner had a particular interest in the cuckoo. It was known that the cuckoo laid her egg in another bird's nest and that the young cuckoo was raised by the foster mother after her own offspring had been thrown from the nest. It was widely believed that the foster mother herself threw out her own offspring. After years of painstaking observations, Jenner was able to refute this theory by witnessing the process himself. The young cuckoo, soon after hatching, dispatched the other eggs and fledgelings from the nest by placing them on its own back and lifting them up to the edge of the nest. The observation was supplemented by experiments in which he placed in the nest, with the young cuckoo, eggs and birds of various sizes.

The paper which Jenner submitted on the cuckoo earned him his Fellowship of the Royal Society.

During all this time Jenner was reflecting on a remark made to him by a milkmaid in Chipping Sodbury, who told him that she could not get the smallpox because she had had the cowpox. Smallpox was one of the great scourges of the 18th century. Between a tenth and a fourteenth of the population died of the disease, and it became customary to inoculate healthy people with smallpox as a preventive measure. The disease transmitted by inoculation, although severe, had a lower mortality than that contracted during an epidemic. Even so, it was an extreme measure, and Jenner was attracted to the idea that the much milder cowpox could confer immunity.

He began to gather observations, both his own and those of his colleagues. Unfortunately, there were inconsistencies. Cases of smallpox were reported in people who had had cowpox. Although his colleagues were skeptical, Jenner did not abandon his hypothesis. Perhaps, he reasoned, the term "cowpox" was being used for several different diseases. He began, therefore, to make systematic observations of the lesions on cows' udders and differentiated those of cowpox from those of other diseases. He made similar observations on the lesions in man, using an artist to make accurate drawings.

After many years of observation he was ready to make his crucial series of experiments which lent further support to his hypothesis. The rest of the story is well known. Vaccination soon became accepted throughout the world, but not before it had been the subject of many doubts, attacks, and misuses by people who did not really understand it. These were people who were using vaccination without the background of patient observation which formed the basis of Jenner's experiments. Jenner was able to refute the arguments of his critics by reference to the hard facts gathered from his own observations. Misunderstanding about vaccination, and failure of inoculation to protect against smallpox, arose from three circumstances which were well understood by Jenner. First, not all lesions on cows' udders were due to cowpox. "There will be no end to cavil and controversy," he wrote, "until it be defined with precision what is and what is not cowpox." Second, the cowpox pustule provided effective virus only for a certain period during its evolution. Third, some individuals had more than one attack of smallpox.

Another episode from Jenner's life is worth noting for it gives us a glimpse of Jenner as a man and as a naturalist. While doing a necropsy of a man who had died from angina, Jenner's knife happened to go through one of the coronary arteries which was so hard that he thought some plaster must have fallen from the ceiling. Finding the whole artery calcified, he made, for the first time, the connection between the clinical syndrome of angina and disease of the coronary arteries. This caused him much distress, for his great friend John Hunter suffered severely from angina, and Jenner knew that this information would deprive him of all hope of recovery. Jenner decided, therefore, not to pub-

lish his discovery and wrote about it instead to Heberden, who had written the classical description of angina in 1772.

James Mackenzie[3,4]

Mackenzie was born in Scotland in 1853, graduated from Edinburgh in 1878, and soon afterwards entered general practice in Burnley, a cotton manufacturing town in Lancashire. It was there, during the following 20 years, that he carried out the studies which were to lay the foundations of modern cardiology.

Like so many before and after him, Mackenzie was mystified by his inability to diagnose so many of the illnesses he encountered in general practice. His medical education had not prepared him to deal with the illnesses of general practice. Blaming himself for his lack of knowledge, he searched the text books for answers – but in vain. The knowledge he sought did not exist.

In search of answers, Mackenzie began to make careful observations on all his patients. Overwhelmed by the volume of data, he decided to concentrate on the study of pain and the symptoms of heart disease. At this time there was much dogma, but very little knowledge, of the natural history of heart disease. Young people were kept in bed for months with sinus arrhythmia. The mechanisms of extra systoles and of auricular fibrillation were unknown. There was no way of determining the prognosis in patients with mitral stenosis. The significance of dyspnea as a symptom of heart failure was not understood.

Mackenzie's method was very simple. He made meticulous clinical observations on his patients. Then he followed their progress to see what became of them. In the case of the pulse, he invented an instrument – the polygraph – for recording simultaneously the radial arterial and the jugular venous pulses. His observations often extended over many years. Of sinus arrhythmia he wrote: "It took me 15 to 20 years of patient observation, as it required the collection of an enormous number of records before I felt confident in the soundness of this prognosis . . . I watched children grow up . . . and observed how they bore themselves during periods of stress in playing games and undertaking hard work. The symptoms observed had to be compared with those in people with failing hearts and after many years of patient labour, this prognosis was established."

By this method, he was able to elucidate the mechanism of extra systoles and to determine their prognosis, to describe "paralysis of the auricles" (later to be called auricular fibrillation), to classify presystolic murmurs according to prognosis, and to elucidate the significance of dyspnea as a symptom of cardiac failure.

It is ironic that Mackenzie became famous for something which he regarded as an incidental aspect of his work: his invention of the polygraph. Then, as now, both public and profession were more impressed by gadgets than by the clinical observations without which they would have been useless. His disciples, the new generation of cardiologists, embraced the new technology but, to Mackenzie's disappointment, failed to appreciate the importance of prolonged clinical observation to discover the natural history of disease. Mackenzie was by no means opposed to investigative medicine or the use of the laboratory; on the contrary, he made frequent use of both. But he never wavered in his belief that the basic science of medicine is clinical observation, and that general practice is the best place to learn the natural history of disease.

After 18 years, Mackenzie moved to London to advance his ideas and to set up a consulting practice. In this he was successful, although he encountered much opposition from those who could not believe that they had anything to learn from a general practitioner. After ten years, however, he realized that he was straying far from the principles on which all his work had been based:[5] the study of patients from the onset of illness to its end. At the height of his fame in London he returned to general practice, this time to St. Andrews in Scotland. There he established the St. Andrews Institute for Clinical Research; its purpose was to study the symptoms of illness in general practice. Unfortunately, he was already experiencing the symptoms of ischemic heart disease, from which he died eight years after he moved to St. Andrews.

William Pickles[6]

Between Mackenzie and William Pickles there is a direct connection. In 1926, when he was 40 and had already been in practice 15 years, Pickles read Mackenzie's "Principles of Diagnosis and Treatment in Heart Affections." The book made a deep impression on him. He resolved to begin making systematic observations in his rural practice in the Yorkshire Dales. In 1928 there was an epidemic of infective hepatitis (then called catarrhal jaundice) in the Dales. Because of their intimate knowledge of the whole population, Pickles and his partner were able to trace the spread of the epidemic in the greatest detail. Time and again they were able to trace the contact through whom each patient had contracted the infection. This led to the discovery that the incubation period was 26 to 35 days.

In 1933 Pickles wrote one of the earliest descriptions of an outbreak of epidemic myalgia, or Bornholm disease, first identified only a year previously by another general practitioner, Dr. Sylvest, on the Danish island of Bornholm. In the ensuing years, Pickles extended his observations to many other infectious diseases and in 1939 published his little classic "Epi-

demiology in Country Practice."[7] Like Jenner, he never felt either the desire or the need to be other than a family doctor. He worked in Wensleydale until his retirement in 1964 at the age of 79. He died in 1969.

Our Own Times

My three examples represent a tradition which runs from the 18th century to our own times. Does the tradition continue? Assuredly it does. In men like Fry in Britain, Bentsen in Norway, Braun in Austria, and Hames in the United States, we see the same principles exemplified: long-term observations carried out by individual physicians who share the same habitat as their patients. And for each one who can be named, there must be many we will never know, whose observations enrich their own lives, but never come to publication. In recent years, also, the work of these individuals has been supplemented by collaborative studies in which many physicians pool their observations.

It must be confessed, however, that the tradition is tenuous. Many of the conditions of modern life do not lend themselves to prolonged observation. Patients and physicians are more mobile than they used to be. And we are so impatient for results. How many research workers today would wish to embark, as Mackenzie did, on observations which might bear no fruit for 10 or 15 years? How many would be content, like Jenner, to ruminate on a hypothesis for 20 years, slowly building up a body of observations until ready to perform the crucial experiment?

I suspect, however, that we should look for deeper reasons for the neglect of this aspect of medical science in our own time. We cannot put all the blame on the conditions of modern life. It is open to any of us, if we so desire, to practice among a stable population and to stay there long enough for our observations to bear fruit. The reasons, I believe, lie in a basic misconception about medical knowledge: the belief that little remains to be discovered by clinical observation, and that the laboratory alone holds the key to medical progress. To correct this fallacy it should only be necessary to reflect on the number of common diseases of whose natural history we are still ignorant. Ryle's words are as true today as when he spoke them: "There is no disease of which a fuller or additional description does not remain to be written: there is no symptom as yet adequately explored."[1]

However, I do not recommend the study of the natural history of disease because it may lead to great discoveries. Admittedly, I chose as my examples men whose work led either to great, or at least to significant, progress in medicine. It is important to understand, however, that none of them worked on their observations with this end in view. Their original motive was the enrichment of their own life and work. It is for the personal satisfaction that it brings, rather than any contribution one may make to medical science, that I recommend the study of the natural history of disease. There may be only one Mackenzie in every generation, but there is not a single physician who cannot enrich his or her experience in this way.

However good our medical education may be, we all enter practice with an awareness of how much we still have to learn. No body of generalized knowledge, or textbook, can ever do justice to the infinite individual and local variations which we encounter in practice. Medicine always has to be learned from experience, and our learning is proportionate to the use we make of that experience. Although he/she may make no great original contribution to medical knowledge, I am convinced that no practitioner who makes systematic observations of his/her practice will fail to experience the joy of discovery.

The feeling I am speaking of is like the joy of the naturalist when he/she sees a rare species, or an unusual variant, or a common species in an unusual place, or an interesting interplay between organism and environment. It is like the pleasure which is derived from observing and recording the common events in one's own habitat – like the yearly unfolding of spring.

The beauty of studying natural history is that it needs so few instruments: the ordinary tools of our profession plus a notebook, a pen, and an indexing system for organizing our collection. We need no laboratory, for the practice and the community are our laboratory. And, as Pickles showed us, it is never too late to begin.

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