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NEW LAMPS FOR OLD*

BY

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While the making of a diagnosis depends entirely upon information received through one or other of the special senses, the extent to which each can be used and the relative value of what it tells vary widely. In extent of use the eyes and the ears far exceed the other two. In the first or "subjective" part of the routine examination the ears bear the brunt of the burden, but the eyes are by no means idle; in the second or "objective part" these two are assisted by the sense of touch and, at times, of smell.

As regards reliability, sight undoubtedly surpasses any of the other senses, but there are occasions when each may provide trustworthy clinical data. The feeling of fluctuation, the sound of pericardial friction, the smell of a diabetic, are as reliable as any visible sign. Even the anamnesis may, at times, be of as great diagnostic value as anything found at physical examination, or possibly greater.

The Microscope

Speaking broadly, however, from the diagnostic point of view the eye is the most important sense organ. Many, perhaps most, of the great advances in medical knowledge have come from "the seeing of something"! Harvey's theory of the motion of the heart and blood was based upon what he saw. The rhythmic beat of the heart, the valves in the veins, had been described long before his time; the use of the armlet was familiar to every blood-letter, but none before him had really seen these, and much else, as a whole! The capillary vessels he did not live to see. The primitive microscope of his day was not powerful enough to show them, but he knew they must be there, and foretold them in these memorable words (Willis, 1889):

"In the limbs and extreme parts of the body the blood passes either, immediately, by anastomosis from the arteries into the veins, or, mediately, by the pores of the flesh, or in both ways."

Within four years of his death the microscope had developed sufficiently for Malpighi to demonstrate the capillaries which Harvey had foretold. Thus we reach the dawn of another great advance in medicine, again thanks to an increased power of seeing!

Histology, pathology, and bacteriology have only been made possible by the development of the microscope, which we owe to the optical physicists and glass manufacturers of successive generations. In working with a microscope, as also in ordinary life, there are times in

which a lamp is needed to give light. Its importance is then incomparable. No higher tribute has been paid to Florence Nightingale than to know her for all time as "The Lady with the Lamp." And so we come to the title of my paper. When the familiar tale of *Aladdin and the Wonderful Lamp* was first told some centuries ago a lamp was as indispensable in every household as it is to-day, and no doubt their lamps, like ours, did not improve with age, but required renewal from time to time. This explains that short incident in the story, when the Moor wanting to recover his magic lamp goes to a coppersmith and says (Lane, 1839):

"'Make me a number of lamps and take their price and more; only I wish thee to hasten and finish them. . . .' And when they were made the Moor paid him the price he asked for them and took them and departed . . . and put them in a basket. Then he went about the streets and bazaars of the city crying, 'O! who will exchange old lamps for new?'"

It is not necessary to complete the story; but there is one further sentence so germane to our subject that it must not be left out. These old Eastern tales, like the fables and the fairy tales, have survived not merely because of the wealth and beauty of their imagery, but also because they are full of wisdom and knowledge of human nature. And so the story continues (Lane, 1839):

"And when the people heard him crying thus they laughed at him, saying, 'No doubt this man is mad, since he goeth about to exchange old lamps for new.' And the street boys pursued him from place to place and mocked at him . . . but he gainsaid them not, nor cared for that, but did not cease perambulating the city . . . while the boys shouted at him, 'Madman, Madman!'"

Harvey's New Lamp

How Harvey was treated when he cried his new lamp in the bazaars of this country only about three centuries ago is well known. John Aubrey wrote: "I have heard him [*that is, Harvey*] say that after his booke of the circulation of the Blood came out, that he fell mightily in his practice, and 'twas believed by the vulgar that he was crack-brained, and all the physitions were against him." Mellanby (1938) in his recent Harveian Oration before the Royal College of Physicians adds a confirmation of this, from a letter written by Lord Conway to his daughter in 1640:

"I hear that you have a great good opinion of Dr. Harvey . . . he is a most excellent anatomist . . . but in the practice part of his Physicke, I conceive him to be much, many times, governed by his Phantasye."

* Paper read before Sheffield Medico-Chirurgical Society, February 23, 1939.

Harvey himself knew what would happen; he writes (Willis, 1889):

"But what remains to be said . . . is of so novel and unheard-of character that I not only fear injury to myself from the envy of a few, but I tremble lest I have mankind at large for my enemies, so much doth wont and custom, that become as another nature, and doctrine once sown and that hath struck deep, and respect for antiquity influence all men. Still the die is cast and my trust is in the love of truth, and the candour that adheres in cultivated minds."

So, although they shouted "Madman!" Harvey gained them not, and did not cease perambulating the city crying his new lamp! The days of magicians, and of pseudo-magicians, crying out their new lamps in our streets and bazaars have not yet ceased; indeed, they are steadily increasing not only in number but in the loudness and insistence of their cries. Some have helped us to see more. Among these the electric-light bulb in its application to medical instruments must not be forgotten. It has not only made easier what were previously difficult, sometimes very difficult, forms of clinical examination, such as the use of the ophthalmoscope and laryngoscope, but it has increased the range and number of internal organs which can now be seen during life. Of the latter one need only mention the bronchoscope and the cystoscope, whilst as regards increased facility of use some of us can recall the frequent difficulty in early days of seeing the fundus oculi, when the patient was restless or semi-conscious, in a cottage bedroom, with no better aid than the reflected light of a candle! Let us pay this tribute to our forefathers: they saw and described most of the important changes in such regions as they could look at, under those old and more difficult conditions.

Lister the Magician

The first great magician offering a new lamp within my medical memory was Joseph Lister. The true greatness of his discovery lies in the fact that it has extended our vision of the internal parts of the human body during life. Just as aided by the light of his "safety lamp" the coal-miner can carry on his work with but little danger, deep "in the bowels of the earth," so the surgeon, with Lister's lamp in hand, can look into the cavities of the living body, and with the minimum of risk perform such operation therein as may be necessary. Even the physician, borrowing for the time the surgeon's lamp, can plunge his hollow needle with safety into the theca, the cistern, or even a lateral ventricle, and although he does not see the inside of them, yet from the material withdrawn he can form a confident opinion as to what they look like.

To realize the extent to which our knowledge of abdominal and meningeal disease has been revolutionized by what Lister has enabled us to see, it is only necessary to refer to the chapters on gastro-intestinal disorders, or gall-stones, in the medical textbooks of last century, or to recall the fact that while previous to Quincke's introduction of lumbar puncture the differential diagnosis of a meningitis was usually only possible at necropsy, to-day it can be made with certainty within a few hours. But the safety of these punctures depends upon the use of Lister's lamp.

Like Harvey, Lister was met by mockery in his early days. The obituary notice of Rutherford Morison in a recent number of the *British Medical Journal* (1939, 1, 139) reads as follows: "After graduating in Edinburgh in 1874 Morison was house-surgeon at the Royal Infirmary to Patrick Heron Watson, a surgeon who was bitterly opposed to Joseph Lister and 'his newfangled methods.' . . . Morison

spent as much time as was possible, and as much as he dare without being detected by his chief, in Lister's ward; he used to relate that the feeling on the part of his chief was so great that had his 'disloyalty' been discovered he knew it would have meant instant dismissal."

Two other lamps, new during the last half-century or so, illustrate well the advantages of visible over other physical signs. The clinical thermometer and the sphygmomanometer have transferred the gauging of "fever" and of "blood pressure" from the hand to the eye. What formerly depended upon, and varied with, individual skill and practice can now be done with accuracy by the merest tyro! While these lamps have been accepted by all, mostly so long ago that we neither know nor care what old ones they have replaced, yet there are two, more recent newcomers—the x rays and the electrocardiograph, each of the highest value—which are still causing some uncertainty as to exactly what, if any, of our old ones they should replace.

The Magic of X Rays

As regards Roentgen's x rays there is no such difficulty in certain departments of our work. In the diagnosing of bone injuries, abdominal diseases, internal calculi, and certain forms of intracranial or intraspinal lesion their position is clear and agreed. They provide a light which is different in kind and exceeds in value any that existed before. In the region of the chest, however, there is still some difference of opinion as to when and where they should come in the ritual of the "physical examination," as taught and practised to-day. Everyone agrees that radiography can never replace entirely the older methods of examination of the patient in general, or of the chest in particular; nor can it remove the necessity for a full and detailed history; but as to the exact position it should take, and what it can replace, views vary considerably. When is it essential; when necessary? At what point in the routine physical examination should it come—before, during, or after? What item or items does it make superfluous?

These questions are not merely of academic interest, they concern all of us. Has not the time come when the teachers of medicine and the teachers of radiology might come together and formulate some general scheme for the instruction of students, and for the guidance of the younger practitioners? To these it must seem rather odd to spend time and trouble in trying to find out the presence or absence of something inside the chest which the x rays would tell at a glance! May they not properly remind us that there are from time to time cases, say, of early or of miliary tuberculosis, which are easily demonstrable by x rays but give no physical signs even to the most expert observer? Similarly, also, with some early cases of aortic aneurysm. Indeed they might strengthen their argument by quoting from a leading modern textbook (Davidson, 1935) on the chest, which says: "From the ideal point of view it is perhaps desirable that every chest should be examined radiologically as well as clinically. *Were this always possible* [italics mine] there can be no doubt that the number of missed diagnoses would be considerably smaller, especially in the case of early tuberculous disease of the lungs." In the days before x rays were heard of Samuel Gee (1907) had expressed the same truth in a rather different way. In his *Clinical Aphorisms*, under the heading "Of Phthisis," Number 12 reads: "Therapeutics must begin before physical signs have developed; for if you wait for physical signs, you wait too long."

On the other hand, among the older members of the profession there is a feeling that the radiograph should not be looked at until after the physical examination has been made: and that the radiological "crib" should not be looked at until we have completed our translation of the "unseen"! Unless this is done it is suggested that the refinements of touch and hearing so essential for physical diagnosis will never be acquired. May not the result be quite otherwise? Is not the radiograph, whether seen before or after our physical examination, the best means of assessing, there and then, the value or otherwise of such signs as our other senses can furnish? Does it not show us at once the relative value of each, and so help to improve our individual technique? It is also pointed out that at the present time, for various reasons, it may not be practicable to obtain a radiograph. Such difficulty is, however, becoming less every year. Indeed, the time is not far off when a radiograph will become an essential in the examination of every suspected chest case. The insurance companies, fully alive to the value of visible physical signs, have for some years demanded written figures for the systolic and diastolic blood pressures; before long they will be asking for a radiograph of the chest, which they can see for themselves! It is only a matter of expense.

The Electrocardiograph

The electrocardiograph, which we owe to Einthoven, though necessarily more limited in extent of use than x rays, has made it possible to see and compare the electrical changes in the beating heart, in health and disease. Its place in cardiological examinations is already assured and agreed upon. With its help many older physical signs and symptoms in diseases of the heart have already been checked and their relative values more accurately assessed.

Time no doubt will settle for us, as it has done before, which of our old lamps shall remain and which shall be given up. Meanwhile, we can best encourage the crying of new lamps, any one of which may be very good, not by scoffing at, nor by acclaiming, them merely because they are new, but by keeping an ever-open and receptive mind; taking great care to avoid the mistake made by Aladdin's wife of giving a better in exchange for a worse.

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The Joint Council of Midwifery announces that the scheme for providing special nutrition for expectant mothers in South Wales, Monmouthshire, Durham, and Northumberland, which has been carried on since 1935 by the Council and the National Birthday Trust Fund, will be continued for another two months until the report of the committee investigating the effects of the special foods is available. The three-year experimental grant of £17,500 made by the Commissioner for Special Areas came to an end on April 1, but this extension has been made possible through special donations, and it is hoped that further gifts will provide the £250 required to continue the distributions until July. Donations should be sent to Lady Williams, 57, Lower Belgrave Street, London, S.W.1.

BLOOD TRANSFUSION WITH THE ROTARY PUMP

BY

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The main object of this paper is to draw attention to the various disadvantages of the syringe method of transfusion, and of transfusion by flask and bellows. At the same time it is appreciated that some form of special transfusion apparatus—as opposed to the ordinary gravity method—has its place in blood-transfusion work, and I have chosen for a detailed description the rotary pump, because I believe this to be so far in advance of other special methods that it ought to be more widely known. The observations in this article are based on the experiences I obtained while working as Moynihan Fellow of the Association of Surgeons, and subsequently.

Transfusion Syringes

In most transfusion syringes there is a two- or three-way tap by means of which the syringe is connected on filling with the blood and with the patient's vein on being evacuated. The types include the three-way direct flow, rotanda, Jubé—used in Great Britain; and Tsanck, Oehlecker, Unger, Soresi—patterns used elsewhere. I had an experience of over two hundred transfusions with the special blood-transfusion syringes before giving up this method. My reasons for abandoning the syringe method are stated below.

General Criticisms.—(i) Multiplicity of parts. A syringe manufactured in this country has eight parts, five of them vital. If one of these is forgotten or lost or has become interchanged with another syringe of the same pattern, the transfusion cannot be given by that syringe. In addition these multiple parts take time to assemble. (ii) Syringes have to be sterilized: if this is not done until immediately before the transfusion the glass barrel must be left some time before it will be cool enough to fit the plunger. (iii) Syringes may break or crack while boiling to sterilize, while in use if any strain is put upon the joints, while cleaning after the transfusion, or in transit. (iv) Syringes are expensive to repair and replace. Replacement of the glass barrel of one pattern of syringe costs 12s. 6d. (v) An assistant is usually required. It is not easy for anyone inexperienced with special blood-transfusion syringes to give the transfusion without help. (vi) Many syringes are of foreign make; representatives who have undertaken to do repair work are few and far between, and are usually out of the spare part when it is required. In many cases the syringe has to be sent abroad, which involves an irritating delay. (vii) The all-metal syringe is not a solution of the problem, since these syringes dent, which is even worse than breaking. Another disadvantage of the all-metal syringe is that the blood cannot be seen during injection.

Disadvantages During the Transfusion.—(i) The blood cannot be introduced at a drip rate. (ii) The flow is intermittent, not continuous, and it cannot be observed. (iii) The transfusion does not "give itself," as the syringe has to be held and worked throughout. The result of this is fatigue and a tendency to give the transfusion too quickly. (iv) Syringes stick. This can be a very serious matter, and may involve abandoning the transfusion. Jamming may still occur in spite of careful cleaning, the use of liquid paraffin, and assembling while cool. (v) Syringes leak. This does not matter very much, but it is unsightly.