

ON LEARNING ANAESTHESIA *

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What doctrines students take from their teachers are of little consequence provided they catch from them the living philosophic attitude of mind, the independent, personal look at the data of life and the eagerness to harmonize them.

—William James (1).

THE movement afoot in medical circles to supply opportunity for those who desire to specialize is demanding an ever-increasing attention from those whose duty it is to arrange suitable courses. In keeping with the ideas which come from the epigraph of this paper, the teacher ought always to remember that beliefs are really rules for action, and the whole function of thinking is but one step in the production of habits of action. Bertrand Russell, in his essay, "*Useless*" Knowledge, says,—"I think action is best when it emerges from a profound apprehension of the universe and human destiny, not from some wildly passionate impulse of romantic but disproportioned self-assertion." Let us therefore, with Sir Charles Sherrington (2), see to it that "The full panel of the 'five-senses' is in session, and by further collaboration with the psyche, a world of subject and object for the individual is in being. The individual has attained a psychical existence. Phases and moods of mental life accure. Each waking day is a stage dominated for good or ill . . . by a *dramatis* persona the 'self.' . . . This self is a unity."

It is just this biologic feature of the self as a unity which should cause us constantly to remember that the candidate, already a graduate in medicine, ought to be afforded full scope for personal development throughout the period of learning in his chosen speciality. In the department of anaesthesia at McGill University, it has been found particularly productive for the participant in the Three-year Diploma Course to move from one hospital to another every six months, so to gain a diversity of experience under the tutelage of many qualified anaesthetists. Then, he cannot be "branded," cannot become hall-marked, by person or by place, even though these be all excellent! It stands to reason that he who learns from many masters, all else being equal, will these outdo, as time goes on, in knowledge and action. It stands to reason that he will be more capable, more Jeffersonian, more perspicacious than he who abides too long with one set of categories.

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He will, in truth, resemble William James, who "had a constitutional distaste for orthodoxy. As soon as ideas became established, or were proclaimed with unction and airs of authority, they became repugnant. You could spoil any good thing for him by converting it into an institution" (3). Let us avoid becoming too fond of any one idea or thing, any one drug or method, even be it method of teaching. Let us, rather, in the spirit of the motto of this article, do all in our power to bring it about that the anaesthetist of tomorrow will be more accomplished than are we. Shall we not thus be attempting the altruistic?

There is a very evident growing need for physician-anaesthetists. There is a consequent necessity for an increasing number of departments of anaesthesiology, adequately organized for the learning of anaesthesia. As the proper establishing of a department proceeds rather slowly, and as it takes time to learn the subject, the immediate indication is that, at those centres where organized training is presently functioning, the *tempo* should be stepped up in every possible manner, principally to provide competent men for positions of leadership in the newly-created departments as these appear.

Seeing that considerable similarity exists between the already-established courses, it may be sufficient to describe a few more of the details of the one conducted at McGill University. In this course the aspirant must have had one year of internship in an approved hospital, preferably in the department of internal medicine. Throughout the three years, the candidate resides in one of six hospitals (as stated above) moving from one to another every six months. All through the course there are weekly seminars and symposia, carefully planned and supervised. Off and on each year guest speakers of distinction are brought on from other institutions. During 1947, we had the good fortune of having with us some well-known visitors, who brought enlightenment not only to our Diploma Course Candidates but also to the members of the Quebec Division of the Canadian Anaesthetists' Society. The following topics were discussed: In January, "Academic and Clinical Considerations of Cardiovascular Reflexes During Anesthesia" and "The Pharmacological Basis for the Signs and Stages of Anesthesia"; In February, "The Control of Respiration Under General Anesthesia"; "Some Pharmacological Oddities of Ether, Morphine and Pentothal"; "Research Techniques of Interest to Anaesthetists"; "The Mechanism of the Decrease of Blood Pressure Associated with Spinal Anesthesia" and "The Histamine Liberating Property of Curare"; In March, "Clinical Signs and Symptoms of Hypoxia and Anoxia" and "Life Belts"; In April, "Procaine and Pentothal in Dilute Solution Intravenously for Analgesia"; In July, "Anaesthesia in Neurological Surgery"; In November, "Sodium Succinate as an Analeptic"; "Diagnostic, Therapeutic and Prognostic Blocks" and "Postoperative Complications." And, in December, "Past, Present and Future of Anesthesia"; "The Oxygen Content of Anesthetic Mix-

tures"; "Fixed Proportions of Sodium Pentothal, Curare and Nitrous Oxide-Oxygen"; "Some Reassuring Thoughts on the Explosion Hazard" and "The Control of the Carbon Dioxide Tension During Anaesthesia." Some little time before all this, another authority came to us and lectured upon the dangerous effects which pentothal can produce as it interferes with oxidation, and upon several matters of importance in the management of anaesthesia in the Mediterranean theatre of World War II. Besides the knowledge which such men impart, it is immeasurably advantageous that they be met, become known and be understood by young men in such immediate fashion. They have sense of duty to youth as taught in George Meredith's verse:

Thou under stress of the strife,
Shalt hear for sustainment supreme,
The cry of the conscience of Life:
*Keep the young generation in hail,
And bequeath them no tumbled house!*
The Empty Purse.

Each member of the Diploma Course is obliged to write a thesis on an allocated subject which, after presentation, is subsequently edited and mimeographed for distribution. The following is a list of the subjects for the current academic year:

1. The Nature of Sleep, Consciousness and Unconsciousness.
2. The Nature of Neuromuscular Transmission and the Action of Curare.
3. The Physiological Consequences of Hypoxia and Hyperoxia.
4. Problems of the Anaesthetist—Hazards in the Use of Anaesthetics and Their Adjuvants.
5. The Anaesthetist's Interest in Salt and Water Metabolism.
6. Parenteral Feeding—The Anaesthetist's Interest in Intravenous Therapy.
7. Current Ideas on Protein Storage and Metabolism.
8. Liver Function.
9. Liver Damage.
10. Nutritional Status and Operative Risk.
11. Kidney Function.
12. The Anatomy and Physiology of the "Respiratory Centre."
13. The Nature of Ventricular Fibrillation—Its Prevention and Treatment.
14. The Effectiveness of Resuscitators and Other Means of Artificial Respiration.
15. Acidosis.
16. The Technology of Anaesthesiology.
17. The Influence of Anaesthetic Agents upon the Heart.
18. The Functions of the Carotid Body.

The writing of essays is regarded very highly as it causes the candidate to use the library intently, gives him practice in writing and supplies thoroughly prepared and well-edited reviews for circulation. It is proposed that some of these compositions will be published.

As early in the course as can be arranged with the chairmen of the respective departments, ancillary courses are given on topics of the basic sciences, in so far as these pertain to anaesthesia. In each department direction is under the Professor or his Associate. In anatomy fifteen afternoons are spent in the laboratory, and the course comprises:

1. The anatomy of the respiratory tract with special reference to tracheotomy, intubation, and so forth.
2. The vertebral column, vertebral canal, spinal cord and the meninges.
3. The general course and distribution of the peripheral nerves.
4. The cranial nerves. Special attention is paid to the sites where each nerve is available for injection, the anatomy and surface landmarks of such sites, advantages and disadvantages of alternate sites, hazards of each and safeguards to be taken, anaesthetic area resulting from each block, common variations and possible sources of partial failure. As an example, the brachial plexus may be taken. The composition and anatomy of the plexus is dealt with, its branches, their course and distribution. From this four different routes for injecting the plexus are arrived at—the paravertebral, supraclavicular, infraclavicular and axillary. The anatomy and surface markings of each route are described. The students carry out the injections on the cadaver and have to verify that the point of their needle actually reaches the desired spot. The advantages and disadvantages and hazards of each route are discussed.
5. Similar injection sites in the distal part of the upper limb and in all parts of the body are dealt with in the same way. Extradural blocks, including sacral (so-called "caudal") block, and dental blocks receive special attention.

In biochemistry the following schedule is at present in operation:

1. Blood—Present knowledge of blood preservation; trends in the operation of hospital blood banks and in the distribution of blood to hospitals; new developments in apparatus for collecting, storing and administering blood.
2. Blood Substitutes and Blood Groups—Current views on so-called blood substitutes; use of preserved blood serum, plasma, albumin and globin; survey of blood groups and types. Laboratory demonstrations on technique of blood-typing.

3. The Rh Factor and Its Clinical Significance—Present knowledge and trends.
4. Body Water and Electrolytes—Review of salt and water metabolism.
5. Nutrition—Basic considerations in energetics and nutrition.
6. Liver Function and Liver Damage—Critique of various tests of liver function; factors which cause liver damage; renohepatic relationship.
7. Kidney Function—Current concepts of function and factors that lead to impairment.
8. Protein Metabolism in Disease—Disturbance in nitrogen metabolism after trauma; treatment—restoration of nitrogen balance.

In pharmacology six one-hour periods are devoted to discourses on the actions of the various drugs used in anaesthesia. Particular attention is paid to the opiates, the barbiturates, drugs used for regional anaesthesia, curare preparations, and the analeptic drugs. In each instance special consideration is given to relative toxicity, efficacy and applicability.

The course in physiology consists of lectures and demonstrations followed by laboratory periods in which the salient points of the lectures are studied experimentally. Six afternoons of three hours each are given over to this work. The physiologic background of problems confronting the anaesthetist is discussed. The main attention is directed to three major systems most directly implicated in anaesthesia :

1. The Nervous System—The problems of (a) Pain, (b) Sleep and Unconsciousness, (c) Muscular Tone and Relaxation, and (d) the Autonomic System.
2. The Respiratory System—(a) Mechanical Factors, (b) Nervous Control, and (c) Chemical Control.
3. The Cardiovascular System—(a) the Heart, and (b) the Blood Pressure.

On account of the tendency to place mental illness beyond physical illness, a short course in psychiatry has been introduced under the direction of the Professor of this subject. It will help the anaesthetist better to influence the *psyche*, better to gain reliance, for has not someone said that suggestion is an attenuated form of hypnosis?

Having taken these courses, the anaesthetist may enjoy the inspiration from Longfellow's poem, *The Builders*:

Build to-day, then, strong and sure,
With a firm and ample base;
And ascending and secure
Shall to-morrow find its place.

Thus alone can we attain
 To those turrets, where the eye
 Sees the world as one vast plain,
 And one boundless reach of sky.

I hear someone say, "but what is to be done in those hospitals which do not enjoy the facilities of association with a medical school?" Although it is fairly easy to answer this question, a practical solution may be somewhat difficult. Let us hope that the authorities of the American Society of Anesthesiologists will soon discover and establish a set of standards for the guidance of such hospitals in order that they may participate fully in providing opportunities for those who desire to pursue learning in our speciality. To begin with, in the case of any given hospital, did the staff of anaesthetists consist of a director, associate anaesthetists in number suitable to the surgical requirements, and as many intern anaesthetists as the extent of the work necessitates; did the anaesthetist collaborate with the physician and the surgeon in the selection of drugs and methods of their administration, endeavouring to suit both to the patient's general condition as well as the individual requirements of the case, always thinking carefully to avoid the routine; did the members of such a department take an active part in immediate postoperative care; and were records kept, in each case, of all relevant data prior to, during, and after operation; were, also, colloquia and seminars conducted frequently and attended by all of the anaesthetists and, too, by any of the general medical staff who are interested. Did all of these things happen, then would valuable information be obtained for publication, which in itself bespeaks research—augurs investigation in a place not close to a university; then would the hospital, with its department of anaesthesia so brought up to good criterion, seek affiliation with a nearby university not only to obtain instruction in the basic sciences for the residents, but also to have these residents rotate every six months with the residents in anaesthesia of the hospitals which are more intimately associated with that university. While I admit that it is perfectly feasible for the attending staff to make itself sufficiently proficient to guide learning in the basic sciences or that a set of itinerant instructors may be encouraged to give courses to various groups of residents in anaesthesia, it is easy to see the difficulties of uniformity and that either scheme might present perplexity.

Although it is not given to us to know the whole truth, we do know that the secret of all learning lies in the passion for the search and we shall do well to remember the warning of Horace. "Life grants no boon to man without much toil."

nil sine magno
 vita labore dedit mortalibus.
Satires, 1, ix, 59.

REFERENCES

1. Dewey, John: *Problems of Men*, Part IV, No. 2: *The Philosophy of William James*, New York, The Philosophical Library, 1946, p. 388.
2. Sherrington, C. S.: *Foreword to 1947 Edition, The Integrative Action of the Nervous System*, Cambridge, University Press, 1947.
3. Perry, R. B.: *The Thought and Character of William James*, Boston, Little, Brown and Company, 1936, vol. 1, p. 142.

The New England Society of Anesthesiologists will hold their meeting Tuesday evening, April 12, 1949, in the Auditorium, Building A, Boston University Medical School, South East Concord St., Boston, Mass. The program is as follows:

1. "Pharmacological Factors Influencing Collateral Respiration: Possible Relation to the Etiology of Pulmonary Complications," by Ralph D. Alley, M.D.
2. "Pulmonary Ventilatory and Respiratory Function Determination Methods," by Donald Rayl, M.D.
3. "Artificial Respiration by Electrical Stimulation of Phrenic Nerves." Demonstration by Stanley Sarnoff, M.D.