THE USE OF VITAMINE FOOD-TABLETS AS AN AID TOWARD CONSERVING THE FOOD SUPPLY[1]

IN the conservation of food, it is necessary to remove the vitamines from certain staple products. Wheat flour can not be conserved for a long period unless it is bolted, thereby removing all of the vitamines. Cane sugar is perfectly stable, but this stability is due to the fact that any protein or vitamine that may have been in the cane juice has been removed. The hydrogenated fats are about the most stable of the fats, and yet the vitamine content is zero. It is, therefore, highly desirable to have vitamine preparations to complete the dietary. Fresh vegetables and fruits may be had in season, but their transportation, storage and marketing are very expensive, and usually accompanied by enormous waste. There are many families who do not, under the present system, receive sufficient vitamines in their food. Therefore, some addition seems necessary, but this is clearly considered as an addition, and not as a substitute for anything. These additions may be in the form of dehydrated products. Many of the vegetables and fruits may be dehydrated and consumed in a form which will furnish the consumer with considerable vitamine, and yet not necessitate a change in the methods of preparation of foods by the family. Those dehydrated vegetables may contain vitamines *A* and *B*, and dehydrated fruits may, under certain circumstances, contain in addition some vitamine—*C*. The dietary habits of various persons, however, form an obstacle to the consumption of sufficient vitamines. There are also many persons who can relish fresh foods (spinach, for instance) when they can not stomach dehydrated foods (spinach). The peel of citrus fruits, and some other fruits, is very rich in vitamines, yet no one eats them. For those persons who do not relish certain vitamine-containing vegetable products, the use of tablets containing these products, that may be swallowed whole, seems desirable. Orange peelings ground in a meat chopper, dried and ground in a coffee mill may be made into tablets by the addition of dehydrated orange juice acting as a binder. Such tablets contain vitamines *A*, *B* and *C*. Ground spinach may be similarly made into tablets with orange juice. I have tried these preparations on animals and determined their effectiveness in regard to vitamine content. Many workers may be engaged in determining the exact vitamine content of many of these preparations[2] and I do not wish to compete with their work in this paper, but merely wish to advocate the method of swallowing this vitamine food whole, in order to avoid the censorship of the palate.

J. F. MCCLENDON

[1] Contribution from laboratory of physiological chemistry, University of Minnesota.

[2] Cooper, Ethel, 1921, *Proc. Exp. Biol. Med.*, XVIII., 343.

SCIENTIFIC BOOKS

The Anatomy of the Nervous System from the Standpoint of Development and Function. By STEPHEN WALTER RANSON, Professor of Anatomy in Northwestern University Medical School. 395 pages, 260 illustrations. Philadelphia, W. B. Saunders Co., 1920.

A certain professor in an American university, through whose laboratory there annually pass between one and two hundred students of the anatomy of the nervous system, has been heard to remark, "Nobody ever learned any neurology out of a book," meaning, of course, that only by actual laboratory contact with neurological materials can one hope to master the baffling complexity of brain structure. No printed description, no pictorial illustration, not even the laboratory demonstration of elegant dissections and brilliantly stained microscopic sections, can take the place of the kinesthetic experience which each must acquire for himself by personal study, manipulation, and dissection of the tissues.

Of course, to this it may be answered that nobody ever learned much neurology without the aid of good books. And until relatively recent times the lack of suitable student manuals was probably one of the factors responsible for the futility of much of the teaching of the

structure of the brain, particularly in the medical schools, where the net result of the student's best efforts was too often the acquisition of a jargon of Greek and Latin polysyllables without meaning or interest except to the antiquarian—and the examining board. Other factors in the recent improvement in teaching this subject are students of better caliber and training and better teachers. Without advancement in these two directions the publication of adequate text-books could not greatly improve the situation, for the students of former days could not have used the books of to-day, and the same is probably true of not a few of their teachers.

The study of the brain is intrinsically difficult. The medical student, in particular, must master and remember a vast amount of extremely intricate anatomical detail before he is prepared to diagnose his first neurological case. Since the student can be expected to acquire at best only a very small part of the known details and to remember still less, it is essential that a selection be made for him by his teacher. And the success of the instructor will be determined as much by what he leaves out of the course as by the skill with which he organizes the irreducible minimum which he does attempt to present.

A student who is directed or permitted to memorize a long list of the absurdly cumbersome names which have been given to the visible parts of the brain without gaining a definite idea of their functional significance and interrelationships has a real grievance. And the chief pedagogical difficulty lies in just this point that the parts are so inextricably interrelated, both anatomically and physiologically, that one can not know anything of value about one of them until he knows a little, at least, about a good number of others. It is like learning a new language; the beginner must know something of its grammatical structure and vocabulary before he can read. When I began the study of Latin I was required to spend an entire year in memorizing Harkness' Grammar before I was permitted to read a line of a Latin author. I understand that languages are not taught by that method any more. The teacher of neurology, as of Latin, is faced with the problem of making the structural elements dynamic, of giving them functional values, as early in the course as possible.

The successful text-book on the nervous system, accordingly, must lay down certain general principles of the relations of structure and function, illustrate these by a judicious selection of examples, proceed in an orderly way to an examination of the gross features of the central nervous system, accompanied by an exposition of a few significant microscopic details of each part and an analysis of its functional connections with the periphery and with other centers, and finally these elements must be knit together, the related parts being woven into working systems of conduction pathways and cerebral centers, each of which has a definite part to play in the complex web of bodily adjustments. Not until the anatomical configuration and normal action of each of these several functional systems has been clearly conceived, the topographical relations of the anatomical pathways to each other in various parts of their courses visualized, and the functional patterns in which they may be combined determined, is it possible intelligently to interpret the clinical pictures presented by nervous disorders or to make any diagnosis of a neurological case by other than rule-of-thumb methods.

Dr. Ranson's book very satisfactorily meets these severe requirements. The learner is skilfully guided from the start in his selection of topics and the order in which to take them up by an analysis of the physiological factors in the organization of the nervous system which is simplified as far as the intricacies of the subject permit. The presentation is clear, logical, and accurate. The illustrations are judiciously chosen, many of them are original drawings which are important additions to the literature, and they are beautifully executed. The publishers, too, have done their work admirably, text and figures are well printed, typography clear, and misprints very few. Most of the figures are based on the human nervous system, but there are included excellent drawings of the brains of the dogfish and sheep which

are of especial value for those laboratories in which these types are used to supplement human material.

The unavoidable difficulties of the study of the nervous system are further increased by an unnecessarily cumbersome nomenclature. Ranson has followed in the main the B. N. A. system of terms, wisely using English forms of the names in most cases. This system has at least the merit that it is possible to find out exactly what its names mean. Like nearly all other recent anatomical writers, he departs from this system in some respects (*e.g.*, dorsal and ventral for posterior and anterior. Pending the international revision of the B. N. A., which is perhaps more urgently needed in neurology than elsewhere, it is desirable that certain other changes be widely adopted. The "pons" of the B. N. A. is a hybrid monster, for whose continued existence there is no justification, anatomical, physiological, embryological or comparative. Other similar infelicities might be mentioned.

As indicated at the beginning of this review, the serious study of the nervous system can not proceed far without practical work, and Ranson's book is so organized as to follow the natural sequence of laboratory study. A brief laboratory outline is included in the final 20 pages.

The author has attempted to include within the covers of one book all that the medical student requires for his guidance in a first course on the anatomy of the nervous system, and this task has been well done. That this plan is very acceptable to the student, there can be no question, but in the reviewer's experience this is not an unmixed benefit. With a manual of this sort in his hands it is the very exceptional student who can be induced to consult the atlases and larger works of reference and the periodical literature which he must learn to use if he would win an adequate preparation and the proper outlook for successful work in neurology. The question may be raised whether from the pedagogical standpoint the symmetry and completeness of this work are, after all, really advantageous.

C. JUDSON HERRICK

SPECIAL ARTICLES

A SIMPLE APPARATUS FOR MICRO-MANIPULATION UNDER THE HIGHEST MAGNIFICATIONS OF THE MICROSCOPE

THE microdissection and microinjection of marine ova and of animal and plant cells have hitherto been carried out by means of Barber's[1] pipette holder, an instrument primarily intended for the isolation of bacteria. Barber's instrument had the big advantage over other similar mechanisms in that it enabled one to manipulate needles in a drop hanging from a coverslip suspended over a moist chamber. This eliminated all obstacles between the objective and the coverslip, thereby permitting the use of high-power objectives.

The method of making the glass microneedles and pipettes is described in full in Barber's various papers dating from 1904 to 1914 and in a paper of mine[2] in which the application of the method to microdissection is given.

The principle involved in Barber's apparatus is a carrier pushed along a groove by a screw at one end. By having a series of three carriers built up on one another, each travelling in a different direction, movements in any one of three dimensions may be imparted to a needle clamped on the top carrier. It is difficult to construct this instrument in such a way that each movement can be maintained in a precise focal plane. Even when skilfully made, wear and tear in time renders the movements jerky and undependable.

The instrument described in this paper has the following advantages over Barber's: (*a*) simple construction, (*b*) absence of any lost motion no matter how long the device is used, (*c*) accurate and constant control of the movements of the needle or pipette tip

[1] Barber, M. A., 1904, "A new method of inoculating microorganisms," *Jour. Kans. Med. Soc.*, IV., 487; 1914, "The pipette method in the isolation of single microorganisms and in the inoculation of substances into living cells," *The Philip. Jour. Sc.*, Sec. B, Trop. Med., IX., 307.

[2] Chambers, R., 1918, "The microvivisection method," *Biol. Bull.*, XXXIV., 121.