when warning of the dangers of the "suck and blow" resuscitators was the factor of negative pressure to the lungs and the impossibility to synchronize with the patient's respiration.

The first warnings on these features appeared in the report of the Bureau of Mines in 1914.[1] It was the report of the committee on resuscitation that "killed the Pulmotor," and Henderson from then on stood up for the findings then established. It would be of interest at this time to know whether the Bureau of Mines had any reason to alter their opinion since then and whether eventually they give the principle of "suck and blow" a right to be.

One of the committee of 1914 was the late Dr. S. J. Meltzer, of the Rockefeller Institute, and it was his disbelief in the safety of negative pressure to the lungs and his belief in the necessity to synchronize which led him to develop the simple, safe and inconspicuous method of resuscitation known as the Meltzer method. It is on the principle of pharyngeal insufflation with a limited safe pressure, leaving deflation to the natural contraction of the chest wall, first published in the *Journal* of the American Medical Association, May 10, 1913, and later adopted by Henderson and Haggard, by the Society for the Prevention of Asphyxial Death, by many specialists on respiration and, with modifications, used by many institutions all over the world.

Naturally an apparatus built on the principle of insufflation only is not as impressive as an apparatus built on the principle of positive and negative pressure. It is human nature, without sufficient thought, to be impressed by the performance of a device apparently so similar to the functions of human respiration. The fact that human respiration is just the reverse, that it is done with negative pressure at inspiration and positive pressure at expiration, while the pumping apparatus applies positive pressure at inspiration and negative pressure at expiration is not considered or I will say not even recognized.

With all due respect to the council, I still believe in Yandell Henderson.

RICHARD FOREGGER

NEW YORK, N. Y.

A NEW PRESIDENT FOR THE HARVARD APPARATUS COMPANY, INC.

IN 1898, three vital changes in the teaching of physiology were proposed:[1]

(1) Since physiology consists not of words but of basic experiments, the student must every day make such experiments for himself. (2) Experiments too difficult or time-consuming shall be dealt with by a separate committee of three students, which committee shall report to the class the account given by the discoverer; and the committee shall show to their mates the original source. (3) There shall be no more lectures in the old sense. The professor and his staff shall discuss with the class the student's experiments immediately after he has made them; and they shall discuss very difficult experiments only after the students have read the discoverer's own statement of the discovery.

Such instruction, based on experimentation, requires large stores of apparatus, accurate but inexpensive.

So the Harvard Apparatus Company was launched. New instruments were invented; old instruments were redesigned for "quantity production."

Forty-five years have now passed. The company has all this time been in the hands of its founder and his admirable associates.

The founder believes it is time to have a new president.

In our search for the new president we have been fortunate indeed. We have found a man of uncommon ability—a man who has earned the profound respect of our profession and our very real affection.

Dr. A. J. Carlson will be president of the Harvard Apparatus Company, Incorporated, beginning on June 1, 1944.

W. T. PORTER

DOVER, MASS.

GENERAL BIOLOGY

THE distinction between the "biological sciences" and the "physical sciences" emphasized by Professor Shull in a recent number of SCIENCE,[1] is a very excellent one. Since it raises the biological sciences to a level where each is commensurate with the exact ones, "physics, chemistry, mathematics, meteorology, geology, astronomy, etc.," the distinction has a most attractive sound to teachers and workers in the less exact, biological subjects. Carried to its logical conclusion, colleges and universities should be reorganized, either by amalgamating the physical sciences into one department or by elevating zoology and botany, perhaps also physiology, genetics, microbiology, ecology, etc., each to full departmental importance. Psychology and anthropology, already full departments in many institutions, might be considered parts of this group.

In the first alternative, it would undoubtedly be necessary to "concoct" a "hodge-podge" course as an "extraction of all" the physical sciences, presenting it as an introduction to these subjects. Since Professor Shull deplores "general biology," so too he would unquestionably object to such a course as "gen-

[1] U. S. Technical Paper No. 77.

[1] See footnote to page 2 of a paper on "The Teaching of Physiology," *Philadelphia Medical Journal*, September 1, 1900.

[1] SCIENCE, n.s., 99: 199, 1944.

eral physical science." The second alternative has interesting possibilities. Each of the new departments would be sure to offer a "general" course, each bidding for student election on the basis of being the most outstanding for some particular reason. Students not planning to major in the sciences are usually required to take toward their "liberal" education at least one course in the physical sciences, and one laboratory course in the biological sciences. Under the revised arrangement, such a student would satisfy the spirit and letter of the requirements by taking one specialized course in each—say "general mathematics" and "general physiology." In the number of class hours available, could such a student be given the insight into the biological sciences now provided in a good general biology course? Could the "insight" be provided without adding to the total of required courses? Is the "insight" worth including in a liberal arts education? Why else does the requirement exist?

Freed of any close association through offering a course in "general biology" the preference for subject-matter shown by teachers and workers tends to draw them apart. The multiplicity of biological societies and journals is a good example of this tendency. But when a botanist, a zoologist, a physiologist, etc., must work together in presenting a "general biology" course, each acts as a check on the others. The botanist does not insert specialized information on neck canal cells, nor the zoologist the terminology of homologous segments in the crustacean appendage, nor the physiologist the logarithmic relationship between this and that, delectable as these items may be. The others object. In consequence the student is given an introduction to most of the branches of the biological sciences, with few of the technical details. Borderline subjects are mentioned in relation to the different aspects of the field. Biochemistry, biophysics, biometry, biogeography, bio-ecology, etc., form unifying bonds to connect the biological sciences with the physical sciences and with each other.

Perhaps a course in "general physical science" is an excellent suggestion. If the mathematics staff, the physics faculty, the chemistry group, etc., were to sit down together and each agree on what the other offered, each trying to get the other to orient the subject-matter into some understandable relationship, would the product perhaps give a better "insight" into the physical sciences than can be gained from one course in "general physics" or one in "general chemistry?" Perhaps such a group might be led to include not only some physical chemistry, etc., but also to show in their course how much relationship there is between the physical and the biological sciences.

As a biologist who found considerable stimulation to thought in pre-war collaboration with colleagues while presenting a share in a general biology course, and as a war research investigator needing familiarity with all the biological and physical sciences, the writer can sympathize with Professor Shull, yet at the same time feel that a closer, rather than a looser coordination between these sciences is particularly desirable in both the teaching and research fields.

LORUS J. MILNE
JOHNSON FOUNDATION FOR MEDICAL PHYSICS,
UNIVERSITY OF PENNSYLVANIA

SCIENTIFIC BOOKS

CYTOCHEMISTRY

Frontiers in Cytochemistry. Vol. X, Biological Symposia. Edited by Professor NORMAN L. HOERR. 334 pp. Illustrated. Lancaster, Pa.: The Jaques Cattell Press.

THIS volume represents a series of lectures given at a symposium held at the University of Chicago in honor of Professor R. R. Bensley's seventy-fifth birthday. A paper by Dr. Bensley himself, on the chemistry of cytoplasm, aptly serves as a summary of the principal contributions of the volume.

For the most part the approach of biochemists to the problem of describing the metabolic activities of living material has involved the use of techniques which disregard the heterogeneity of the cell or of the tissue being studied. It is to be expected that the only enzyme reactions to survive this treatment would be those characterized either by an exceptional and persisting activity or by the resistance of their component parts to the deleterious influences involved in breaking up cell structure.

However, due largely to the influence of Professor Bensley, a group of investigators, for the most part men who are trained as cytologists, have begun to attack the problem of localizing within the individual cell particular parts of the enzyme reactions which we write now as descriptions of the over-all metabolic process. Perhaps many of the difficulties in our present over-all schemes will be resolved when we are able to draw a precise biochemical map of a cell.

At the present time it is possible to separate or characterize cell fractions constituting the nucleus, components of the nucleus, mitochondria, a submicroscopic lipo-protein complex, Nissl bodies in the case of nerve tissue and protein fractions which apparently constitute the structural elements of the cell. Cyto-