First, a minor correction of Dr. Twenhofel's statement is needed. In my article "Sedimentation and Sedimentology," in SCIENCE of January 1, 1932, "sedimentology" was not proposed as a designation for "the range of geologic processes concerned in the formation of the sedimentary rocks," but as a designation for the subject concerned with these processes.

The term "sedimentology" had previously been so rarely used in geological literature (3 or 4 times), that I believe most geologists were not aware of its existence. After my article appeared in SCIENCE in January, 1932, I learned that the term "sedimentology" was first introduced some ten years ago by Dr. A. C. Trowbridge, who, in "American Men of Science," has listed sedimentology as one of his major subjects.

Etymologically hybrid formations are not uncommon. In my earlier article in SCIENCE, glaciology was mentioned as an analogy to sedimentology. "Sociology," "vulcanology" and "stratigraphy" are hybrid formations which in the past have been used without objection. Since "terminology" itself is a Latin-Greek formation, there seems to be no reason for disqualifying the term "sedimentology," especially since the latter, in the interest of non-ambiguity and logical consistency, is superior to "sedimentation" as a term for the subject. Hybrid formations are also frequently found in the German language, which permits such combinations as *Sedimentgesteine, Sedimentpetrographie,"* etc.

All standard dictionaries state that sedimentation is an act or process of depositing sediments. The use of the term "sedimentation" also for the subject concerned with processes of sedimentation and formation of sediments, ancient or recent, is a violation of the principle of non-ambiguity, and is therefore more objectional than the use of a hybrid formation. There is a distinct difference between the glaciation of North America and the glaciology of North America, or better, the glaciation of Greenland and the glaciology of Greenland. In analogous manner, differentiation should be made, for instance, between the sedimentation of the Mexican Gulf and the sedimentology of the Mexican Gulf.

The choice between "sedimentologist" and "sedimentationist" as designations for a student of sediments is not entirely a matter of taste. The terms "Vulcanist" and "Neptunist" designate two old schools of geologists, *i.e.,* these terms signify advocates or assertors of certain theories rather than students of certain subjects. The sole ending *-ist* does not always signify a student or one versed in a particular subject. There is generally a difference between a socialist and sociologist, a symbolist and symbologist, an idealist and ideologist. Generally, the ending *-logy* signifies a theoretical, scientific, analytical, philosophical study, and the ending *-logist* usually denotes a student or one versed in the subject.

Another objection to "sedimentation" is that it does not readily permit the formation of derivatives corresponding to "sedimentologic" and "sedimentological." These adjectives are useful for such expressions as "sedimentological (or "sedimentologic") research," "sedimentological investigations," "sedimentological theories," etc.

In conclusion, retention of "sedimentation" for the act or process of deposition of sediments, and adoption of "sedimentology" as a term for the subject concerned with these processes will tend toward clearness. A new term entirely of Greek composition is not likely to be accepted.

"Sedimentography" is herewith introduced as an additional term signifying the descriptive branch of sedimentology, *i.e.,* that part which deals with the minute phases, megascopic and microscopic features, textures and classification.

HAKON WADELL

MECHANICISM, VITALISM AND THE GROWTH OF BACTERIA

MUCH has been written about the chemical nature of growth, and in this connection unicellular and higher cold-blooded organisms have received especial attention. The fact that the rate of growth, metabolism and activity of such organisms increases with a rise of temperature, to the optimum, in a similar manner to the thermal acceleration of a chemical reaction, has justly received emphasis.

It is not the intention of this note to detract from the progress which has been made toward the explanation of life processes on purely physical and chemical bases. Least of all would we wish it to be considered as a partisan contribution to that threadbare discussion of "vitalism" and "mechanism." After all, it is probable that most of the functions of living matter which can not now be accounted for physically or chemically are obscure simply because of the deficiencies in our scientific conceptions.

Bacterium coli grows actively at 45° C. and also at 10° C., the rate of reproduction being about thirty times as fast at the higher temperature. It is known that actively growing bacteria continue to grow at the same rate when transferred to sterile medium of the same composition. On purely chemical grounds one would expect that if a transfer were made from an actively growing culture at 10° C. to sterile medium of the same composition at 45° C., growth should immediately be accelerated to the rate characteristic of a culture growing at this temperature. This, however,

is not the case. Such a treatment induces a "lag" before growth of the culture can again proceed, and some of the cells die before the adjustment is made. Within one hour, however, reproduction is under way at a rate characteristic of a 45° C. culture.

If an actively growing culture at 45° C. is transferred to sterile medium of the same composition at 10° C., more striking results are obtained. In this case there occurs an extensive mortality among the young bacterial cells—sometimes exceeding 95 per cent. of the total. As is well known, such a drop in temperature has no effect upon "mature" bacterial cells.

A fact brought out by these experiments, which is perhaps new and certainly not generally appreciated, is that abrupt environmental changes within the range of growth of an organism may prove lethal to the young of the species. The "hardening" of young greenhouse plants by subjecting them to low temperatures, so they may later survive freezing, is a practise which rests on conclusive experimental data. But that environmental fluctuations within the natural range of growth may be fatal to the young organism has not been so clear.

A point of more interest is the fact that the young bacteria growing at 10° C. are not so extensively killed when changed to 45° C. as are those growing at the higher temperature when changed to the lower. This indicates a greater hardiness in those grown at the lower temperature. That this is indeed the case has been proved by other methods.

The experiments on which this communication is based constitute a part of a series which was planned in order to test a hypothesis, long held by us, that slow growth should lead to a more perfect adjustment of an organism to its environment and, therefore, to greater viability. While the greater viability of the cells grown at low temperatures, as compared with those grown at higher temperatures, has been established, it is not conclusively proved that the difference is due to the slower growth rate. Proof of this point would convey broad implications.

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REPORTS

HONORS CONFERRED BY THE FRANKLIN INSTITUTE

AT the Medal Day exercises of the Franklin Institute of the state of Pennsylvania, held in the hall of the institute in Philadelphia on the afternoon of Wednesday, May 17, fourteen honors which had been awarded during the institute year were presented to their recipients or representatives of them. The medalists were drawn from three foreign countries as well as from the United States. The awards were as follows:

A certificate of honorary membership was presented to Mr. Alfred Rigling, of Philadelphia, Pennsylvania, in recognition of a half century of helpful and intelligent service as librarian and assistant secretary of the Franklin Institute, during which long term of duty well done he has been a pillar of strength to the institute, a source of comfort to the discouraged and of knowledge to the ignorant, a librarian amazingly informed concerning his library and a kindly gentleman skilful and eager in friendly service to his fellow men.

A certificate of merit to Dr. Henry Selby Hele-Shaw, of London, England, in consideration of his development of a superior filtering device involving stream-line principles. The British consul, Mr. Frederick Watson, received the certificate.

A certificate of merit to Mr. Arthur F. Poole, of Ithaca, New York, in consideration of his combination in a battery-operated clock, of known mechanisms, that has produced a clock in which the swing of the pendulum is the driving force of the gears controlling the hands, and also determines the frequency of the impulse, that requires battery renewal at long intervals only and that is an accurate time-keeper.

The fourth presentation of the day was that of an Edward Longstreth Medal—founded in 1890 by Edward Longstreth, of Philadelphia—to Mr. Howard L. Ingersoll, of the New York Central Lines of New York City, in consideration of his development of the locomotive booster to a state in which it gives valuable aid to locomotive performances and railroad service.

A second Longstreth Medal was presented to Dr. Dunlap Jamison McAdam, Jr., of the Bureau of Standards, Washington, D. C., in consideration of the fact that Dr. McAdam has provided information that satisfactorily explains certain structural failures, has developed formulae and diagrams to illustrate the complex relationship of the influences of stress on corrosion, and has done more than any one else to establish the fundamental principles of corrosion fatigue, coupled with the fact that the information provided has already been usefully applied and should have wide future practical application.

Three John Price Wetherill Medals—founded in 1925 by the family of the late John Price Wetherill—were next presented: the first to Messrs. Henry S. Hulbert, Francis C. McMath and Robert R. McMath,