

cerned, I am not sure that the meaning preferred by Professor Jennings is the most widely accepted one. Eisler, for example, in the last edition of his "Wörterbuch der philosophischen Begriffe" defines "Neo-Vitalismus" primarily as the doctrine which "betont die *Autonomie* und *Aktivität* der Lebensprozesse, die Unmöglichkeit diese restlos aus mechanisch-chemischen Gesetzen abzuleiten"; and though he adds to this formula (which he ascribes in common to Bunge, Wolff, Reinke, Hartmann, v. Uexküll, K. C. Schneider and Driesch) some peculiarly Drieschian details, these do not amount to a theory of "biological indeterminism."

Usage, however, is still too various and confused to settle the matter; and none of us has authority to legislate upon the subject. The term vitalism might, with real advantage to both biology and philosophy, be retired from service. Even if that desirable consummation be past hoping for, it should still be possible to persuade contributors to the discussion to bear in mind the ambiguity of the term and of the antithetic "mechanism," and to recognize and keep separate the several distinct issues which in much current use of those terms tend to become blurred and confused.

A. O. LOVEJOY

THE JOHNS HOPKINS UNIVERSITY,  
June 19, 1911

#### SUBSIDENCE OF ATLANTIC SHORELINE

ON page 906, of SCIENCE, No. 858, I observe certain statements of D. W. Johnson, of Harvard, maintaining that there is no decisive evidence of recent subsidence of the Atlantic coast regions, but, on the contrary, some beach-formations which would seem to prohibit such conclusion. This is all very startling, not to say iconoclastic.

The great shallow bays of our more southern coasts, such as Delaware, Chesapeake, Albemarle and Pamlico, having long estuary-like arms, which suddenly and bluntly terminate at their upper ends and there receive in every instance a stream of comparatively small size, might at first seem to be a some-

what puzzling geographic condition; but it can readily be accounted for through subsidence and in my opinion in no other way.

At the maximum of the last elevation of the coast, the Susquehanna River flowed southward, with sensibly more than its present volume, and emptied into the Atlantic near the present Cape Henry. A few miles above this point it received from the west a moderate stream following the direction of the present James River. Higher up another moderate stream, following the line of the present Potomac, joined the Susquehanna near the present Smith Point.

For some thousands of years, perhaps, constant denudation lowered and flattened out the land along these streams. A subsidence of the coast then began. The sea, entering the Susquehanna, formed at first a small bay which received both the curtailed Susquehanna and the James. With still further subsidence the ocean filled more and more of the river valley and those of its branches, until, after a subsidence which need only amount to some 75 feet, we find the long shallow Chesapeake and its lateral arms formed by the intruding ocean as we know them to-day. The same reasoning applies to the other bays mentioned. Further north these results are less manifest because of the more precipitous nature of the coast; but the great terminal moraine constituting the backbone of Long Island became separated from the mainland by the waters of Long Island Sound, and it is probable that Narragansett Bay was largely formed in the same way.

If the nature of these shallow bays and their long, wide, abruptly ending lateral arms, receiving in every case at the upper end a flowing stream, is not positive evidence of progressive subsidence of the coast in recent times, it would be difficult to imagine any satisfactory reason for the observed facts. The evidence seems, in fact, as plain as though written in bold characters for us to read.

Other evidence of subsidence is shown by the salt marshes, with perfectly level surfaces built up by vegetable débris at high-tide

level, while the deep streams meandering sluggishly through them do not shoal, but become continually deeper through a slight excess of depression of their bottoms, as a part of the area of general subsidence, over the fill due to sediment. This is a classic and very evident proof of actual subsidence, as valid now as ever. The subsidence has probably been very slow, possibly not over six inches in a century, but that it is real admits of no doubt. To ascribe these phenomena to the fluctuations of height of ordinary high tides is, to say the least, inadmissible.

THOS. L. CASEY

---

SCIENTIFIC BOOKS

*Conservation by Sanitation.* By Dr. ELLEN H. RICHARDS. New York, John Wiley & Sons. 1911. 8vo. Pp. 305. Cloth, \$2.50. Illustrated.

Peculiar interest attaches itself to this work, as it is almost the last publication of one who has contributed very largely to the literature of modern sanitation. Mrs. Richards's books on water analysis are well known to a wide circle of readers. Her other books on the cost of cleanness, the cost of living, the cost of food, the cost of shelter, the chemistry of cooking and cleaning, home sanitation, etc., are equally well known to an entirely different circle of readers. To say that these books have had an important influence in molding modern sanitary thought, especially among women, is to put the truth but mildly.

"Conservation by Sanitation" is a laboratory guide for sanitary engineers in the study of air, water supply and the disposal of waste. It is divided into two parts. Part I., which comprises about three quarters of the work, is of a general character and adapted to a wide field of readers. Its style is discursive, perhaps too much so, but it covers many matters of interest and importance in the realm of sanitary science.

Especial prominence is given to the sanitation of air, which is regarded as "a neglected resource." The advantages of pure air and better ventilation in houses and factories is set forth. One chapter is devoted to the work

of the sanitary inspector and the analysis of air.

Several chapters are devoted to the history of public water supplies, the development of the sanitary idea as indicated by the municipalization of water works, economic and sanitary efficiency of water works, protection of water supplies as a conservation of natural resources, the regeneration of a spoiled watershed, the interdependence of town and country, and efficiency of filtration. On many of these subjects the information given is disjointed, but is nevertheless instructive. Particular emphasis is placed upon the necessity of collecting water from a clean gathering ground and storing it in clean reservoirs. The uses of the chemical analysis of water are described at length, but one of the rather surprising features of the book is the conspicuous absence of references to bacteria and their importance in water supplies.

Two chapters are devoted to the disposal of wastes, including garbage, sewage and wastes from manufacturing establishments. The effect of dilution is considered at some length, but little space is devoted to works for the purification of sewage.

The first part of the book closes with a chapter on the education and position of the sanitary engineer in the progress of modern sanitation, in which emphasis is placed on the need of efficiency in the enforcement of health laws.

The mechanical basis of modern life must come to the aid of moral and personal influence. It is not enough to tell men to do the right thing—they must be fenced in from the wrong thing. For this reason the public service engineer is the emerging leader in community welfare.

Part II. comprises a series of laboratory exercises and tests on the inspection of ventilation and the analysis of water and sewage. These notes are based on exercises prepared for the fourth-year sanitary engineering students at the Massachusetts Institute of Technology, where Mrs. Richards was for so many years an important member of the faculty.

G. C. WHIPPLE