Hydraulic Ram Action of Kidney Glomerulus

IT HAS been brought to my attention by Professor Swann, of Galveston, that a suggestion communicated by me (SCIENCE, **114**, 505 [1951]) regarding the possible hydraulic ram action of the kidney glomerulus is antedated by an elegant article in the *New Orleans Medical and Surgical Journal* of May 1880, by J. G., attributing the concept to Andrew Smyth. Smyth based the ram action on occlusion of the efferent arteriole by the afferent pulsation and used it to deny Bowman's claims regarding filtration.

A later suggestion of intrinsic contractile power of the glomerular tuft (*J. physiol.* [Paris], **7**, 660 [1906]) does not seem to fit the histology, although any one of them would serve to produce the missing component of the secretory pressure of the nephron. Only more adequate analysis of the orders of magnitude of the theoretical effects can validate their importance.

HANS H. ZINSSER

Department of Surgery (Urology)
University of Southern California

Cosmic Cloud Hypotheses of the Origin of the Solar System

The public is being played upon and utterly misled by the dreamery of the rival mathematical astronomers and physicists.

THIS statement by Henry E. Armstrong (*1*) quoted by Van Anda (*2*) in SCIENCE 21 years ago in his "Unsolved Riddle of the Solar System," seems equally pertinent today, for if it was fair to reject all previous hypotheses because they could not account for angular momentum and other data of the solar system, it is equally fair to reject all present-day hypotheses for the same reasons.

The dictum of Russell, Dugan, and Stewart (*3*) written in 1926 is still true; namely, that no one has ever imagined a process for accounting for angular momentum of the solar system in evolutionary hypotheses. Ter Haar (*4*), in 1948, referring to von Weizsäcker's dust-cloud hypothesis, wrote: "It is, however, difficult to see why this separation of the cloud according to angular momentum and atomic weight should take place. Also, this process cannot decelerate the sun sufficiently; there is a discrepancy factor of 100,000." Again, in 1951, ter Haar (*5*) wrote: "I would like to stress . . . the difficulty is the slow rotation of the sun. One has to find a mechanism which slows down solar rotation."

Whipple (*6*) wrote in 1952: "The general tendency at present . . . is to ignore the whole problem . . . of angular momentum."

Another problem that seems to present insuperable difficulties is the loss of material from the condensing earth. For example, if the earth contains a ton of hydrogen, obviously the protoplanet contained at least a ton of hydrogen; and if the protoplanet contained more than a ton, there must have been some process by which the excess hydrogen was lost during the formation of the earth. Likewise, similar processes must have existed for every element and isotope in the earth. Computations indicate that such processes are nonexistent, especially for elements with large atomic weights. To illustrate: Urey (*7*) specifically states that there was a loss of Hg during the formation of the earth; however, since the thermal dissipation of Hg requires temperatures that exist only in stellar depths, it follows that the loss of Hg did not occur.

Computations on the excess mass in the protoplanets are based on Kuiper's dust-cloud hypothesis (*8*). Appropriate modifications should be made in numerical values if another dust-cloud hypothesis is used. The excess mass in the protoplanets varies from 14,000 times the mass of the present planet in the case of Mars to 9 times in the case of Jupiter; and the total excess mass in the protoplanets is 50–60 times the mass of the planets.

The loss of 1200 times the mass of the earth from the terrestrial protoplanet with velocities ranging from an original 0 to ~ 30 km sec^{-1} seems impossible, particularly in the case of Ne. To prevent the forming earth from acquiring more than its very small concentration of Ne from a cloud of "cosmic" composition requires that the earth condensed at a temperature of more than 6000° K. At this temperature all compounds are dissociated. and, consequently, all elements with an atomic weight of 20.2 or less, as well as a large proportion of elements with somewhat greater atomic weights, would be lost from the forming earth. Hence, the chemical retention of terrestrial elements suggested by Brown and Patterson (*9*) could not have occurred. There seems, moreover, to be no process with sufficient energy to have kept the forming earth at 6000° K during the time interval required for condensation. There must therefore have been some mechanism to prevent contact of the forming earth with Ne, for it is unthinkable that any sorption of the cosmically abundant Ne could be so inefficient as to result in the meager terrestrial concentration of Ne.

If the planetary bodies condensed from a cosmic cloud, their observed variation in the direction of rotation and revolution seems preposterous. This variation is from 0 to 98°. Imagine, if you can, the mud from a rear bicycle wheel missing the back of the small boy riding through the mire!

The existence of satellites presents another difficulty. The diversity in composition of the mantle of the earth, especially the existence of continents, seems incompatible with any condensation process. But why extend the list? For, obviously, if the condensation of the planets is an imaginary event, most observational data will necessarily be contrary to conclusions drawn from that fantasy. Mass, composition of planetary bodies, energy, momentum, and angular momentum are too real to be derived from folk tales, and

hypotheses that fail to explain so many facts or to conform with so many basic principles are no more entitled to acceptance than folk tales.

P. S. PALMER

135 N.W. 60th St., Miami, Florida

References

1. ARMSTRONG, H. E. *Nature*, **126**, 275 (1930).
2. VAN ANDA, C. V. *Science*, **74**, 187 (1931).
3. RUSSELL, H. N., DUGAN, R. S., and STEWART, J. Q. *Astronomy*. Boston: Ginn, 463 (1926).
4. TER HAAR, D. *Mat. Fys.-Med.*, **25**, (3), 16 (1948).
5. ———. Personal letter (Jan. 18, 1951).
6. WHIPPLE, F. L. Personal letter (Jan. 2, 1951).
7. UREY, H. C. *The Planets*. New Haven: Yale Univ. Press, 131 (1952).
8. KUIPER, G. *Proc. Natl. Acad. Sci. U. S.*, **37**, 1 (1951).
9. BROWN, H., and PATTERSON, C. *J. Geol.*, **55**, 405 (1947).

CORRECTION: In the short paper by Heston and Schneiderman that appeared on page 109, SCIENCE, January 30, there is an error at about the middle of column 2. The chemical name for the mustard oil should be "allyl iso-thiocyanate" and not "ethyl iso-thicyanate," as printed. This is our error.

W. E. HESTON

National Institutes of Health, USPH
Bethesda, Maryland

Book Reviews

The Yeasts: A Taxonomic Study. J. Lodder and N. J. W. Kreger-Van Rij. Amsterdam: North-Holland Pub.; New York: Interscience, 1952. 713 pp. Illus. $19.80.

This single volume of 713 pages is a condensed and revised translation of three earlier volumes: *Die sporogenen Hefen* (1931), *Die anaskosporogen Hefen,* I Hälfte (1934), and *Die anaskosporogen Hefen,* II Hälfte (1942). It also includes the family of Sporobolomycetaceae, which was not covered in the previous editions. Examinations are reported on 1317 strains of yeast.

There are seven chapters in the book and an author and culture name index. A short introductory chapter defines the term "yeasts" and outlines the scope and intent of the book. Chapter II describes 6 morphological and 12 physiological properties that are applied in the classification. Additional properties not previously considered are the formation and shape of the ballistospores and sugar assimilation. There is an interesting discussion of why additional physiological properties, like the assimilation of certain carbon, nitrogen, and sulfur compounds, as well as the vitamin requirements of yeasts, applied by various investigators, were not used.

Chapter III surveys the different types of variation that may occur in yeasts and discusses their significance in relation to taxonomy. Chapter IV has the main line of the classification under the ascosporogenous yeasts, family Endomycetaceae, the yeasts producing ballistospores, family Sporobolomycetaceae, and the asporogenous yeasts, family Cryptococcaceae. The last three chapters discuss the species, and each has a key to the various genera belonging to the three families.

This book on the taxonomy of yeasts is a very thorough study and a most significant accomplishment. It would appear, however, that more physiological properties need to be considered in order to clear up the confusion that now exists, especially at the species level. The names of many yeast species are listed as synonymous. The authors record 67 strains of yeast belonging to the single *cerevisiae* species and 53 strains belonging to its *ellipsoideus* variety. The latter differentiation is based solely on a slightly greater ratio between the length and width of the cells. A single example will suffice to show that these yeasts are not all synonymous but can be differentiated further in some cases. The well-known *cerevisiae* strains Rasse M and Rasse II have similar growth factor requirements but are different in their assimilation of sulfur compounds, whereas the strain Rasse XII is different from both these strains in its growth factor pattern.

This book is highly recommended not only for those mainly concerned with the identification of yeasts but for anyone interested in the ever-expanding and important study of this single-celled organism.

ALFRED S. SCHULTZ

Fleischmann Laboratories, Standard Brands Incorporated
New York

Livestock Health Encyclopedia. The control of diseases and parasites in cattle, sheep and goats, swine, horses and mules. Rudolph Seiden, Ed. and Compiler. New York: Springer Pub., 1951. 614 pp. $7.50.

Into *Livestock Health Encyclopedia,* the author has packed an immense amount of information, which makes it useful to farmers and their advisers, and as a college text for students of medicine and pharmacology. By using a system of symbols and abbreviations, which are translated in two pages at the back of the book, this condensation of knowledge is achieved. The plan does not detract from the reading, in this reviewer's opinion. Whether it will confuse farmers or will be too technical for them remains to be seen.

Allied fields—i.e., wood preservation—for which drugs are used on the farm, are covered, as well as animal health. With so much information packed into 614 pages, there is but little space to tell readers "how to do it," but it is not a how-to-do-it book—