DIRECTION OF SOLUTION FLOW AND THE FORMATION OF MINERALS

IN a moving solution the field of environment and any resulting chemical activity are asymmetric with respect to a plane normal to solution movement. Crystal products formed in the laboratory in a moving stream of solution display a number of features peculiar to each end of the polar axis of flow. Mineral and ore specimens show similar asymmetric features which may be recognized in one mineral species and also by the relations between two or more species. The idea is also extended to larger scale geological bodies where the same principle of asymmetric development of mineral bodies (ore deposits) should obtain.

The problems differ in open space fillings and replacements, but the principles of asymmetric development, linearity, linear distortion and stoss and lee effect are common to both. Investigation is continuing in the interrelation of these features and the structural relations of both open space fillings and replacement deposits.

W. H. NEWHOUSE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SCIENTIFIC BOOKS

SCIENCE IN THE SOUTH

Scientific Interests in the Old South. By THOMAS CARY JOHNSON, JR. viii + 217 p. New York and London: D. Appleton-Century Co., Inc., For the Institute for Research in the Social Sciences, University of Virginia. 1936. Price $2.50.

THIS is a source book of details derived from an extensive and exhaustive review of available sources, books, periodicals, newspapers, catalogues and ephemeral publications of universities, colleges, academies, seminaries, museums and other educational enterprises south of the Mason and Dixon line prior to the Civil War. The author's theme is the refutation of the summary indictment by Morrison in "The Oxford History of the United States," volume 2, page 15, of the "non-existent intellectual life" of the South, due to the cultivation of cotton, the neglect of men and the blight of human slavery. The data assembled tend to support his defence, for they display a wide-spread and active interest in the physical, chemical and medical fields, and a considerable though desultory activity in the natural sciences. An outstanding center of scientific activity was Transylvania College, with its impressive catalogue of scientific apparatus and book bills listing a very complete collection of early nineteenth century memoirs. "It passed its zenith in 1826." Charleston was another brilliant center of scientific interest. Here the Elliott Society of Natural History started off in its *Proceedings* (1859) with a fine display of productivity only to be snuffed out by the war. New Orleans, with its considerable infusion of French blood at a period of intellectual activity in Paris, also became noted for its interest in scientific matters.

The arrangement of the material does not facilitate consultation from a scientific approach except by way of the index. The subject-matter is grouped under such headings as "in college halls, among the people, sweet Southern girls, the glory that was Charleston, the glamour of New Orleans, and scattered scientists." This aroma of a social and historical approach to the subject pervades all the chapters. Details of evidence of educational interest abound, but a synthesis of accomplishment in the several disciplines of the sciences is not achieved. There is a noticeable absence of evidence of sustained scientific activity by productive investigators in scientific fields. The publications cited at considerable length from De Bow's *Review* (New Orleans, 1846–1880) are mainly of a general or popular nature, or are reviews of publications elsewhere. The *Southern Review* (Charleston, 1828–1832), the *Southern Quarterly Review* (New Orleans, Charleston and Columbia, S. C., 1842–1856), and the *Literary Messenger* (Richmond, 1834–1864) all contained some scientific articles of this general character indicating a wide-spread interest in science, but there is nothing in the South comparable to the American Philosophical Society of Philadelphia, the Linnaean Society of New York or the American Academy of Arts and Sciences of Boston. The early interest of the South in these organizations fell off in later years, and no local academies of significance were originated locally in the South.

The author cites with just pride the scientific eminence of Dr. William Charles Wells, of Charleston, South Carolina. This pioneer is cited for his anticipation of the theory of natural selection. Wells undoubtedly owed much to Dr. Alexander Garden, his Charleston mentor and correspondent of the Royal Society of London. He also utilized his medical knowledge of tuberculosis and malaria gained in native Carolina as data for his concept of natural selection operating differentially upon white and Negro races of man. But Wells was educated in Edinburgh, and was driven out of the States because of his vigorous loyalist sympathies. Later he was a member of the medical faculty in London and a member of a coterie of leading intellectuals, including the Hunters, Baillie and others. He

was a member of the Royal Society of London, and all his scientific work was done and published there. The author cites the sixth edition (1873) of the "Origin of Species" as the place of acknowledgment by Darwin of the priority of Wells's publication of the concept of natural selection, whereas Darwin first published this in the fourth edition (1866, p. xiv). Wells was not only a pioneer in evolution and physics (of dew) but also in ophthalmology (theory of vision) and epidemiology.

Scientists are peculiarly subject to environmental influences. Their best work has been done under the aegis of intellectual freedom. Wells spent his energies in Carolina in political turmoil. Fortunately, science knows no race, nationality nor region.

CHARLES A. KOFOID

SPECIAL ARTICLES

YELLOW FEVER VIRUS IN JUNGLE MOSQUITOES[1]

UNTIL recent years yellow fever was regarded as a house disease, transmitted solely by the domestic mosquito, *Aedes* (*Stegomyia*) *aegypti* (Linnaeus). The existence of a special epidemiological type of the disease, now known as jungle yellow fever, became evident when it broke out under rural and jungle conditions in the Valle do Chanaan, Espirito Santo, Brazil, in 1932. During the course of the epidemic no trace of the classical vector could be found in the infected area.[2]

Since then over 20 similar outbreaks have been observed in various parts of South America (Colombia, Peru, Bolivia, Paraguay and most of the Brazilian states.)[3] Study has shown that during such outbreaks man is generally infected only while in contact with the forest or jungle. Household infections are not common, except where the house stands within the jungle.

It has been shown experimentally that a number of Brazilian mosquitoes other than *Aedes aegypti* can become infected under laboratory conditions. Successful transmission by bite, however, has been obtained only with three species: *Aedes scapularis* (Rondani), *Aedes fluviatilis* (Lutz) and *Haemagogus capricorni* (Lutz).[4,5,6,7,8]

The 1938 outbreak of jungle yellow fever in the state of Rio de Janeiro, Brazil, afforded an opportunity to demonstrate the presence of yellow fever virus in mosquitoes caught in the jungle. Mosquitoes collected alive at points near where human infection had occurred were forwarded daily to the laboratory in Rio de Janeiro. They were first classified by species or groups of species and then allowed to bite non-immune rhesus monkeys.[9] After feeding on the monkeys the insects were tested for the presence of yellow fever virus by a method previously described[11] but briefly summarized as follows: They were killed, ground finely, suspended in a diluent and centrifuged, and the supernatant fluid was injected into mice intracerebrally. This report is based on results obtained with 24,304 mosquitoes sent in from the state of Rio de Janeiro over a period of eleven weeks, the following species being represented:

LIST OF WILD-CAUGHT MOSQUITOES TESTED FOR THE PRESENCE OF YELLOW FEVER VIRUS

Group	Species	Used	Fed	Remarks
1	*Aedes scapularis* (Rondani)	180	100	
2	*A. leucocelaenus* (Dyar and Shannon)	4,671	2,270	Positive by bite
3	*Haemagogus capricorni* (Lutz)	1,216	646	Positive by bite
4	*Psorophora ferox*	253	143	
	P. albipes	15	7	
	A. fulvus (Wiedemann)	8	5	
	A. serratus (Theobald)	1,570	545	
	A. terrens (Walker)	503	58	
5	*Saebethes*, 3 species	1,092	369	
6	All other sabethines (*Sabethoides, Limatus, Wyeomyia, Goeldia* and *Trichoprosopon* (*Joblotia*), totalling about 20 species	14,796	3,443	Positive by injection

Positive results were obtained from the following: (1) *Aedes leucocelaenus* (D. and S.). On February 22, Monkey 5, on which a total of 16 *A. leucocelaenus*

[1] From the Cooperative Yellow Fever Service of the Ministry of Education and Health of Brazil and the International Health Division of The Rockefeller Foundation, Rio de Janeiro.

[2] F. L. Soper, H. A. Penna, E. Cardoso, J. Serafim, Jr., M. Frobisher, Jr., and J. Pinheiro, *Am. Jour. Hyg.*, 18: 555–587, 1933.

[3] F. L. Soper, *Quart. Bull. Health Org., League of Nations*, 5: 1–50, 1936.

[4] We are indebted to Dr. P. C. A. Antunes for the recent information that *Haemagogus janthinomys* (Dyar) 1921 is a homonym of *H. capricorni* (Lutz) 1904.

[5] N. C. Davis and R. C. Shannon, *Jour. Expt. Med.*, 1: 803–808, 1929.

[6] N. C. Davis and R. C. Shannon, *Am. Jour. Trop. Med.*, 11: 21–29, 1931.

[7] L. Whitman and P. C. A. Antunes, *Am. Jour. Trop. Med.*, 17: 803–823, 1937.

[8] L. Whitman and P. C. A. Antunes, *Am. Jour. Trop. Med.*, 17: 825–831, 1937.

[9] The methods used for collecting, shipping, classifying and feeding will be dealt with in a subsequent paper.[10]

[10] R. C. Shannon, "Methods for Collecting and Feeding Mosquitoes in Jungle Yellow Fever Studies." *In preparation.*

[11] L. Whitman, *Jour. Exp. Med.*, 66: 133–143, 1937.