easily illustrated by shining a flashlight beam against the upright cap of a fountain pen and projecting the latter's shadow on a horizontal sheet of white paper. One heavy shadow and several lighter ones will be cast. Variations of the intensity of light of the minor shadows are due to the degree of reinforcement of the light rays (principle of Newton's rings). The actual breakdown of the sunlight into the various bands of color probably is accomplished by the moisture particles of the Canyon clouds.

An even more likely explanation of the phenomenon is that advanced by W. J. Humphreys:[1]

> Glory or Brocken-Bow. . . . When favorably situated, one occasionally may see rings of colored light around the shadow of his own head as cast upon a neighboring fog bank or cloud. This phenomenon, to which several names have been given—glory, Brocken-bow, Brocken-spectre, mountain-spectre—is produced by the diffraction by particles comparatively near the surface of light reflected from deeper portions of the fog or cloud.

[1] *Physics of the Air,* 1920, p. 537.

The reflected light obviously emerges in every direction, but the nearer one looks along the path of incidence the larger the ratio of illuminated to nonilluminated particles in his line of sight. Indeed, at any appreciable angle from this special direction a considerable proportion of the droplets in one's vision evidently must lie in the shadows of others nearer the surface. Hence, not only will the shadow of one's head be surrounded by the brightest reflected light, like the "heiligenschein" one may see around the shadow of his head on a bedewed lawn, but it will also be the centre of the brightest and only perceptible glory or reflected halo, and that for the simple reason that the more intense the initial light the more brilliant its diffraction effects.

No appreciable difference was noted when the phenomenon was observed along the path of the incidence light forming the shadow, as from a horizontal angle of thirty or more degrees from this path.

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Received December 15, 1953.

Book Reviews

Symposia of the Society for Experimental Biology, No. VII: ***Evolution.*** R. Brown and J. F. Danielli, Eds. New York: Academic Press, 1953. 448 pp. Illus. + plates. $7.80.

A symposium on "Evolution" was held under the auspices of the Society for Experimental Biology, in collaboration with the Genetical Society of Great Britain, at Oxford in July of 1952. The published volume contains contributions of 26 authors, 23 of whom are British, 2 American, and 1 Belgian. Nevertheless, the volume can hardly be said to represent a cross section of current British evolutionary thought. Several well-known figures are absent and, more important, no paleontologists are included. As nearly as one can classify the participants, 10 of them are primarily geneticists, 10 botanists or zoologists, and 6 physiologists and biochemists.

The symposium opens with an interesting though necessarily speculative discussion of the origin of life by J. W. S. Pringle. The formation of prebiotic organic compounds is attributed to branching chain reactions, rather than to ultraviolet radiations postulated by Haldane, Oparin, Bernal, and others. Perhaps the most general statements of modern views of evolutionary mechanisms are contained in the articles of K. Mather on The Genetical Structure of Populations, and of C. H. Waddington on Epigenetics and Evolution. Mather emphasizes that interbreeding Mendelian populations are important units of evolutionary change; Waddington stresses the homeostatic adjustments of the developmental processes brought about by natural selection.

To this reviewer, J. M. Thoday's discussion of the Components of Fitness is most thought provoking. Thoday defines the fitness of a unit of evolution (a Mendelian population or a species) as the probability that it will leave descendants after a lapse of a long period of time, such as 10^8 years. An increase of fitness is defined as evolutionary progress, and a decrease as retrogression. High fitness may be attained by development of genetic population structures which permit sufficient genetic stability together with some evolutionary plasticity, by increasing homeostasis, or by occupation of ecological niches which are preserved more or less intact for a long time. Adaptedness is, then, the ability of the organism to survive and to reproduce under contemporary environmental conditions. The difficulty, perhaps only verbal, with Thoday's definition of fitness is that, as far as this reviewer can see, the primordial virus must be adjudged to have been the fittest creature of all, since it has left most numerous as well as most diversified descendants. The evolutionary line leading to man need not be the most progressive one, since there is no compelling reason to believe that our species will have descendants living 10^8 years hence.

The work of H. Spurway on races and incipient species of newts is important and suggestive. The hybrids between these races show a heterosis in F_1, and a breakdown in F_2 generation and in backcrosses. Is the heterosis a direct consequence of heterozygosis for numerous loci? The hybrid breakdown indicates that the genotypes of the races are integrated adaptive systems which are shattered by recombination. The chromosomes of these races differ by translocations; the origin of the races is, accordingly, best accounted for by genetic drift interacting with selection. Origin of reproductive isolation by natural selection is indi-

cated also for species of *Primula* studied by D. H. Valentine. Another interesting contribution is the study of a blind cave fish from the Congo by M. J. Heuts. According to Heuts, the blindness is not a result of mutation pressure with relaxed selection, but rather of a heterogonic growth connected with low basal metabolism and slow development. Low metabolism is supposed to be favorable in cave environments because of food scarcity. The validity of this interpretation hinges on ecological data omitted from the paper. The complexity of adaptive consequences of some gene changes is emphasized also by P. M. Sheppard, whose study of genetic alterations taking place in a certain natural population of the moth Panaxia is the most thorough of its kind. Quite interesting and original are also P. B. Medawar's discussion of evolutionary problems raised by the viviparity in vertebrates, S. M. Manton's treatment of the locomotion in arthropods, and M. R. A. Chance and A. P. Mead's of social behavior as a factor in the evolution of primates.

The article of C. N. Hinshelwood on adaptation in microorganisms is in a class by itself, aiming as it does to circumvent the evidence that such adaptations occur in many instances through selection of pre-existing mutants. In his foreward to the symposium, J. B. S. Haldane regards Hinshelwood's contribution as "useful in presenting results comparable with those on which Lysenko's criticism of Mendelism is based." The matter is, however, adequately taken care of by M. Demerec and by D. G. Kendall; the occurrence of mutation in microorganisms is no longer in doubt.

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Contact Dermatitis. George L. Waldbott. Springfield, Ill.: Thomas, 1953. 218 pp. Illus. $8.75.

This is an excellent book in a specialized field, written and illustrated in such a manner that it is not only of value to the dermatologist and the allergist but also very readable for the general physician or others interested in this field. It has the unusual distinction of being written by an allergist and edited by a dermatologist.

Although the basic phenomena of contact dermatitis are discussed as to incidence, mechanism, pathology, and diagnosis, with adequate consideration of the determination of the causes by history and patch test, the uncommon feature of the work is the stress laid on the various patterns of contact dermatitis. Various tables and illustrations are helpful to the practicing physician or researcher.

Special situations are considered in separate chapters such as poison ivy, pollen dermatitis, cosmetics, soaps, wearing apparel, drugs, footwear, and occupation. Treatment with special emphasis on the care of poison ivy dermatitis is considered in a separate chapter. The principal contact agents and other contributing irritants are listed and discussed. A glossary together with a very complete bibliography complete the work.

The typography, illustrations, format, and paper are of superior quality.

Although the book does briefly mention the psychosomatic angles of contact dermatitis and emphasizes the misuse of the psychoanalytic approach, the opposite is more likely in the reviewer's opinion, i.e., the contact dermatitis angle of a specific case is much more often overdone by the average physician while losing sight of the nervous factors.

The author has wisely eliminated the chemical analysis of the various contactants leaving this problem more specifically for texts on occupational dermatitis.

This is an excellent book and is highly recommended for those interested in this problem.

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Books Reviewed in THE SCIENTIFIC MONTHLY

December

Eugenics: Galton and After. C. P. Blacker. Cambridge, Mass.: Harvard Univ. Press, 1952. 349 pp. $5.00.
Reviewed by C. Nash Herndon.

Introduction to Logical Theory. P. F. Strawson. New York: Wiley; London: Methuen, 1952. 266 pp. $3.50.
Reviewed by Paul C. Rosenbloom.

Along the Great Rivers. Gordon Cooper. New York: Philosophical Library, 1953. 159 pp. + plates. $4.75.
Reviewed by Herbert B. Nichols.

Atoms, Men and God. Paul E. Sabine. New York: Philosophical Library, 1953. 226 pp. $3.75.
Reviewed by A. Cornelius Benjamin.

The Itinerant Ivory Tower. G. E. Hutchison. New Haven, Conn.: Yale Univ. Press; London: Oxford Univ. Press, 1953. 261 pp. $4.00.
Reviewed by Marston Bates.

Succulent Plants: Other Than Cacti. A. Bertrand. New York: Philosophical Library, 1953. 112 pp. Illus. + plates. $4.75.
Reviewed by Edward J. Alexander.

Our Neighbour Worlds. V. A. Firsoff. New York: Philosophical Library, 1953. 336 pp. Illus. + plate. $6.00.
Reviewed by Frank K. Edmondson.

A Free Society. Mark M. Heald. New York: Philosophical Library, 1953. 546 pp. $4.75.
Reviewed by William E. Diez.

Heredity in Health and Mental Disorder. Franz J. Kallmann. New York: Norton, 1953. 315 pp. Illus. $6.00.
Reviewed by Laurence H. Snyder.

The End of the World: A Scientific Inquiry. Kenneth Heuer. New York: Rinehart, 1953. 220 pp. + plates. $3.00.
Reviewed by G. Gamow.