of ideas, movements or results. The task of bringing order into the apparent tangle of luxuriant growth of scientific and technological advances is almost an impossible one, but Professor Wolf has succeeded to a large degree in setting forth what is known. There is nothing particularly new in what the author has written; he has gathered his material from a rich source of original work of the great pioneers in each field.

The cultural aspect of science upon society should have been continually emphasized. One of the best examples of the influence of an institution upon an epoch was that of the Royal Society of London upon the life and thought of the colonial period of American history and culture. We find a good account of the experiments of Franklin with electricity in 1746 and succeeding years. These were the great pioneer days of research in static electricity, and Wolf has treated carefully of Franklin's influence on the principal workers in this field. However, as well as commenting upon Franklin fully and deservedly, the author should have included a better treatment of the work of other Colonial scholars such as Cotton Mather, Paul Dudley, James Logan and John Bartram, who did pioneer experimentation on plant breeding, and Zabdiel Boylston, who was famous for being the first in the Colonies to inoculate for smallpox. The Royal Society recognized these men and approximately fifteen other colonial scholars during the eighteenth century of colonial America, by electing them as fellows.

A true history of science can be written by covering one field by epochs, but not by encompassing the whole range of human thought and invention. The history of art, science or philosophy should be treated in the form of a great symphony in which interrelations are shown in movements, where each great crescendo seems to be the result of a gradual upbuilding of ideas, feelings and moods, all influencing the human soul in its constant struggle for greater self-expression and life. A historian can be a Beethoven, a Mozart or a Wagner.

However, as stated in the beginning, the reviewer takes the liberty of judging this book from an unusual point of view, that of a librarian or bibliographer. The constant demand upon this profession for appraisal of the worth of a book and its service to readers encourages the bibliographer or reference librarian to become specialized in some field of research. The librarian of to-day, in this country, is becoming more and more conscious of scholarship. He is aware of his superior modern library technique and is now seeking the cultural aspects of his profession. Standard reference or source books are the essential tools of the reference librarian, and to this class Professor Wolf's book belongs in large measure. What has been set forth in each chapter and sub-chapter is clearly and concisely stated, sufficiently so that if further details are required the reader is referred to the original source. Also, for the bibliographer who wishes to prepare a select or critical bibliography of original source references and biographies of the great scientists of the past, the material is readily available. Professor Wolf has used good judgment in his selection.

The index, in its treatment by author and subject, leaves much to be desired. In cases of more than three references to a scholar it should have been more descriptive or analytical. The table of contents does not aid us here, in spite of the fact that it is well prepared from another point of view. This is a disconcerting phase for the reference librarian. In seeking to ascertain the work of any scholar, as for example, Newton, Euler, D'Alembert, etc., one does not find complete reference to his accomplishments. For example, in the chapter on light, which is comprehensive for general reference, mention is made of Euler and his work on light, leaving us not quite certain that this was all he did. The index does not show his profound discoveries in mathematics and physics, but gives only a large number of blank page references which makes it difficult to find record of his work in other fields.

The format is good, the book being well printed on durable light paper, which was necessary in order to handle a volume of 814 pages conveniently. The illustrations and line drawings are carefully selected and printed, and the numerous portraits lend dignity and beauty to the volume, since they were printed on paper especially adapted for such work. Professor Wolf has placed before the librarian and general scholar a decidedly useful compendium of scientific, technical and philosophical knowledge of the eighteenth century, which should be on every reference shelf, private or public.

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BIRDS AND THE SPECIES PROBLEM

A Systematic Review of the genus Phylloscopus (Willow-Warblers or Leaf-Warblers). By CLAUD B. TICEHURST. British Museum (Natural History), 1935. Pp. 193. Two colored plates.

At first sight it might well appear that a revision of a genus of Old World Warblers (*Sylviidae*) would be of little interest to American naturalists, but I should like to recommend Dr. Ticehurst's book for supplementary reading in all biological laboratories. The method of presentation is so interesting and so adequate, that we seem to have revealed to us the very course of events by which new races and species arise. The work is based on the examination of about nine thousand specimens, and much field work. Under each species we have details concerning the breeding range,

and also the winter range, reached by migratory movements. The characters cited are divided into two groups, those which may be studied in the museum, and those which may be observed in the field. The latter include peculiarities of voice or song, which are often strongly characteristic of birds which would be hard to distinguish in life by vision alone. There are recognized thirty species, but these are increased to sixty-seven if we count all the subspecies. What is a subspecies? It is a recognizably distinct population which in some part of its range intergrades with one or more allied populations, all together constituting the species. Such subspecies, regarded objectively, may in certain cases owe their characters to the direct effects of a special environment. These have no proper genetic basis, and are not equivalent to true subspecies as recognized in taxonomy. But it is clearly brought out by modern research that genuine subspecies may have two different sorts of origin; they may arise by gradual differentiation from a parent stock, or they may be due to the crossing of two distinct types, which would otherwise be regarded as good species. In the one case, the subspecies represents a stage in the origin of species; in the other, it represents the breaking down of specific characters which have developed in isolation. Thus, for instance, Ernst Mayr in a paper just published, on the Birds of New Guinea, points out that *Megapodius affinis* and *eremita* are very distinct, but on Dampier Island they meet and freely cross, no physiological barrier having arisen to prevent it. Hence they must be treated as a single species. Ticehurst, in his treatment of subspecies of warblers, shows that a very curious condition may arise. He finds that two subspecies may develop from a common species, and spreading outward become increasingly distinct. At length, they may happen to invade each other's territory, and when so doing, may behave as perfectly distinct species, keeping distinct from one another. This happens in the case of the forms of *Phylloscopus trochiloides,* as is explained in detail, with a map. A very interesting case is that of *Phylloscopus borealis kennicotti* (Baird, 1869), the only member of the genus which reaches North America. It has evidently come over from Asia, and while it breeds in Alaska, it still migrates southward in the winter along the coast of Asia, and not at all along our Pacific Coast. The migration route is thus older and more persistent than the subspecies.

Another noteworthy fact is that whereas a species may go far south in migration, and thus have an immense range, it may nevertheless throw off satellites, if one may so call them, which become permanent residents somewhere along the path of migration. Thus *Phylloscopus collybita canariensis* is a permanent resident in the western group of the Canary Islands, while *P. c. exul* occurs only on Lanzarote, in the same archipelago. These cases recall some on the islands off the west coast of North America. *Regulus calendula obscurus* (also one of the Sylviidae) occupies Guadalupe Island; while the humming-bird, *Selasphorus alleni sedentarius,* instead of migrating to Mexico, is a permanent resident on Santa Catalina, San Clemente and Santa Cruz Islands.

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SOCIETIES AND MEETINGS

THE VIRGINIA ACADEMY OF SCIENCE

THE Virginia Academy of Science held its seventeenth annual meeting in Danville on May 4, 5 and 6 with weather conditions favorable for its two field trips, one in biology and one in geology. There was much interest in a new section on engineering, which presented a program of 16 papers.

The finance committee brought in an encouraging report, and so two new lines of work were undertaken by authorizing the incoming president to appoint (1) a committee to encourage the formation and foster the development of science clubs in the high schools of the state, (2) a committee to establish an official academy publication which will probably be known as the *Virginia Journal of Science.* The academy also referred to its conservation committee for especial consideration the problem of the conservation and preservation of the Dismal Swamp.

The academy prize of $50.00 was awarded to M. J. Murray and Forrest F. Cleveland, of Lynchburg College, for a paper entitled, "The Use of Polaroid in Depolarization Measurements on Raman Lines," and the Jefferson Gold Medal was awarded to G. M. Shear and H. D. Ussery, of the Virginia Polytechnic Institute, for a paper entitled, "Frenching of Tobacco Distinguished from Thallium Toxicity by Spectrographic Analysis."

In the sectional meetings Astronomy, Mathematics and Physics presented 20 papers; Biology 13; Botany 7; Zoology 10; Chemistry 26; Education 12; Engineering 16; Geology 18; Medicine 9; and Psychology 7, making a total of 138 besides a symposium on "Organic Analytical Reagents" and a round table on "The Problems of Applied Psychology."

The following officers were elected: Ruskin S. Freer, of Lynchburg College, *President;* Wortley F. Rudd, of the Medical College of Virginia, *President-elect;* E. C. L. Miller, of the Medical College of Virginia, *Secre-*