of infected insect vectors approximately 110 miles north into the largest population center of California.

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COMPARISON BETWEEN PRE-COLONIAL AND PRESENT-DAY OYSTERS

THE American Indian, who, prior to the sixteenth century, inhabited that area which is now the coastal region of Charleston County, South Carolina, made extensive use of *Ostrea virginica* as food. This is attested by the large number of Indian shell heaps found throughout the area. Any one familiar with the present-day oyster industry examining these shell piles immediately realizes that the size and evident quality of these pre-colonial oysters far surpassed those gathered to-day.

On the west bank of the Ashley River, about eight miles above Charleston, S. C., there is a large shell heap containing over 3,200 bushels of oyster shells. The geographic location of this shell pile is such that the oysters therein must have come from the nearby river. Practically all the oyster shells in this mound are over 3.50 inches from hinge to bill. To-day the Ashley River produces no oysters commercially, and even experimentally it is doubtful if any oysters could be gathered which would compare favorably with those from the Indian shell heap. Of course, the Ashley River is and has been for some years heavily polluted with sewage and mill waste. This pollution may have been the cause of the decrease in the size of the oysters of to-day.

In order to compare the size of pre-colonial oysters with present-day oysters in areas not affected by pollution, shells were collected from a large Indian shell heap on the edge of Sewee Bay, Charleston County, S. C. These shells came from oysters quite evidently gathered in the vicinity of Sewee Bay, which is far removed from any source of pollution. The largest individual oyster shell in this collection measured 8.00 inches long and 2.75 inches wide. Of 10 specimens selected as being the largest, the average length was 6.54 inches, with an average width of 2.56 inches. The average measurements of all specimens (50) were 4.29 inches by 2.51 inches.

From the same general locality, 290 live oysters were gathered from 15 different commercial beds. One hundred and forty of these specimens were chosen for their size, that is, the beds were carefully examined and these 140 individuals were selected as being the largest. The largest oyster in this group was 4.75 inches by 2.25 inches. The average of the group was 3.91 inches by 1.93 inches. In addition to this group, 150 oysters were gathered at random from the same beds. These were considered as being fairly representative of the oysters which could be gathered by commercial oystermen from this particular section of South Carolina. This group averaged 2.67 inches in length by 1.76 inches in width.

From these comparative measurements, the selected pre-colonial oysters were found to be 58.78 per cent. longer and 75.39 per cent. wider than selected present-day oysters. The ordinary pre-colonial oysters were found to be 62.23 per cent. longer and 76.89 per cent. wider than the ordinary present-day oysters, all of which were gathered in the vicinity of Sewee Bay.

These observations probably do not indicate that *Ostrea virginica* has become a smaller species in the past four hundred years. In all probability the small size of the present-day oyster is due entirely to intensive commercial fishing which does not allow it to reach its maximum growth.

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QUOTATIONS

THE ADVANCEMENT OF SCIENCE AND SOCIETY

DR. F. R. MOULTON, permanent secretary of the American Association for the Advancement of Science, addressed a communication to *Nature* which was printed in the issue of March 19, 1938. It reads:

Members of the American Association for the Advancement of Science have read with much interest the comments on their resolution on international cooperation of scientists which appeared in *Nature* of January 22, p. 150. As gratifying as these comments are, in one respect they differ somewhat from the spirit of the resolution.

Since I wrote the resolution and am suggesting to the Executive Committee that it extend formal invitations for an international conference of representatives of scientific societies to be held in London this coming summer, I should like the privilege of explaining the spirit of the resolution, which I believe represents the present sentiment of a large majority of the members of the American Association. By frank expressions of opinions well in advance of the contemplated conference we shall be able to make progress towards mutual understandings of possible slightly different points of view and thus prepare the way for constructive action at the conference, if it should be held.

The resolution passed by the American Association on December 30 was published in the article in *Nature* referred to above.

The preamble to the resolution consists of two distinct parts, the first of which acknowledges the profound effects of science upon society and thereby admits a heavy re-

sponsibility of men of science to their fellow men. The second part expresses the pure objectivity of science and states conditions only under which it can flourish permanently. Differing from the 1933 resolution of the American Association and from possible interpretations of the comments in *Nature*, this preamble is in no degree political or national. There is in it absolutely no note of criticism of governments or of social orders, for condemnatory words seldom lead to harmony and cooperation.

The resolution itself also consists of two parts, the first of which pertains only to the American Association. It expresses directly only what has long been a distinct policy of the association. For example, the Section on Medical Sciences is now organizing the tenth of its symposia, participated in by leading American specialists, on subjects (in this case mental health) of wide public interest and importance. Another section has held important symposia on various aspects of conservation of natural resources, while still another has made plans for five symposia on the general title "Science and Society," of which one has been held.

The second part of the resolution relates entirely to international cooperation of men of science. The invitation to cooperation is not dependent on racial, political or theological qualifications; it is open to every organization in the world the purposes of which are to spread the benefits of science to all mankind.

This sadly disordered world needs some new objective upon which it can focus its attention, some new course of procedure which it will ardently follow. It is possible that men of science can set up such an objective and gradually work out practicable methods for attaining it. Certainly, of all the conclusions that men hold, those of scientists are most easily verifiable and the methods of scientists are most easily evaluated and standardized. The verifiable nature of much of the work of scientific workers and the relative freedom of their conclusions from emotions and prejudices insures for them from the beginning a considerable amount of common ground. Possibly this common ground can be gradually enlarged until it will form a substantial basis for the general progress of civilization. Is it too much to hope that international problems of health, for example, that have been precipitated by the applications of science should be attacked and solved by scientists? Would not the altruistic spirit exhibited by science meet a compelling response in the general conscience of mankind?

Without anticipating what recommendations the American Association may desire to make respecting the purposes of the proposed conference, and not wishing to do more here than to open the question for preliminary discussions, I suggest three things that might be considered and attempted: (1) The formulation of a set of fundamental scientific principles of an ethical nature on which unanimous agreement of the delegates can be reached. (2) The formulation of the maximum number of inviolable methods of international intercourse and cooperation among scientists on which the delegates can unanimously agree. (3) The planning of the necessary machinery for making effective and enlarging the agreements reached in (1) and (2).

To the above communication P. G. H. Boswell, general treasurer, and F. T. Brooks and Allan Ferguson, general secretaries of the British Association, made a reply, which was printed in the issue of *Nature* for March 26, 1938. It reads:

We are glad to read the letter in *Nature* of March 19, under the above heading, from Dr. F. R. Moulton, Permanent Secretary of the American Association for the Advancement of Science. It need scarcely be said that the invitation from that body to the British Association to cooperate in forming the nucleus of a wider organization for this great object is engaging our earnest attention, and has already been brought to the notice of the council of the British Association. We look forward to meeting Dr. Moulton and some of his colleagues this summer, to discussing the project with them, and to having them with us at our meeting in Cambridge. It may be added in regard to the last clause in Dr. Moulton's letter concerning the "planning of the necessary machinery," that a scheme in rough outline has already been forwarded to him for informal comment, in the hope that it may prove possible, whether on the basis of that scheme or of some other, to lay practical proposals before the governing bodies of both associations at an early date.

SCIENTIFIC BOOKS

PHYSIOLOGICAL OPTICS

Introduction to Physiological Optics. By JAMES P. C. SOUTHALL. Oxford University Press, 1937.

ANY one acquainted with the author and his previous publications verifies his expectations of a creditable work on perusing this latest contribution. Professor Southall is modest in considering this an "Introduction" to the subject. It is such only in the sense that a single volume of reasonable size can not encompass all aspects of physiologic optics adequately plumbed to their depths. Some subjects, such as eyes, refraction and binocular vision, are discussed sufficiently for any general treatise. Color-vision and colorimetry are perhaps over-emphasized from an over-all view-point. Psychophysiological aspects are almost entirely ignored. In brief, the discussions are chiefly confined to certain aspects of vision and rarely touch the larger realm of seeing.

In fairness, it should be stated that Professor Southall has confined himself to the ground rules which he established in the preface. The boundaries of physiologic optics have not been established by any absolute authority and, therefore, an author may place them where he wishes for his particular purpose.