occurrence of these organisms will probably indicate a much more wide-spread distribution in oceanic waters.

Pure cultures of ten species of the marine cellulose-destroying fungi have been obtained from wooden test blocks which had been permanently submerged for six to ten months in the sea. Several other species have been isolated from specimens of decaying piling collected by the author in various Massachusetts harbors. The wooden test blocks as well as valuable data have been supplied through the courtesy of the William F. Clapp Laboratories in Duxbury, Mass. The organisms thus far isolated belong to the Pyrenomycete group of the Ascomycetes and to several groups of the Fungi imperfecti. In certain species the spores and the mode of spore dispersal indicate adaptation to aquatic conditions. In many cases the abundant occurrence of black perithecia on the surface of test blocks and other specimens has facilitated the isolation of pure cultures.

Histological and micro-chemical examination of infected material shows that the fungi bring about a rapid enzymatic hydrolysis of the cellulose in the thick secondary walls of plant fibers. The fungal hyphae penetrate with ease the cell walls of both hard and soft woods as well as those of the various fibers used in cordage. The exposed portions of plant materials attacked by the organisms exhibit a marked deterioration involving loss of cellulose and concomitant reduction in tensile strength.

Extensive studies of these fungi are now in progress to determine their rates of growth on various substrata.

Dr. David H. Linder, of Harvard University, is collaborating with the author in this series of investigations. A joint publication is now in preparation concerned with the morphology, taxonomy and physiology of these organisms.

It is deemed desirable to make a preliminary statement at the present time on the existence of these hitherto unreported marine fungi, owing to their extremely common occurrence and considerable economic significance, particularly in the destruction of cordage and other plant materials exposed to marine conditions.

E. S. BARGHOORN, JR.

DEPARTMENT OF BIOLOGY,
AMHERST COLLEGE

TOO HOT FOR THE DINOSAUR!

THE point to the Dinosaurian bird resemblances is that these recur over a long reach of geologic time and never appear assembled in any one type. An allowable inference is that the Dinosaurs in the course of their long deployment made some approach towards warm-bloodedness; while the respiratory function may have varied markedly within the group as time went on. Certainly as the Cretaceous waned a much changed respiratory balance ensued. The photosynthetic oxygen release of the more and more distinctly dicotyledonous forests heralded the mammals and the birds.

Also, the laying down of heavy beds of coal and eras of limestone formation meant that an age-long abundance of aerial carbon dioxide, the breathing stimulus, was no more. There the Dinosaur failed; and in all his later life there is merely discernible a course of resistance to environmental change. Continental planation in later Cretaceous time was marked; but taking climate and the food supply there must have been left over many an "asylum" in which the Dinosaur could have lived on, bar that fatal lack of carbon dioxide. In its presence the Dinosaur had earlier lived through several periods of relative climatic warmth.

Admissibly, "the earth makes its own climates." Thus the surficial internal heat must have tended to lessen as Mesozoic times ended and the emergence of the Andines and the Rockies began. Global temperature was then merely normally warm for the Dinosaur far into northerly latitudes. Though, then, the plus and minus chemistry of respiration led to the end of that stupendous reptilian brood. In its stead arose the mammals and birds.

As between origin and extinction the atmospheric oxygen-carbondioxide ratio becomes a foremost factor. As assumed, a late Cretaceous withdrawal of much carbondioxide would have had a worldwide cooling effect fully balancing warming due to continental planation. Hence the time is here when the animal and plant physiologist and the geologist are much in need of coordinating their studies. For there stand adposed in the Mesozoic the Dinosaurs and the Cycadeoids. Were not the factors of origin and extinction complementary for both?

G. R. WIELAND

CARNEGIE INSTITUTION
AND YALE UNIVERSITY

THE DIFFUSION OF SCIENCE[1]

THE individual scientist in the vanguard has been able to win to his understanding and eminence only by a lifetime of the most arduous and painstaking thoroughness. He has watched the pernicious social

[1] Excerpt from "The Diffusion of Science" by J. L. Bennett, Chapter III, pp. 51–53. The late Jesse Lee Bennett, of Baltimore, wrote and worked actively in the field of adult education and the diffusion of knowledge. He left a manuscript ten years ago which his mother has just had published by the Johns Hopkins Press, "The Diffusion of Science." This, to me, seems to be a very important book, and from it I have had a short excerpt copied which is so well expressed that I believe that it would be generally helpful to reprint it in the pages of SCIENCE.—JOSEPH L. WHEELER.

consequence frequently resulting from a few careless or hasty words on the part of some fellow scientist. He has come increasingly to understand the need for the most relentless precision of expression. He has come to realize ever more keenly the enormously complicated nature of all the phenomena investigated by science. He finds it increasingly difficult to make clear to untrained men the conclusions to which his patient, lifetime work have brought him. He finds himself perplexed and annoyed by the dangerous implicit fallacies and errors in the writings of "popularizers" seeking to give the general population some understanding of the work of himself and his confrères. For progress in his own speciality, unceasing concentration upon his researches is necessary. Inevitably he loses something of the common touch, he finds himself ever less interested in the reflection of contemporary life given by magazines and newspapers, he finds himself unable to give the attention necessary to understand the reality underlying contemporary political movements and bringing into prominence conspicuous political personalities. Naturally, he is drawn to those men who are equipped to understand his work—his fellow scientists throughout the world. Every day brings him reason to doubt the capacity of the masses of the population to understand the work with which he is concerned. When, occasionally, he seeks to lend assistance to movements apparently seeking social betterment he is generally perplexed or shocked by the obstacles, intrigues, and ignorances he encounters. However strong his sense of social responsibility, he finds it difficult or impossible to make any effective contributions save in his own work. He realizes that he is performing a highly specialized social function. He comes generally to feel that those concerned with the other highly specialized social functions of government, religion, journalism, education, are performing their tasks in the same spirit in which he attempts to perform his own and that any methods by which he might effectively cooperate with them are difficult to perfect and require thought and energy which his own activities do not allow him. As an actual problem confronting every scientist this situation and this conclusion seem inescapable. Yet, the fact remains that the body of thought with which these scientists, as a world-wide group, are concerned is relatively disinterested and comprises the most enduringly precious possession of mankind, while the activities and concerns of those dealing with government, finance, commerce and all the other complicated general social activities of man are inevitably influenced by considerations arising from self-interest. They are, moreover, socially valuable only to the degree in which they are influenced by the broad social vision which can result only from the knowledge gained from these men in the vanguard, insulated from the great mass of the population and isolated from the daily concerns of men by the wall which all the considerations we have stressed have served to erect.

QUOTATIONS

THE FOOD-PRODUCING POWER OF GREAT BRITAIN

THREE years of war have seen a great increase of our food-producing power. In this time, in what is potentially from the standpoint of the scientist a magnificent agricultural country, agriculture has been more substantially improved than in any previous period, even ten times as long.

To four factors are due the progress made: the farmers and their workers, the Women's Land Army, a great increase in mechanical power on the land, and the application of scientific knowledge. And influencing the form of the progress made has been the policy of the Government, with three outstanding aspects: (1) to plough up grassland for the production of crops for man; (2) to adjust livestock numbers; and (3) to ensure better farming and more from every acre.

In all this the application of science has played an important part. For instance, a large part of the success of the ploughing up campaign may be attributed to making good deficiencies in the soil. There were large stretches of soil which, deficient in lime or phosphates, would not produce good crops or grass. Farmers, by practical experience, had discovered the cause and acquired skill in dealing with it; but science has now supplied a complete remedy. It has been widely applied by the various agents of the Ministry of Agriculture, and in consequence many thousands of acres which had a poor reputation formerly have been made to yield handsome crops. Giant machines and gelignite have helped to reclaim for cultivation swampy fen, the tree-covered tops of downs and bleak mountain sides, but the foundation on which this activity rested was knowledge of the soil and application of the necessary fertilizers.

Last year alone scientific staffs supplied by the Ministry of Agriculture were responsible for 115,000 separate analyses of soil. The wire worm—the grub stage of a little beetle—which can do enormous harm to crops, has baffled the best scientists throughout the world for years, and no remedy is yet known. However, scientists can indicate whether a given piece of land contains many or few of these pests and so advise