

Books

Physik im Wandel meiner Zeit. By Max Born. 252 pp. Friedr. Vieweg & Sohn, Braunschweig, Germany, 1957. DM 19.80. *Reviewed by R. Bruce Lindsay, Brown University.*

This is a volume in the series "Einzeldarstellungen aus der Naturwissenschaft und der Technik" and is to a certain extent the German version of the book *Physics in My Generation* published by Pergamon Press (London and New York) in 1956, and already reviewed in *Physics Today* (June, 1957). There are, however, sufficient differences to warrant a separate notice of the present work. The article "Physics in the Last Fifty Years" (first published in *Nature*, 168, 625, 1951) appears in the English but not in the German version. On the other hand there are two important papers in the book under review which were not included in the English version. Both of these relate to Einstein. The first is a lecture delivered on March 18, 1955 at a meeting of the German Physical Society in Berlin to commemorate the appearance of Einstein's epoch-making work on relativity and light quanta in 1905. The second is a more popular lecture on personal reminiscences of Einstein (April 4, 1956). Both are decidedly worth reading for the keen insight Born displays into the fundamental significance of Einstein's discoveries and the beautiful clarity with which he reviews their essential features. Born's deep affection for Einstein as a man and his admiration for Einstein's genius shine forth from every page. They do not prevent him, however, from expressing his wonderment that the man who had so much to do with the establishment of the fundamental idea of the quantum theory should have found it impossible to accept quantum mechanics and its statistical interpretation as set forth by Bohr and the Copenhagen school, of which Born has been such a staunch defender. All students of physics and its history will find these essays delightful and rewarding reading.

A History of Luminescence: From the Earliest Times Until 1900. Vol. 44 of *Memoirs of the American Philosophical Society*. By E. Newton Harvey. 692 pp. The American Philosophical Society, Philadelphia, Pa., 1957. \$6.00. *Reviewed by L. Marton, National Bureau of Standards.*

One usually judges a book by comparing it with some other book, which covers the same ground. In the case of this particular book, such judgment is impossible. As far as I know, this book is unique in subject matter:

I know of no other history of luminescence. All of the work's properties, its advantages and shortcomings have to be judged therefore keeping in mind the uniqueness of its nature.

The author himself (as many of us know), is the greatest living authority on bioluminescence. Here I have given part of my story away. The book is a history of luminescence but not in the interpretation of the word as physicists use it. It contains what physicists call luminescence, but in addition it contains a vast domain of luminescent phenomena such as chemiluminescence, thermoluminescence, bioluminescence, shining fish, flesh, and wood, glowworms, the glowing of cat's eyes, the light in the warrior's eyes during battle, etc. It traces luminescence in history and in literature back to the earliest writings. It isn't a history in the sense of modern historical research where the evolution of ideas is in the foreground. It doesn't try to make us a contemporary of the investigator as is done in other modern books on the history of science as exemplified by the writings of Butterfield. Here we look down from our pinnacle of knowledge upon the less informed ancients, whereas Butterfield would take us back in time and knowledge so that we could experience the struggle to shake off authoritative misinformation and superstition in order to make an advance. In that sense it is old-fashioned history but with the most delightful aspect of old-fashioned history giving verbatim quotations from old writings in abundance. Some of these are so good that I can't resist the temptation of reproducing them here. Take for instance this quotation from Pliny in an early translation:

"In Hercinia, a forrest of Germanie, wee have heard that there bee straunge kinds of birds, with feathers shining like fire in the night season. In other respects, I have nothing to say of them worth the writing, save only they are of some name, for beeing ferre fetched."

Another example is taken from "Speculum Mundi" by John Swan:

"*Ignis lambens* is a cleaving and licking fire or light; and is so called because it useth to cleave and stick to the hairs of men or beasts, not hurting them, but rather (as it were) gently licking them. These flames may be caused two wayes, as the learned write.

"First, when clammie Exhalations are scattered abroad in the aire in small parts, and in the night are set on fire by an *Antiperistasis*; so that when any shall either ride or walk in such places as are apt to breed them, it is no wonder that they stick either on their horses, or on themselves.

"Secondly, they may be caused another way, vis. when the bodies of men or beasts, being chafed, do send out a fat and clammie sweat; which (according to the working of nature in things of this kinde) is kindled and appeareth like a flame.

"*Ignis fatuus*, or *foolish Fire* (so called, not that it hurteth, but feareth or scareth fools) is a fat and oily Exhalation hot and drie (as all Exhalations are which are apt to be fired) and also heave in regard of the glutinous matter whereof it consisteth: in which regard

the cold of the night beats it back again when it striveth to ascend, through which strife and tossing it is fired, (for in this encounter it suffereth an *Antiperistasis*) and being fired it goeth to and fro according to the motion of the Aire in the silent night by gentle gales, not going always directly upon one point, . . .

"These kindes of lights are often seen in Fennes and Moores, because there is always great store of unctuous matter fit for such purposes; as also where bloudie battells have been fought; and in church-yards or places of common buriall, because the carcasses have both fatted and fitted the place for such kinde of oyle Exhalations. Wherefore the much terrified, ignorant, and superstitious people may see their own errors in that they have deemed these lights to be walking spirits; or (as the silly ones amongst the Papists beleieve) they can be nothing else but the souls of such as go to Purgatorie, and the like. In all which they are much deluded: For souls departed (Eccles. 9. 5, 6.) cannot appeare again: . . ."

At the end of this quotation Dr. Harvey adds: "there can be no doubt of the religious affiliation of the author." Many similar quotations could be repeated here if we had the space. For all those who become interested by this review there is only one recourse to be taken—have a look at the book itself. I'm sure they will be rewarded.

All my praise doesn't mean there is nothing to be criticized about this scholarly volume. In fact, one of the criticisms which may be leveled against it is that it is almost too scholarly. It abounds in quotations. There are hardly any pages where there are not two or three extensive quotations given. For those, who like myself prefer their quotations readable, there is one reassuring appearance, all the quotations are translated into English and given in English only. This practice I approve of because I like a continuity of reading and not jumping from one language to another, even though I may be familiar with the original language.

The volume has been very handsomely produced by the American Philosophical Society. One irreverent question has to be raised. There are many places in this volume where footnotes call attention to the fact that some illustrious man, versed in the study of luminescence, has been a member of the American Philosophical Society. Is that kind of advertising really needed for such a venerable society?

Elementary Wave Mechanics with Applications to Quantum Chemistry (2nd Edition). By W. Heitler. 193 pp. Oxford U. Press, New York, 1956. \$2.90. Reviewed by H. Primakoff, *Washington University*.

Heitler's little book is an introduction to quantum theory from the Schrödinger wave mechanical viewpoint with particular emphasis on applications involving the interpretation of the homopolar chemical bond. A general discussion is also given of the theory of valence including a treatment of directional effects and of the origin of chemical activation energies. The book opens with chapters on the experimental basis of quantum

AN INVITATION TO JOIN ORO

Pioneer In Operations Research

Operations Research is a young science, earning recognition rapidly as a significant aid to decision-making. It employs the services of mathematicians, physicists, economists, engineers, political scientists, psychologists, and others working on teams to synthesize all phases of a problem.

At ORO, a civilian and non-governmental organization, you will become one of a team assigned to vital military problems in the area of tactics, strategy, logistics, weapons systems analysis and communications.

No other Operations Research organization has the broad experience of ORO. Founded in 1948 by Dr. Ellis A. Johnson, pioneer of U. S. Opsearch, ORO's research findings have influenced decision-making on the highest military levels.

ORO's professional atmosphere encourages those with initiative and imagination to broaden their scientific capabilities.

ORO starting salaries are competitive with those of industry and other private research organizations. Promotions are based solely on merit. The "fringe" benefits offered are ahead of those given by many companies.

The cultural and historical features which attract visitors to Washington, D. C. are but a short drive from the pleasant Chevy Chase suburb in which ORO is located. Attractive homes and apartments are within walking distance and readily available in all price ranges. Schools are excellent.

**For further information write:
Professional Appointments**

OPERATIONS RESEARCH OFFICE
ORO The Johns Hopkins University
7100 CONNECTICUT AVENUE
CHEVY CHASE, MARYLAND