

given in the book of Riemann-Weber. But what is now considered as the fundamental theorem of the subject, that if  $f(x)$  has its squared modulus integrable over  $(-\infty, \infty)$ , then so has  $F(y)$ , had only just been proved by Plancherel. Little use had been made of the theory in its up-to-date form, and no books on the subject existed.

To-day the position of Fourier integrals might be compared with that of power series in the old theory of functions. A Fourier integral is the natural way in which one represents functions of certain classes, and the various generalizations of the integral, such as the Stieltjes integral, enable us to bring wide classes of functions within the scope of the method.

The subject of the present book is the same as that of a book by G. Doetsch in the *Grundlehren der mathematischen Wissenschaften* series, but the details are widely different. This work begins with a very useful detailed account of the theory of Stieltjes integrals, and the Laplace integral is mainly considered in the Stieltjes form

$$f(s) = \int_0^{\infty} e^{-st} d\alpha(t).$$

The theory of the representation of a function of a complex variable  $s$  in such a form is established. Applications are then made to moment problems, to the theory of absolutely and completely monotonic functions, to Wiener's general Tauberian theorems and the prime-number theorem. After a discussion of the bilateral Laplace transform (with limits  $-\infty, \infty$ ) applications are made to the 'Stieltjes transformation'

$$f(x) = \int_0^{\infty} \frac{\psi(t)}{x+t} dt$$

and related topics. Much of the analysis is the author's own original work. This very lucid presentation of it will be welcomed by all students of the subject.

E. C. TITCHMARSH.

## THE NEW BIOLOGY

**Molecular Films, the Cyclotron and the New Biology**  
Essays by Hugh Stott Taylor, Ernest O. Lawrence and Irving Langmuir. (Rutgers University Publications of the One Hundred and Seventy-fifth Anniversary Celebration, No. 4.) Pp. v+95+24 plates. (New Brunswick, N.J.: Rutgers University Press, 1942.) 1.25 dollars.

THERE are many ways of celebrating an academic anniversary, though some, alas! are not available in war-time. The method adopted by Rutgers University to honour its one hundred and seventy-fifth anniversary has been to commission and publish a series of essays by men of distinction in science and learning.

One is always glad to hear from Dr. Irving Langmuir on any topic he chooses to handle; in this instance it is molecular films. He has a way of making profound things seem obvious which is very flattering to the intelligence of the reader. The remarkable results which are still flowing from the Berkeley cyclotron keep one on the *qui vive* for any new account by its inventor and director, Prof. Ernest Lawrence. There is no doubt that a collection of essays gains much if there is some more vital connexion between them than the mere fact that they

happen to be enclosed in the same covers. The theme of the present volume is the interrelation of the physical and biological sciences in the past, and the hopefulness for mankind of still closer co-operation between them in the future. The theme is stated explicitly by Prof. H. S. Taylor in his introductory essay on "Fundamental Science from Phlogiston to Cyclotron". "To go forward to meet the years of difficulty ahead," he writes, "we shall need the effort of all men of good-will among whom the scientist, by the nature of his calling, must certainly be numbered. The processes of mutual co-operation and assistance among the individual sciences must be multiplied. The isolation of one science from another must become progressively less and less even though the degree of specialization within a science becomes perhaps greater and greater. This calls for an increasing breadth of culture and of education among the scientists." Prof. Taylor's excellent survey of the history of science during the past 175 years is in the nature of a commentary on this theme. The essays by Dr. Langmuir and Prof. Lawrence provide, in fuller detail, forcible illustrations of the argument from science actually in the making.

In his essay on "Molecular Films in Chemistry and Biology" Dr. Langmuir deals mainly with the chemical aspect, contenting himself with pointing out that the method is one which must throw very considerable light, when properly applied, on many of the obscurer problems of biology. He is offering a tool which the biologists have still to make use of. The cyclotron has already captured the imagination of the biologists, particularly of the medical biologists, and Prof. Lawrence has much progress to report on subjects as diverse as the treatment of cancer, the action of enzymes and vitamins, the secrets of photosynthesis, and the digestion of proteins.

The book is not addressed specifically to the general reader—it assumes some acquaintance, at any rate, with scientific nomenclature—but it should not be difficult reading for anyone who takes an intelligent interest in the progress of the sciences. Biologists, both medical and lay, to whom it is particularly directed, should find it both fascinating and stimulating; though whether they will consider the subtitle of the volume, "The New Biology", to be, as yet, quite justified remains to be seen. That the new weapons now being forged will bring, as Prof. Lawrence predicts, "exciting new pioneer days of discovery" in biology as well as in physics and chemistry is already certain.

This brief review has, I fear, done rather scant justice to Prof. H. S. Taylor's admirable opening essay. By way of *amende*, I quote its concluding sentences. "The modern world, says Maritain, by which I mean that world which is coming to an end before our eyes, has not been a world of harmony between forms of wisdom, but one of conflict between wisdom and the sciences, and, he adds, it has seen the victory of science over wisdom. Have not we scientists, so to speak, to surrender that victory? We shall not yield our energy, our courage, our diligence in the search of truth. We shall but renounce the primacy to which a sick world has thrust us; and we shall gain by our renunciation. In the free world to which we still dare to look forward, with the soldiers and statesmen, artists, philosophers and priests we shall integrate our scientific skills with the social and spiritual aspects of human life and nature. Let this, we may pray, be an horizon not too far distant."

J. A. CROWTHER.