A CENTURY OF DARWINISM

LEST preoccupation with discordant matters of our day permit it to pass unnoticed, I venture to say that the month of June marks the one hundredth anniversary of Darwin's writing the first draft of the "Origin of Species." Referring to it in his autobiography he says, "In June 1842 I first allowed myself the satisfaction of writing a very brief abstract of my theory in pencil in 35 pages; and this was enlarged during the summer of 1844 into one of 230 pages, which I had fairly copied out and still possess." Darwin's son, who assumed responsibility for the publication of these two manuscripts, says, "It only came to light after my mother's death in 1896 when the house at Down was vacated. The Ms. was hidden in a cupboard under the stairs which was not used for papers of any value, but rather was an overflow for matters which he did not wish to destroy." These forerunners are indispensable to biologists who are interested in Darwin's views of evolutionary processes about a decade and a half before they were made accessible to his contemporaries through publication of the "Origin of Species by Means of Natural Selection" (1859). These manuscripts were first published in 1909 by his son, Francis Darwin, under the title "The Foundations of the Origin of Species" (Cambridge: University Press).

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QUOTATION

MR. McNUTT AND THE DOCTORS

THIS year's meeting of the American Medical Association is of extraordinary importance, since the time has come to take stock of our medical resources and to consider how they can be most effectively distributed to meet the needs created by the war. Paul V. McNutt appeared twice before the meeting to express the Government's dissatisfaction with what has been done thus far. As yet, neither the Government nor organized medicine has presented an adequate plan to meet our medical emergency. No program has been submitted to satisfy both the Army and the civilian population. Mr. McNutt threatened action by the Government if more aid is not forthcoming. His charge that only one third as many physicians volunteered in the first six months of this war as in the corresponding period of the last war indicates that not even the Army has been supplied with all the doctors it must have.

If we are to have an Army of 9,000,000 men, as Mr. McNutt suggested, the armed forces will need one third of all our physicians, including those who have retired. What is to become of the civilian population, especially where villages of a few hundred have mushroomed in a few months into communities of fifty and seventy thousand? To leave that problem to local practitioners is clearly no solution. "Doctors will have to be assigned on a voluntary or on some other basis," warned Mr. McNutt. We shall have to establish Federal medical facilities and experiment with new forms of medical practice. Lastly, there is the problem of rehabilitating the wounded and crippled veterans of this war—men to whom the nation owes a heavy debt. Here we face the task not only of restoring the handicapped to something like good physical condition but of training them for industrial tasks that they can perform.

Medicine, as Mr. McNutt rightly reminded his audience, is presented with an extraordinary opportunity. It is plain enough that doctors must not only rise to a critical occasion but that they must willingly engage in a social experiment which will clearly indicate what kind of medicine we must have if we are to carry out the implications of the Social Security Act.—*The New York Times.*

MORE ANTISEPTICS FROM MOLDS

THE fact that some microorganisms produce antiseptic substances—acting, of course, only on other unrelated species—has recently advanced from the sphere of purely academic interest towards that of practical application. The best known of these substances, penicillin, has been put on the therapeutic map by the work of Florey and his colleagues to which we referred last year, although difficulties of production still bar the way to extensive clinical trial. For some years past Dubos and others have been studying the antibacterial substances which can be extracted from cultures of *B. brevis:* one of these, now known as "gramicidin," has been shown to exert its action *in vivo*. Another example is actinomycin, isolated by S. A. Waksman and H. B. Woodruff from a streptothrix which they have named *Actinomyces antibioticus*. All these microorganisms have been identified either by chance or by selective breeding out from material containing an unknown and complex flora. As two of them are fungi it might well be worth while to study related species systematically with the object of finding others behaving similarly. This task has in fact been undertaken by H. Raistrick and his colleagues, and the work has been in progress for some years, in the course of which no fewer than

fifty products have been isolated from cultures of many more different moulds: they appear to be relatively simple compounds, for the molecular structure of many of them has been established, and in some cases they have also been synthesized. Raistrick and others have now described the isolation and properties of two of these compounds. Citrinin is formed by *Penicillium citrinum,* and penicillic acid—a quite different substance from penicillin—was first detected many years ago in *Penicillium puberulum,* found in mouldy maize, but has been obtained for this work in larger quantities from *Penicillium cyclopium.* When a suitable culture medium is used the yield of these substances is as large as 2 grammes per liter, and the processes of extraction and purification are simple; it appears also that the resulting products are stable. The investigation of citrinin and penicillic acid for biological activity has so far only reached the stage of simple *in vitro* tests of power to inhibit bacterial growth in broth. This power is possessed by both to a degree which ranks them below penicillin in activity against certain bacteria, a degree, nevertheless, which ought to be effective therapeutically should their application prove feasible. Citrinin acts almost exclusively on Gram-positive species; penicillic acid has also the power to inhibit the growth of the Gram-negative intestinal bacteria.

It was shown by Florey and his colleagues in various ways that penicillin exerts its bacteriostatic action not only in plain broth but in the presence of high concentrations of serum protein. Whether this is also true of citrinin and penicillic acid remains to be seen; from their similar derivation and behavior an affirmative answer is to be expected. It is an even more important point in favor of penicillin that it can be shown in many ways to be singularly harmless to the living cells of the body; this is another character which awaits investigation in these two new compounds, and unfortunately it is not one which can confidently be predicted, because some antiseptics of microbic origin are highly toxic. Raistrick and his colleagues are careful to point out that until the necessary biological tests have been made it should not be concluded that citrinin and penicillic acid will take their places as chemotherapeutic agents. They emphasize, nevertheless, that if such tests should prove favorable these compounds have an immense advantage over penicillin in that their large-scale production would be a comparatively simple matter. Their yield per liter of medium is actually two hundred times greater, and extraction is by a simple process. It is also noteworthy that their molecular structure is known, and although neither has yet been synthesized a study of the biological properties of related synthetic compounds might well yield interesting results.—*The British Medical Journal,* March 14, 1942.

SCIENTIFIC BOOKS

CHEMISTRY

This Chemical Age. By WILLIAM HAYNES. xxxii + 385 pp. Illustrated. New York: Alfred A. Knopf. 1942. $3.50.

THIS is a fascinating historical narrative of the miracle of man-made materials, by an author whose previous writings of this nature are well known. Sixteen full-page plates in stunning colors immediately set the layman in a receptive mood for this family album of familiar faces, of facts and figures, of historical anecdotes and of bits of characterizations.

The story of dyes (three chapters) starts with Perkin and leads through synthetic mauve, alizarin and indigo to the breaking of the great German Dye Trust and the birth of industrial organic chemistry in America.

Drugs (two chapters) relate the stories of quinine and of salvarsan, with an especially up-to-date family history of sulfanilamide in which we see Domagk and the I.G., Colebrook in London, and Long and Crossley in America.

Rubber (three chapters) shows Macintosh and his cheap solvent for rubber, Goodyear's vulcanization process, Oenslager's compounding of rubber, closing with a résumé of modern rubber substitutes, neoprene, Thiokol and butadiene rubbers.

Petroleum (one chapter) flows from Titusville to iso-octane; but Houdry and alkalation are too young to be included in the album.

Textile fibers (three chapters) stretch from Chardonnet rayon to Carothers' nylon polymers and include lanital and Aralac from milk.

Plastics begin with Hyatt's celluloid and end in the next chapter with Bakelite. Unfortunately, the newer polymerization plastics, such as the methacrylates, are scarcely mentioned. Separate chapters review the history and chemistry of perfumes, the Hercules Powder Company's program for naval stores and Creighton's electrolytic processes.

A final interesting chapter on "Our Chemical Armory"—potash, nitrogenous explosives, chemical war gases and incendiary bombs—is included for enthusiastic air-raid wardens.

A simple glossary and a splendid index conclude the book.

The freely flowing narrative is marred, at times, by inaccuracies of the most elementary chemistry—for instance, phosphorus is classed as a metal on page