stood until it was recognized that most of the fossils are not limited so much by age as by association with lithologies that intersect chronologic planes. The deltageosyncline is a geometric form; lines of equal thickness—isopachs, reflecting depression, do not conform necessarily to the lines of similar lithology—isoliths, influenced by the many factors affecting the surface of deposition.

The autogeosyncline is illustrated by the middle and late Paleozoic of southern Michigan. There is strong correlation between the basin structure, shown by contours of depression on a single stratigraphic plane, and the isopachs of Silurian and younger Paleozoic sediments. Successive rock units are thickest in the center of the state because that area was sinking most rapidly, the structure developing as the deposits were laid. The Illinois Basin developed similarly during the late Paleozoic. The autogeosyncline in Michigan and the deltageosynclines in Pennsylvania are separated by a less depressed belt that is the northern end of the Cincinnati arch. Autogeosynclines form within the craton without a complementary highland; the causes of their advents and passings are obscure, but they have definite durations. The present structures of some basins reflect their autogeosynclinal origin; other autogeosynclines have been folded and faulted so as to obscure the earlier behavior, or are concealed by sediments of different structural pattern.

The early geosynclines have striking correlation or coincidence with some major structures of the continent. The western belts retained much of their early character until the middle Mesozoic. There are very few west-derived sediments in the miogeosynclinal belt, and they can have come from uplifted eugeosynclinal rocks. In the Nevadian revolution of the mid-Mesozoic late Jurassic, the belt that included eugeosynclines was thrust on the miogeosynclinal belt in some areas, such as central to southwestern Nevada, and was invaded by batholiths. The resultant highlands spread detritus eastward to form the great deltageosynclinal belt of the Cretaceous on the western craton. In the Laramian[2] revolution at the close of the Mesozoic, the miogeosynclinal belt was thrust on the craton along much of its length, and invaded locally by batholiths; folds and minor thrusts formed in the deltageosynclinal belt on the craton. Subsequently, block-faulting in the Cenozoic era behind the thrusts produced the present Basin Range structure.

In the East the eugeosynclinal belt was thrust on the relatively narrow miogeosynclinal belt in the Taconian revolution at the close of the Ordovician. Deltageosynclines extended on the craton before and after the orogeny. Deposition in the eugeosynclinal belt terminated with folding and intrusion of batholiths in the Shickshockian disturbance of the later Devonian. In the southern Appalachians, the Appalachian revolution at the close of the Paleozoic thrust rocks of the Ordovician miogeosynclinal belt on the craton. Subsequently, normal faults developed in the lee of the thrusts, producing the rift-bounded geosynclines (taphrogeosynclines) of the early Mesozoic Triassic of the Atlantic Coast. Thus the structural sequence in the East closely resembles but antedates that in the West. The times of some of the events in each region are not as precisely known as the statements suggest. Moreover, this is but a description of the development of two orogenic belts; one must not assume that all had the same history.

The relationship of the Appalachian Structural Front, the northwestern major fold of the mountain system, to early geosynclines, emphasizes their plurality. The Front lies within the late Paleozoic Lower Pennsylvanian miogeosyncline from Alabama to central Virginia, where the folds trend northward in an arc into central Pennsylvania, leaving the miogeosyncline to enter an area having thick medial Paleozoic deltageosynclines. The folds tend to coincide with the area of greatest thickness of sediment, but the latter is composed of geosynclines of different types and ages. The cratonal flexure of the Lower Pennsylvanian miogeosyncline lies west of the Adirondack line, defining the Ordovician miogeosyncline, crosses it about Maryland, and is to the east in the north. Thus there is not an Appalachian geosyncline, but there are geosynclines of several sorts and of differing ages in the Appalachian region.

This has been an endeavor to emphasize distinctions among North American geosynclines, and express them in classification. Not all geosynclines are as typical, for some have been formed under plural influences, others are of sorts that have not been considered. The discussion may give a better understanding of the continental plan—if it encourages closer analysis of the deposits that confront the geologist, it will serve a good purpose.

[2] Nomenclature is simplified by considering the Laramides to be the structures of the Laramian revolution, the Nevadides, those of the Nevadian, etc.

OBITUARY

JESSE G. M. BULLOWA

IN the death of Dr. Jesse G. M. Bullowa, since 1928 clinical professor of medicine at New York University College of Medicine, science lost a keen and competent research worker, medicine an experienced practitioner and teacher and numerous patients a skilful

and versatile physician. As a colleague of long standing remarked, it will take many men to pick up the threads of his diverse activities.

Dr. Bullowa was born in New York City on October 19, 1879, and following his graduation from the College of the City of New York (1899) studied medicine at Columbia University, where he won a graduation prize (1903). He served as consulting physician at several hospitals and as visiting physician at a number of others, including Riverside Hospital, Willard Parker Hospital, the Municipal Sanitarium at Otisville, N. Y., and Harlem Hospital, where he was in charge of the pneumonia service. In collaboration with the late Dr. William H. Park and others, he developed efficient methods for the treatment of lobar pneumonia with refined specific antibacterial sera, quite a task when one remembers that apart from other kinds of etiological organisms, there are about fifty recognized types of pneumococci. He died on November 9, 1943.

He also did pioneer work in the development and use of oxygen tents in the treatment of pneumonia, and enlisted the aid of Mr. Lucius Littauer, serving as trustee of the Littauer Foundation, endowed to finance medical research. In 1936, Dr. Bullowa discussed his pneumonia researches before the Second International Microbiological Congress in London.

With the advent of the sulfa drugs, he coordinated their use, in pneumonia, with that of specific sera, and had started work with penicillin as a means of fighting the resistant Friedlaender bacillus.

In 1919 he published a translation of Bechhold's "Colloids in Biology and Medicine." In 1937, the Oxford University Press published his book, "The Management of the Pneumonias"; and in 1939 there appeared his book, "The Specific Therapy of the Pneumonias." Apart from these, he published about 160 papers on a wide variety of scientific and medical subjects, including the influence of colloidal protection on milk, Roentgen-ray studies of bronchial function and practical applications of basal metabolism. He was elected to membership in the honorary societies, Alpha Omega Phi and Phi Beta Kappa.

Dr. Bullowa's selfless devotion to his patients exemplified the highest ideals of the medical profession. It is men of his mold that bring increased honor and respect to the professions they practice. He was a well-grounded and successful diagnostician, although he once jocularly remarked that, because of inherent difficulties and uncertainties, diagnosis is the art of shrewd guessing, the ability to discern the basic cause underlying the available evidence. Apart from his personal practice and research, he taught others his skill and his ideals.

JEROME ALEXANDER

RECENT DEATHS

DR. WILLIAM D. HENDERSON, physicist, director of the extension division of the University of Michigan, died on May 26 at the age of seventy-seven years.

DR. WILLIAM MASON GROSVENOR, consulting engineer of New York City, president of the W. M. Grosvenor Laboratories, Inc., died on May 30 at the age of seventy years.

DR. J. K. ROBERTS, physicist, fellow of Christ's College, Cambridge, died on April 25 at the age of forty-seven years.

A CORRESPONDENT writes: "The Rev. G. Birkmann, a retired Lutheran minister, died on May 17 at Giddings, Texas, in his ninetieth year. Any one doing research work with insects, birds and snails or other small organisms from the Gulf Coast of the United States is familiar with the name G. Birkmann, Collector, after the name of original descriptions written by the early systematists who worked in the southern United States. This information is given for the benefit of those who desire to have a complete record of those men who made possible the wonderful collections from southeastern Texas."

SCIENTIFIC EVENTS

SCIENTIFIC RESEARCH AND DEVELOPMENT IN GREAT BRITAIN[1]

A STATEMENT of the existing Government organization has now been issued as a White Paper under the title "Scientific Research and Development" to provide a factual background for the discussion of the part which the government can play in this field after the war. After describing briefly the constitution and functions of the Development Commission and of the three Committees of the Privy Council for Scientific and Industrial Research, for Medical Research and for Agricultural Research, and the organizations working under them, the statement outlines the existing organization in each of those government departments which is faced with special scientific problems peculiar to its own field of activities and administers research and development organizations of its own or has scientific advisers on its staff.

A further section of the White Paper describes the provision made by the government for financial assistance to the universities for fundamental research, and the final section, on coordination and control organization, deals with the Scientific Advisory Committee of

[1] From *Nature*.