found in the Lower Tertiary deposits in Patagonia are so similar to the skeleton of the marsupial Thylacine now living in Tasmania, that these animals have sometimes been referred to the same family. They have therefore been interpreted as indicating a former direct connexion between South America and the Australian region. In their palate and successional teeth, however, the Sparassodonts are more nearly similar to some of the early Tertiary primitive Carnivores known as Creodonts, which lived in the northern hemisphere and might well be regarded as also the ancestors of the Australian Thylacine. The Sparassodonts and the Thylacine, therefore, may be merely parallel developments from the same northern source, which migrated southwards by two different land-routes to the remote, widely-separated areas where they are now found.

Among the fossils discovered in late superficial deposits in Australia and some adjacent islands, there are species of a peculiar horned tortoise, *Miolania*, which has the tail armoured with rings of bone. A nearly similar tortoise, which has been referred even to the same genus by some authors, occurs in a rock of uncertain age in Chubut, Patagonia. Here again, at first sight, there seems to be evidence of a former direct connexion with the Australian region and South America. *Miolania*, however, belongs to a sub-order of Chelonians which had a very wide distribution over the northern hemisphere before it became specially characteristic of southern lands. The species found in Australia and South America may therefore be merely independent offshoots of the same source which have retreated south by different routes.

The same explanation almost certainly applies to the little Mesosaurian reptiles which are found in the Permian rocks of South America and South Africa, and have been quoted as part of the evidence that at the end of the Palæozoic era these two lands were directly connected. In the Coal Measures of both North America and Europe, which represent a somewhat earlier geological period, there are ancestors from which the Mesosaurians were possibly derived; and these reptiles may have gone south in parallel ways down the African and American continents. Similarly, the Dicynodont reptiles, which occur in slightly later rocks in both countries, may have wandered southwards independently, for they are known to have been distributed at the time over Europe, Asia and North America. These fossils therefore do not help to prove that South America and South Africa formed a continuous land when the reptiles in question were living; and the recent discovery of numerous large Rhynchosauria in the same rocks in southern Brazil suggests that there was no such land-connexion, because no trace of these reptiles has been found in the well-explored corresponding rocks in South Africa.

It is thus evident that when former changes in land-connexions are being discussed, it is not enough merely to compare lists of fossils. The precise relationships of each fossil need first to be determined so far as possible; and even if this precision can be reached, there are often alternative interpretations which have to be considered.

Obituary

PROF. H. B. BAKER, C.B.E., F.R.S.

THE recent death of Herbert Brereton Baker removes a familiar name from the roll of chemists who made their reputation before the opening of the present century. He was born on June 25, 1862, as the second son of the Rev. John Baker, curate-in-charge at Livesey, near Blackburn—a district in which the distress arising from the cotton famine was then intense, and the relief of which was a real concern of the Baker family. After a period of schooling at Blackburn, both boys were enabled, by sacrifice and rigid economy on the part of their parents, to become pupils at Manchester Grammar School. Beginning on the classical side, young Baker turned over to science, securing later a scholarship at Balliol, as well as a Brackenbury school scholarship. The teaching of chemistry at the Manchester Grammar School was then in the capable hands of Francis Jones, and Baker was always ready to acknowledge his debt to one whom he termed "the best of all teachers".

Baker's tutor at Oxford was H. B. Dixon, and the enthusiasm for investigation which the senior man possessed in an eminent degree was communicated to his pupil. After taking a first class in natural science, Baker was appointed demonstrator at Balliol and private assistant to Dixon; an association which led him to the main investigations of his life—the effect of moisture on chemical change.

In 1884 Baker was appointed chemistry master at Dulwich College, and on his initiative a science side was developed on the same lines as at Manchester. The chemistry department at Dulwich had already some tradition of research, and equipment for such work had been provided by Baker's predecessor, Alfred Tribe, best known, perhaps, as a collaborator with J. H. Gladstone. The tradition was more than maintained by Baker, and, in spite of heavy teaching duties, he published during this period a great deal of the work with which his name is specially associated. It is indeed a remarkable fact that Baker

was elected a fellow of the Royal Society in 1902, while he was still a schoolmaster.

After a short period as headmaster of Alleyn's School, he returned in 1903 to Oxford, succeeding Vernon Harcourt as Dr. Lee's reader at Christ Church. To a man of Baker's temperament the opportunities offered by such a post were naturally more attractive than the administration of a large school; and he took a prominent part in the long overdue reorganisation of the teaching of chemistry at Oxford.

In 1912, the year in which the Chemical Society awarded him the Longstaff Medal, Baker was appointed to the directorship of the Chemistry Department of the Imperial College of Science and Technology in succession to Sir Edward Thorpe, and this post he occupied until his retirement in 1932. It was not long before the placid course of academic teaching and research was rudely disturbed by the outbreak of war, and Baker was one of the first chemists called on in 1915 to deal with the serious problems of gas warfare; in this field he rendered distinguished service, taking a prominent part in devising measures of protection against poison gas, specially phosgene. His work was recognised by the award of the C.B.E.

The War over, Baker returned to the administration of a department overflowing with students, and to the research work in which his interests mainly lay. His position as one of the leaders of British chemistry was afterwards recognised by the award of the Davy Medal of the Royal Society in 1923, and by his election as president of the Chemical Society for the period 1926–28. Apart from his special scientific interests, Baker took a share in the activities of the University of London, and served for a number of years on the Senate and its committees.

Baker had married in 1905 Muriel, only daughter of H. J. Powell, partner in the Whitefriars Glass Works, herself a chemist and a collaborator with her husband in various researches. Mrs. Baker and a daughter survive him.

The starting point of Baker's life-work was Dixon's observation that a spark could be passed through a mixture of dry carbon monoxide and oxygen without any explosion occurring. A natural development was the study of the effect of thorough drying in other cases of combustion, and Baker was able to show that the combination of various solid elements with oxygen at a high temperature is enormously retarded, or even prevented altogether, provided stringent measures are taken to dry the apparatus and the materials. The successful distillation of phosphorus in dried oxygen was a striking case in point.

Following up these early observations, Baker studied the behaviour of thoroughly dried substances which ordinarily react—in some cases violently—with one another. Among the remarkable results of his drying technique was the proved absence of reaction in the following cases: (*a*) sulphur trioxide and lime, (*b*) hydrogen and chlorine, (*c*) ammonia and hydrogen chloride. It was further shown that the thermal dissociation normally characteristic of ammonium chloride and mercurous chloride does not occur when the substances are thoroughly dried. Subject to the same conditions, a mixture of electrolytic hydrogen and oxygen can be heated to a high temperature without explosion or even partial combination.

Many workers have attempted in vain to repeat these classical experiments. Baker showed, for example, that ammonia gas, previously dried by pure quicklime, could be finally desiccated over carefully purified phosphorus pentoxide without any appreciable absorption of the gas by the pentoxide. This has been frequently challenged, but it is now clear that he was entirely in the right, and that few have succeeded in reproducing his technique.

The earlier work on ammonium chloride and mercurous chloride led Baker, in collaboration with his wife, to examine the case of nitrogen trioxide. As hitherto prepared, this substance invariably dissociated on evaporation, but it was now shown that the thoroughly dried liquid could be vaporised without decomposition. The incidental observation that nitrogen trioxide had an abnormally high boiling point initiated an investigation into the influence of intensive drying on the physical properties of liquids generally, and in various papers and addresses to the Chemical Society between 1922 and 1929, Baker described determinations made of the boiling point, surface tension, vapour density, etc., of intensively dried liquids: many of these substances had been desiccated with phosphorus pentoxide over the War period. Intensively dried benzene, for example, was found to boil 20°–30° above the normal boiling point.

These remarkable observations have attracted much interest and not a little criticism. That the behaviour of substances dried by Baker's technique undergoes alteration seems fairly certain, but no quantitative assessment of this change (as distinct, say, from super-heating effects in the case of the boiling point) is yet available and no completely satisfactory interpretation of the phenomenon has yet been advanced.

Another field of research in which Baker was active was the determination of atomic weights. Tellurium, mercury and silver were cases in which collaborators under his direction applied the accurate manipulative methods of which he was a master.

Baker was first and foremost an experimentalist, and his skill in glass-blowing and other practical arts was plain to all who saw him at work. Chemical craftsmanship was his chief joy, and up to within a few weeks of his death, in spite of physical disabilities, he was to be found in his laboratory, devising and constructing apparatus for a fresh attack on old problems. Brereton Baker was a modest man of simple tastes and homely interests whose character and personality secured for him a warm place in the hearts of very many pupils and co-workers.

J. C. P.

WE regret to announce the death on May 14, at the age of sixty-eight years, of Prof. Edwin B. Frost, associate of the Royal Astronomical Society, and emeritus director of Yerkes Observatory.