germ cells. These are inherited as units, that is, are either present or entirely absent in the offspring according to whether they are what are now termed "dominant" or "recessive". Also, recessive characters can reappear in the second generation.

In 1902, Prof. B. Němec⁴ gave an account of the beginning of modern work on heredity, and by 1910 it was possible to correlate data dealing with the inheritance of acquired characters, variability and crossing in fruit trees. Even at this time the study of genetics in the Czech lands was linked closely with cytology, as is clear from the publications of Němec and Vejvodský⁵, particularly the work on mitosis and polyploidy in lower plants.

After 1919, work in this field developed rapidly, both academically and in its practical applications to agriculture. The Czechoslovak Experimental Agricultural Institute near Prague and the Biological Institute were founded and, among other matters, were concerned with the improvement of crop plants and the breeding of better-quality cattle. A barley with stronger stalks and fungus-resisting wheats were obtained partly through the work of Prof. J. Peklo, and work was in progress in connexion with varieties of tobacco and with plants the seeds of which were rich in oil, the object being to improve upon the qualities of existing ones. The Association of Sugar Manufacturers had its own seed selection and improvement station at Semčice in Bohemia, and from which emanated many publications relating to the production of disease-resisting beets with high sugar content⁶. State nurseries at Průhonice and large private ones at Blatná also conducted important experiments on the crossing of flowering plants. Large quantities of seeds of new varieties were distributed annually as a result of this work. They included in 1934:

6,356	quintals of spring wheat from 8 stations
5,987	" " " " " " " " 9 "
3,274	" " " " " " " " 7 "
24,688	" " " " " " " " 4 "
10.5	" " " " " " " " 2 "
270	" " " " " " " " 1 "
120	" " " " " " " " 2 "
12.9	" " " " " " " " 1 "
148	" " " " " " " " 1 "
7,506	" " " " " " " " 9 "

The breeding of sheep for wool, meat and milk (used in cheese-making) was conducted with some success under Prof. F. Bílek at the Zootechnical Department of the Agricultural Experimental Institute, whilst Dr. J. Kríženecy made much progress in the scientific control of results in poultry breeding.

The genetics of man received attention in Czechoslovakia both from its physical and its mental aspects. In the former came the work of Prof. J. Matiegka, Dr. V. Suk and Dr. J. Valšík⁷, whilst Prof. K. Helfort was concerned with the mental side. The Czech Eugenics Society and the Genealogical Society both base their activities on genetics, and among genealogies recently compiled from old records are those of J. A. Komenský, J. E. Purkyně (Pourkinje) and other Czechs prominent in cultural and artistic fields.

Perhaps the most outstanding work on genetics in Czechoslovakia was that due to Dr. Arthur Brožek (1882-1934), the first professor of genetics in the Charles University of Prague⁸. Brožek early applied mathematical methods to the elucidation of biological data, especially in his crosses of *Mimulus quinquevulnerus* with *M. tigrinus*. He produced, among other hybrids, a mosaic variety, *M. tigrinoides*

var. *Paulina*, during experiments that involved the emasculation and artificial pollination of thousands of specimens. He took more than 20,000 photographs and made still more records of details of the results of these crossings.

His experiments with albinos revealed that the phenomenon is not inherited according to Mendelian laws. Absence of chlorophyll is localized in the plastids and not in the chromosomes. Further experiments with *M. cardinalis* produced several multi-coloured varieties of pure strain. Microscopic examination revealed yellow plastids in the cells of the floral leaves in addition to the red sap which is present. In yellow varieties the sap is colourless.

Apart from these researches with *Mimulus*, Brožek was engaged with Bílek in experiments with caracul sheep and other animals and he wrote an exhaustive work in Czech on genetics⁹. In 1924, he visited the United States and for a time collaborated with Prof. C. B. Davenport and Prof. T. H. Morgan in their work on *Drosophila*.

In some ways it is possible that Brožek's work suffers from a lack of appreciation, though not to the extent that befell Mendel's. At present Czechoslovak biologists are unable to continue their work for the advancement of science, but it is clear that when the nation is again in control of its affairs research in this and other subjects will be resumed.

¹ *Abhandlungen Verh. Naturforscher-Verein in Brünn*, 4, 1 (1865). (A translation was given in *J. Roy. Hort. Soc.* in 1901.)

² Focke, W. D., "Pflanzenmischlinge" (1881). Peter, *Englers Bot. Jahrbuch* (1884), refers to Mendel's work on *Hieracium* published in the Brno journal, 8, 26 (1869).

³ Correns, *Ber. bot. Ges.*, 17, 158 (1900). de Vries, H., *ibid.*, 13, 435 (1900). Tschermak, E. von, *Z. landwirt. Versuch. Oest.*, 3 (1900).

⁴ Němec, B., *Ziva*, 12, 65 (1902); 13, 129 (1903). ("Polyploidy in Algae" and "Cytological Observations with Higher Plants").

⁵ Němec, B., "Das Problem der Befruchtungsvorgänge und andere Zytologische Fragen" (1910). Vejvodský, "Zum Problem der Vererbungsträger" (1912).

⁶ Bartoš, V., *Věstník C. Jednoty Repáru*, 1-5 (1922).

⁷ *Vlastivěda* (Prague, 1933). "Nauka o Plemeněch" (1929).

⁸ *Věstník C. bot. Společnosti*, 2, 1 (1922).

⁹ "Rostlinopis" (Vol. 5 of a comprehensive "Czech Handbook of Botany") (1930).

OBITUARIES

Prof. P. P. Bedson

It was a shock to learn of the death of Prof. P. P. Bedson, emeritus professor of chemistry of the former Durham College of Science, on April 4 at Hove, two days after his ninetieth birthday and our sending him a congratulatory letter thinking he was enjoying reasonably good health at four score years and ten.

Peter Phillips Bedson was born at Manchester on April 2, 1853, the third son of George Bedson, his second Christian name being taken from his mother. He was educated at Manchester Grammar School and graduated at Owens College under Roscoe, continued his studies in London (Dalton Scholar 1875), and in 1876 proceeded to Bonn to work for two years with Kekulé. On his return he spent the years 1878-82 on Roscoe's staff and then at the age of twenty-nine was elected to the chair of chemistry in the College of Science, Newcastle-upon-Tyne, which he occupied for thirty-nine years. He thus saw the rise of the College from the small beginnings to near its present stature. His first published work was from Manchester (1876) on the double compounds of ether with titanium chloride and vanadium oxychloride. At Bonn he worked on substituted phenylacetic

acids, an integral part of the indigo problem (1877).

On coming to Newcastle, Bedson showed courage in linking his chemical fortunes with those of the district by attacking the chemistry of coal. His pioneering work included the demonstration of the presence of paraffins up to pentane, the investigation of the wet oxidation of coal and the solvent action of pyridine. These methods have in later days proved of the utmost importance in the hands of Bone and Fischer. Other important aspects of his work were connected with the explosive nature of coal dust in air and the composition of colliery waters. He also demonstrated the presence of argon in rock salt, and as a regular lecture experiment he showed the rhythmic precipitation of copper ferrocyanide in gelatine many years before its rediscovery by Liesegang. With Charleton-Williams he translated Lothar Meyer's "Modern Theories of Chemistry" and in 1896 gave the Lothar Meyer Memorial Lecture in London.

Up to the end of last century, scarcely any student entering the College had any prior knowledge of chemistry, and as the numbers were growing rapidly, the staffing of his department invariably lagged behind the number of students to be instructed. Members of staff taught for thirty-five hours a week, including some evenings, and were fortunate to get Wednesday afternoon free for research! By contrasting these conditions with those obtaining in universities to-day, Bedson's original work constitutes a remarkable achievement. In addition to the above handicap, he became necessarily more involved in the administration of the rapidly growing institution, of which he became vice-principal; he was also later a justice of the peace.

Although of small stature, Bedson was of striking personality and a very successful teacher. His lectures, on the preparation of which he spared neither time nor trouble, were clear, logical and well illustrated by experiments. Cheerful and ever humorous, he was yet a strict disciplinarian of the old school, but was nevertheless loved and respected by his students, to whom he was affectionately known as 'Peter'. It is, however, alleged that on one occasion an errant student on being questioned by his professor replied that he was seeking salt-petre! His

chief recreation was music. He was a competent violinist and an ardent concert-goer.

He is survived by his lifelong helpmeet, Mrs. Bedson, and one son and one daughter, the former an eminent bacteriologist.

A few years after his retirement his successors founded "The Bedson Club" in honour of the man who had done so much to establish the School of Chemistry in the University of Durham. So his name goes on, though we mourn the loss of an able chemist and a father to King's College.

In the preparation of this note I have had the invaluable help of Dr. J. A. Smythe, for long a member of Prof. Bedson's staff. G. R. CLEMO.

The Rev. E. N. Neumann, S.J.

THE REV. EMMANUEL NAVARRO NEUMANN, S.J., died on January 30, 1941, according to the *Memorabilia Societatis Jesu* of December 1941 (delayed on account of the War). The greater part of his research studies and labours was spent in the field of geodynamics. He operated observatories, issued bulletins, developed seismographs and published more than three hundred separate articles on seismology. With other Jesuit men of science he was exiled from Spain by the anti-clerical Government in 1931, and resided in Italy for some time. On August 11, 1938, the Cartuja (Granada) Observatory was restored to the Jesuits and Father Navarro Neumann was present. He was in poor health and experienced much physical suffering for many years, and in 1939 retired from active scientific work.

WE regret to announce the following deaths:

Dr. T. McFadden, senior demonstrator in physics at the Queen's University, Belfast, on March 25, aged twenty-six.

Dr. H. G. Rule, reader in chemistry in the University of Edinburgh, on March 15, aged fifty-five.

Prof. Warrington Yorke, F.R.S., Alfred Jones professor of tropical medicine in the University of Liverpool, on April 24, aged sixty.

NEWS and VIEWS

Ionospheric Variations during the Sunspot Cycle

IN a lecture entitled "Radio Exploration of the Ionosphere", delivered before the Wireless Section of the Institution of Electrical Engineers on April 7, Sir Edward Appleton described the results of an eleven-year series of ionospheric measurements just completed by Mr. R. Naismith and himself. The work began so far back as 1931, the critical frequency method of measuring the ionization density in the various atmospheric layers being employed (see *NATURE*, February 7, 1931). Measurements made by this method had not been in progress more than a couple of years before it was suspected that electron concentrations were varying in sympathy with solar activity. The need for continuing the observations for a complete sunspot cycle of just over eleven years was then realized and plans made accordingly. During the course of the cycle, other observers, in different

parts of the world, have adopted the same method, and a world survey of the electrical state of the upper atmosphere by means of it is now in progress. The British observations have been made as part of the programme of the Radio Research Board of the Department of Scientific and Industrial Research.

The ionization in the E and F_1 layers has been found to increase by 50-60 per cent from sunspot minimum to sunspot maximum, indicating a corresponding increase of 120 per cent in solar ultra-violet light, which is known to be the ionizing agency in question. The ionization in the F_2 layer has varied even more markedly, especially in winter. Such a change has an important bearing on long-distance radio transmission, which proceeds by way of ionospheric reflexion. It is now clear that the range of short wave-lengths available for this purpose increases very substantially with solar activity. The