intermediate region in the present year. This would rather support that the earthquake shock has successively shifted to the region where the isostatic compensation has been disturbed to the maximum extent as years have passed on.

The earthquake occurred on a new moon day. At the time an atmospheric cold wave was also passing over the region. Some writers have pointed out that the influence of the planets or the disturbance of the atmospheric pressure may have been the immediate cause of the earthquake. It is known that the action of the sun and moon on a new moon day produces maximum "body tide" in the elastic solid material of the earth. Because of the coincidence, it is difficult to dispute the statement in this particular instance, that the "body tide" or the variation of load due to pressure may have acted as a 'trigger' in producing a sudden release of strain. No relationship has, however, been definitely traced between earthquake and atmospheric pressure or 'body tide' in the earth.

If the disturbance of the isostatic compensation is the cause of these earthquakes, it is clear that similar tectonic earthquakes will occur again in some region or other of the Himalayas, may be after the lapse of some years. We must, therefore, in rebuilding our cities take special steps to have earthquake-resisting structures and provide each important building, if possible, with an earthquake warning instrument, such as a simple pendulum, so adjusted that it will make an electric contact immediately on the incidence of the earthquake and work bells warning all residents to leave the building forthwith.

Dimitri Ivanowitsch Mendeleeff (1834–1907).

THIS year we celebrate the centenary of the birth of Dimitri Ivanowitsch Mendelèeff, who was born on February 7th, 1834 (N. S.). He will ever have an honoured place in the roll of famous chemists, since on the Periodic Law which he enunciated is based much of our modern classification of the chemical properties of matter, and of our knowledge of the electronic structure of atoms.

Mendelèeff was educated at his native place, Tobolsk, and at Leningrad, where he was appointed to a University Chair in 1866. He resigned his post in 1890, consequent on a difference with the University authorities, who found his independence of spirit something of a nuisance. In 1893 he became Director of the Bureau of Weights and Measures, a post which he held until his death at Leningrad on February 2nd, 1907 (N. S.).

Ever since the discovery of a range of chemical elements, efforts had been made to classify them in groups possessing similar chemical properties. No satisfactory result was achieved, however, until, in 1869, Mendelèeff communicated to the Russian Chemical Society his first periodic table and an enunciation of the Periodic Law according to which "the elements arranged according to the magnitude of atomic weights show a periodic change of properties". For the first time it was clearly recognised that the fundamental periodic property of the elements is valency. In 1871, Mendelèeff published his improved form of the Periodic Table, practically as we know it to-day. The main difference is that now the arrangement of elements is according to the atomic number to which, however, the atomic weight usually corresponds. Where the correspondence ceases we obtain the few anomalies in the Table, which so puzzled chemists who knew nothing of nuclear charges, nor of the existence of isotopes.

In 1871 Mendelèeff from a consideration of the gaps in the Periodic Table made his well-known prediction of the existence and properties of "eka-boron", "eka-aluminium", and "eka-silicon". In 1875, 1879 and 1886, there were discovered, respectively, gallium, scandium and germanium which confirmed these audacious predictions, and finally established the fundamental importance of the Periodic Law.

Mendelèeff was also led to question the correctness of the atomic weights assigned to certain elements as they did not correspond with the Periodic Law, and here again his statements were justified by further work.

One other achievement of the Periodic Law may be mentioned. It could not have been used to predict the existence of elements of zero valency. But when one member of the group (argon) had been discovered, it was clear that other elements similar in type

must be sought and their discovery was not long delayed.

The allocation of the rare earths was for years an apparent defect in the application of the Periodic Table. Mendelèeff considered that their installation should be deferred until their properties were better understood. We now know that these elements arise from the fact that at a certain point in the series of elements, each electron added to the system to balance unit increase in nuclear charge, goes to complete inner levels and leaves unchanged the outer valency electrons on which the chemical properties of the elements chiefly depend.

Although the Periodic Law was his outstanding contribution to chemical science, Mendelèeff did much work in other fields. His printed publications total 262. These include communications on physical and chemical subjects, books, pamphlets, reports and newspaper articles relating to exhibitions, to Russian industries, to weights and measures, to education, to art, and to spiritualism. He carried out a long series of experiments on the thermal expansion of liquids. His definition published in 1861 of the absolute boiling point of a liquid as the temperature at which cohesion and heat of vaporisation vanish, and the liquid vaporises irrespective of pressure and volume anticipated Andrews' conception of the critical point. He also directed a number of investigations on the densities of solutions, particularly mixtures of alcohol and water, sulphuric acid and water. and of salt solutions. He gave a good deal of attention to the subject of the elasticity of gases, and to the nature and origin of petroleum.

After his Periodic Law, however, he is best known for his famous *Principles of Chemistry* which has gone through many editions in various languages. In English there are three editions of which the last (1905) is from the seventh and best complete Russian edition (1903). The book is remarkable not only for its text which deals with inorganic chemistry, but also for the voluminous notes which testify to the enquiring spirit of the writer and the restless activity of his mind. As a teacher these same qualities of originality and freshness made him one of the greatest of his time. He had a talent for arousing a desire for knowledge, and students from all faculties of the University thronged his lectures.

We know more of the Periodic Table than ever Mendelèeff knew. We look to greater knowledge to a table which will express the purely nuclear properties of atoms. In 2034 when once again returns the centenary of the birth of this great chemist, knowledge of the periodic table will be assuredly deeper and more profound than the knowledge we possess to-day. But time will not dim nor the advance of knowledge obscure the memory of one, who in the early days of modern chemistry, by sheer native genius and application, laid the foundations of possibly the most important generalisation known to chemical science.

Ernst Haeckel (1834–1919).

ZOOLOGISTS will also remember that this year marks the centenary of another great figure, Ernst Haeckel. Born at Potsdam he was educated in various universities, and one of the three degrees of doctorates that he held was that of Law (an honorary degree) in addition to his qualifications in Philosophy and Medicine. In 1854 he came under the influence of J. Müller in Berlin. Müller left a remarkable impression on Haeckel and in 1858 he commenced to practise medicine like his contemporary Gegenbaur. Soon after the death of Müller which came as a shock to young Haeckel. the latter commenced the study of Radiolaria of the Italian coast and later returned to Berlin. It was about this time that Haeckel came into contact with the famous and perhaps the then revolutionary book, the "Origin of Species" by Darwin. He says 'It profoundly moved me at the first reading.' On the other hand, the other German Biologists were opposed to this trend of thought and regarded the book as 'absolute nonsense'. Haeckel therefore happened to be the pioneer in ushering Darwinian ideas in Germany.

He was appointed Professor of Zoology in Jena, a post which he held for a very long time. Amongst his memoirs must be mentioned the report on the Radiolaria, on Siphonophora, the deep-sea Keratosa, Planktonic studies, and Cell-Theory. The crowning glory of Haeckel was his lecture at the International Congress of Zoology at Cambridge in 1898, where he spoke about the ever interesting subject—The Evolution of Man.

Professor H. E. Watson, D.Sc., F.I.C., M.I.Chem.E.

THE impending departure of Dr. H. E. Watson from the Indian Institute of Science, Bangalore, is widely regarded by men of science as an unrelieved misfortune for this country. Particularly among his past and present colleagues and students will the resultant breach in continuity of chemical work at the Institute be deprecated, because it is only by them that his unrivalled contribution to the achievement of that foundation can be truly estimated. Having been appointed assistant professor of general chemistry at the opening of the laboratories in 1911, and thereafter becoming professor (1916), he has been increasingly identified with the Institute's growth, and it may be claimed that his own share in its development is unexcelled.

This claim is not founded on length of service alone, but is based on the more steadfast footing of meritorious devotion to the interests of graduates coming under his guidance. That has been shown primarily by the rigid orthodoxy of his training methods, his unswerving adherence to the principle of scientific responsibility, and his unflagging industry. A further benefit derived by those in laboratory association with Dr. Watson follows from his extraordinary skill in the less conventional aspects of experimentation, enabling him not only to elaborate complicated apparatus in glass and quartz required for the study of rare gases; but, by his highly trained senses of sight and hearing to detect faults and suggest uncanny improvements in the design and construction of appliances for his physicochemical researches and radio-work. It is impossible to estimate the advantage to a developing scientific mind offered by direct laboratory contact with so subtle a craftsman.

A survey of Dr. Watson's early career reveals the promise that has been amply fulfilled, and excludes him from that band of successful men who have been the despair of their schoolmasters. At eighteen he left Marlborough (in 1904) laden with prizes and scholarships, gained principally for languages, mathematics and science. Although these included a mathematical scholarship at Trinity College, Cambridge. he preferred to enrol himself at University College, London, with Sir William Ramsay, among whose bright young collaborators were M. W. Travers, F. G. Donnan and E. C. C. Baly. To this association may be traced his early interest in the spectroscopy and physical properties of the rare gases helium, neon, krypton and xenon; it explains his later developed facility in glass-blowing, for which Ramsay was famous, and it was ultimately responsible for his joining the Institute, at whose foundation Sir Dorabji Tata depended largely on the judgment of Ramsay in selecting a staff. Meanwhile, however, Dr. Watson had continued at University College the course of academic distinction presaged by his Marlborough career, gaining a succession of prizes and scholarships that culminated in the 1851 Exhibition. While holding this he worked at Berlin with Nernst on the specific heat of gases at low temperatures (1909) and at Geneva with Guye (1910), concluding his *Wanderjahre* at the Cavendish Laboratory, Cambridge (1911) with Sir J. J. Thomson.

It is difficult for those more recently familiar with the laboratories at Hebbal to realise that 25 years ago the Institute was merely a name attached to an untenanted estate. The initial staff were veritable pioneers, charged with the dual task of establishing physical equipment and ethical tradition. Dr. Watson's material contribution to that labour has been very substantial indeed. It is witnessed by the range of