

The Uncertainty Principle

IN a lecture delivered to the Physical and Chemical Society of University College, Nottingham, on February 4, Prof. E. Schrödinger directed attention to the difficulties and contradictions which arise from attempts to unite quantum theory with geometry and with the theory of relativity. Although the first researches on wave mechanics used the relativity ideas, they are really in flat contradiction to them. The theory of relativity supposes that rods and clocks can be used to measure exact lengths and times, and that in some way velocities can also be measured accurately. Unfortunately, Heisenberg's uncertainty principle, which appears to be inherent in quantum mechanics, lays down that simultaneous accurate measurements of position and velocity are impossible. Moreover, the regulation of a clock is not possible to more than a limited degree of accuracy, except when the clock is infinitely heavy. Similar considerations forbid us to apply our ideas of Euclidean geometry, based upon ideal rigid measuring rods, to small physical regions. Physicists have at least as much confidence in the special theory of relativity as in quantum theory; the problem of devising a unified theory appears to be still unsolved.

A French Chemical News Service

WE have before us the first number of *Les Nouvelles de la Chimie*—a new monthly paper issued in Paris. It resembles in its general appearance a daily paper, a fact which may seem unusual in England; in France there exist already several medical news journals having the same format. The front page of the new journal contains news items, interviews and similar topical material; on the second page we find a review of general scientific activities in the universities and laboratories, while the third and fourth pages are devoted to general technical and economic information. The editor of the new paper is M. Jean Gérard, the active director of the *Maison de la Chimie* and its Centre of Documentation. We understand that if the new venture fulfils the expectations of its promoters, it will develop into a weekly and finally into a daily news service covering not only the field of chemistry but also that of science in general.

Baffin Island Survey

THE annual report of the Canadian Department of Marine for the fiscal year 1933–34 contains some interesting information respecting the operations of the Canadian Hydrographic Service during the period under review. Among other technical observations, the Service carried out a survey of the Baffin Island coast, of which the following extract is a partial description. "In aspect, the south-eastern coast of Baffin Island is very bleak, bare rugged hills of gneiss and granite rising to elevations about 600 feet close to the sea and to greater heights inland. The ragged shore is broken by numerous fiord-like inlets, but from Pritzler Harbour to Barrier Inlet, 45 miles north-northwestward, the shore is fronted by many islets, rocks and shoals of a most dangerous

character. The 50-fathoms contour, which lies at an average distance of 3 miles off the islands, should be considered the danger line. The country is quite uninhabited except for some Eskimos who travel gregariously along the coast in whaleboats (omiaks). These natives appear to be of a very good type—healthy, honest and well adapted to the rigours of the country. Their habitat is both the north and south coasts of the long peninsula which separates Frobisher bay from Hudson strait. The small, swift rivers which flow into the heads of the inlets are well stocked with a fine species of salmon trout weighing up to 8 lbs.; this food, together with seal, constitutes their chief diet. At certain times a caribou hunt takes place and the hunters travel inland for several days to secure fresh meat. In addition, the country also provides aquatic fowl, ptarmigan, arctic hare and an occasional walrus or polar bear."

Reversing Falls at Barrier Inlet

AFTER recording the absence of good ship harbourage between Pritzler Harbour and Barrier Inlet, the report of the Canadian Department of Marine goes on to describe the physical features of the latter, which is an arm of the sea extending 12 miles inland. At the entrance, it has a width of about a mile and a half, but two miles inside, the width contracts to three quarters of a mile. The channel is still further constricted at this point by a number of rocky islets, connected at low stages of the tide and leaving only two narrow passage-ways less than a hundred yards wide. "The free flow of the tide in and out of the inlet being thus constricted at the narrows, a 'head' of water is formed and creates a reversing falls. At the time of low tide on October 1, there was a sheer outward waterfall $8\frac{1}{2}$ feet in height, and the lowering of the fiordal waters continued for a space of $2\frac{1}{2}$ hours whilst the tide was rising outside at the foot of the cataract. Slack water occurred for a few moments when the flood tide reached the elevation of the water in the fiord but almost immediately the inward rush of water formed whirlpools and great eddies and soon waves, 6 feet high, careened wildly from side to side. A boat attempting to pass through at such time would be engulfed."

American Museum of Natural History: New Director

ACCORDING to *Science* of January 15, Dr. George H. Sherwood has resigned his post as director of the American Museum of Natural History to give his entire time to the School Service Section as curatorial-chief of education. Dr. Sherwood will remain honorary director of the museum. Dr. Roy Chapman Andrews will succeed Dr. Sherwood as the active head of the museum. As leader of the Central Asiatic Expeditions of the American Museum of Natural History, Dr. Andrews took his first expedition into the field in 1916 to work in the territory of Tibet, South-west China and Burma. His second expedition went into North China and Outer Mongolia in 1919, and the third expedition has worked in Central Asia, especially in Mongolia, since 1921,

where it uncovered some of the richest fossil fields in the world. Dr. Andrews was awarded the Elisha Kent Kane Gold Medal of the Philadelphia Geographical Society, previously given to only eight explorers. Brown University and Beloit College have both conferred on him the degree of honorary doctor of science. He has been given the Hubbard Medal of the National Geographic Society in recognition of his discoveries in Asia. He is well known as a lecturer and author of popular books and articles on the results of his various expeditions, including a large volume covering his entire field work in Mongolia and China up to the present time entitled "The New Conquest of Central Asia".

Organisation of Museums

THE Madrid Conference on Museography on October 28–November 1, 1934, attended by seventy-five experts representing twenty different countries, was noteworthy for the publicity it gave to the organic life led by museums outside their actual exhibition galleries, quite as much as for the success of the Conference in paving the way for a general treatise on the principles and practice of museums. The main object of this Conference, organised by the International Museums Office and the International Institute of Intellectual Co-operation, was to collect observations and the results of actual experience from as large a number of museums and countries as possible, rather than the formulation of general rules. The agenda of the Conference included discussions on the general principles of the architecture of a museum, on museum equipment both in exhibition and other public rooms and in the museum services; on lighting, heating, ventilation and air-conditioning; the conversion of ancient monuments and other buildings into museums; general principles regarding the enhancement of works of art; methods of presenting collections; organisation of stores, reserves and study collections; permanent and temporary exhibitions; problems arising from the growth of collections; exhibition material; plans of rooms and the numbering and labelling of exhibits. A number of special questions such as collections of sculpture, decorative and industrial art, folk-art and ethnography, and graphic and numismatic collections were also discussed. The Academy of Fine Arts, Madrid, was specially fitted up for the Conference by the Spanish Government, and the International Museums Office lent a considerable amount of graphic and photographic documents to illustrate the papers.

Electric Discharge Lamps for Road Lighting

IN many of the long stretches of main roads between towns and villages the only practical way of lighting at present seems to be by means of the lamps on the vehicles. In a paper on "Electric Discharge Lamps and Road Lighting" read to the Institution of Automobile Engineers on December 11, Mr. H. Warren and Mr. L. J. Davies show how the length of the permanent illumination of roads can be extended, with acceptable economy, by means

of the new discharge lamps, when care is taken to distribute the light scientifically by means of suitable lanterns. Controlling the reflective properties of the road surfaces has also to be taken into consideration. With mercury and sodium vapours we have two substances which, when excited in the correct way, produce a sufficient proportion of energy in the visible spectrum to give a two- or three-fold increase in efficiency over incandescent lamps. A fifty-fold efficiency is theoretically possible, but the practical utilisation of electrical discharges has just made a beginning. At present, electric discharge lamps for street lighting are of two main types, high-pressure mercury vapour and sodium vapour. The former type of lamp is most favoured in Great Britain, while on the Continent and in America the sodium vapour lamp is most used. Mercury discharge lamps have an excellent 'luminous output' during their lives, which are longer than those of other forms of lamp. The colour of the lamp, when viewed directly, is greenish-white. In the colours radiated, blue, green and yellow predominate, but red is practically lacking. By incorporating cadmium with the mercury a satisfactory red tinge can be introduced, but at a slightly lower efficiency. The colour correction of these lamps is receiving a great deal of attention in commercial research laboratories at present.

Continuously Evacuated Radio Transmitting Valves

AT the meeting of the Wireless Section of the Institution of Electrical Engineers on February 6, a paper entitled "Continuously Evacuated Valves and their Associated Equipment" was read by Mr. C. R. Burch and Dr. C. Sykes. This paper describes the development of demountable thermionic transmitting valves of various power ratings, the valves being evacuated continuously by means of oil condensation pumps. This work has arisen out of some experiments carried out in 1929 on the distillation of lubricating oil in a molecular still. It was found that one of the fractions was about a thousand times less volatile than mercury, so that if such a liquid could be used as the working fluid in a condensation pump, a vacuum of the order of 10^{-6} mm. should be attainable without the use of liquid air or other refrigerants; and such a vacuum is quite adequate for valve exhaustion. These expectations have been fully realised in the development of oil-condensation pumps which will work against a fore-vacuum of 0.05 mm. and will produce a vacuum of 10^{-3} – 10^{-6} mm. at a speed of 20 litres per second. Such pumping equipment is described in the paper in some detail, and reference is made to its application to the production of thermionic valves of a power rating ranging from 20 kw. to 500 kw. for high-frequency furnaces and for radio transmitting stations. Several valves of the 30 kw. order have been in use on commercial radio traffic at the Post Office station at Rugby for long periods, and they have given satisfactory service. A 500 kw. valve is in the stage of experimental trial on the long-wave transmitter at Rugby. The relative merits of these valves and those of the sealed-off type were discussed