NEWS and VIEWS

Gardiner Chair of Chemistry at Glasgow

AFTER a connexion of almost forty years with the chemical department of the University of Glasgow, Prof. T. S. Patterson retires from the Gardiner chair of chemistry at the end of the present session, thus bringing to a close a period of teaching activity which has coincided with a period of great expansion in the University Chemical Department. As a research worker Prof. Patterson's chief interest lay in the subject of optical activity, and more especially in the physico-chemical aspect of the subject. His investigations on the effect of solvent, temperature and wave-length of light on the rotatory power of the derivatives of tartaric acid have produced data which will be of great value to future workers, while his modification of the "characteristic diagram" of Armstrong and Walker has simplified the co-ordination of rotatory dispersion phenomena. But in recent years Prof. Patterson has become more absorbed in the historical aspect of chemistry, and in this field he has found fuller scope for his literary ability than was possible in the mere recording of the results of personal experiment. The results of his researches on the lives and work of the earlier chemists have been embodied in excellent articles contributed to the *Annals of Science* and to *Isis*. He has always taken an interest in student activities and was a constant attendant at meetings of the "Alchemists", a student chemical society the well-being of which he had much at heart.

DR. J. MONTEATH ROBERTSON has been appointed to the Gardiner chair of chemistry in the University of Glasgow as from October 1, 1942, in succession to Prof. T. S. Patterson, whose resignation takes effect then. Dr. Robertson, who is forty-one years of age, was educated at Perth Academy and the University of Glasgow, where he graduated B.Sc. with special distinction in chemistry in 1923 and M.A. in 1925. His post-graduate research work also began there, and he has since received the degrees of Ph.D. and D.Sc. from the University. During the tenure of a Carnegie research fellowship Dr. Robertson worked at the Royal Institution in London under Sir William Bragg. During 1928–30 he was in the United States as a Commonwealth Fund fellow and worked in the University of Michigan and the Gates Chemical Laboratory, Pasadena. On his return he joined the staff of the Davy Faraday Laboratory of the Royal Institution and remained there until his appointment in 1938 as senior lecturer in physical chemistry in the University of Sheffield. He has published many papers dealing with the chemistry of natural products, X-ray diffraction methods, molecular dimensions and structure, etc.

Dr. Robertson is best known for his beautifully finished determinations of the structures of conjugated organic compounds by the X-ray study of minute single crystals. In 1932 he mapped the electron density distribution in anthracene crystals by means of two-dimensional Fourier analyses along three principal directions, and showed that the chemist's structural formula represents with considerable nicety the arrangement of atoms in the plane molecule. By designing an apparatus which would enable an absolute comparison to be made photographically between the intensities of the incident and reflected X-ray beams, and by devising various mechanical methods of speeding up the formidable amount of computational work involved, he was able to make similar studies of many other compounds, including those of the dibenzyl and the phthalocyanine series (partly in collaboration with Miss I. Woodward). He proved that the interatomic distances in these compounds are dependent upon the bond characters, and provided a mass of reliable experimental data for testing theoretical calculations based upon energy relationships. His direct determination of the structures of nickel and platinum phthalocyanines not only gave valuable information concerning the stereochemistry of those metals but also showed that the usual 'trial and error' method of determining phase constants can be dispensed with in special cases. His latest work (in collaboration with Dr. A. R. Ubbelohde) has concerned the lengths of hydrogen and hydroxyl bonds and their changes with crystalline dimorphism, temperature and deuterium substitution. Few present-day scientific men have succeeded in obtaining so much accurate numerical data of fundamental importance to organic chemistry.

Suppression of Culture in Norway

WE are informed that a petition, signed by fifty-two members of the Royal Society of Science and Letters of Göteborg, has been presented to the Swedish Minister for Foreign Affairs asking him to intervene on behalf of three Norwegian members of the Society who have been imprisoned and subjected to severe treatment in Norway. A translation of the petition reads: "Three foreign members of the Royal Society of Science and Letters of Göteborg have already for a considerable time been deprived of their liberty. They are known to us as eminent scientists and scholars and are citizens beyond reproach. As far as we know, none of them has been convicted of any crime against the laws of their country by a legal court of justice or even accused of any criminal offence. To all of us their fate has given great pain. The fact that Prof. Seip (of the University of Oslo), for reasons unknown to us, has been subjected to cruel treatment has further increased our anxiety on their behalf. We members of the Royal Society resident in Göteborg herewith apply to your Excellency to do everything in your power in order to set our fellow-members at liberty and enable them to resume their studies and research." *It is to be feared that this petition will be of little avail, though it reflects the views of the men of science of neutral countries, and is much to their credit.*

Scientific Research in Sweden

EXTENSIVE research activity is going on in Sweden, in order to find substitutes for products which can no longer be imported owing to the War. One of the most important centres for this research is the Physical-Chemical Institute, Uppsala, headed by Prof. The Svedberg. The Institute has now lost all the foreign research workers who used to study there, with the exception of one Swiss; nevertheless the staff has been doubled. Extensions have in particular been made to departments dealing with the many present supply problems, of which the chemical aspects fall within Prof. Svedberg's own department, namely, the giant molecules. The work with different kinds of synthetic rosins and cellulose-derivatives is now progressing on a large scale. Among other objects of research may be mentioned bread. Experiments are being made to find a means of replacing

imported hard wheat, which was formerly used to improve the baking qualities of bread made from Swedish native soft wheat. Investigations are also being carried out on synthetic rubber. The work has proceeded so far that the product has been evolved in the laboratories of the Institute, although it is too early yet to say whether domestic production can be started and its probable extent.

One of the foremost technical means of research of this Institute is the Svedberg ultra-centrifuge, which has become of the utmost importance to science. The rotor of this centrifuge is given a speed of up to 70,000 revolutions per minute by a number of oil turbines. The Institute also houses such instruments for research as one of the world's largest electro-magnets and a neutron generator, both of which have been made in Sweden. In the bio-chemical section the experiments for locating and cultivating infantile paralysis virus and tuberculine on the basis of a new method for analysing mixtures through molecule splitting are carried on under the direction of Prof. Arne Tiselius, who has devised this method. The object in the first place is to obtain a pure form of virus. The stoppage of the import of apes for these experiments for a while threatened the workers with the loss of indispensable test animals, but it is stated that their replacement with rats has now proved acceptable.

Quality Control in Manufacture

AN article by H. Rissik on "Quality Control in Manufacture" in the *Electrician* of March 27 reviews the principles of the subject with special reference to the use of control charts. The theoretical foundations of the method were laid down originally by Prof. R. A. Fisher, and the technique itself, which was originated in the Bell Telephone Laboratories of the United States, has been applied successfully for more than twelve years throughout the various manufacturing organizations of the Bell system. The technique of quality control is, briefly, one of inspection-cum-production, based on known statistical methods which have been applied successfully in other fields, and it has proved to be a valuable aid to manufacturing concerns engaged on repetition work. Its advantages include reduction in inspection costs and in rejects, attainment of maximum benefits from quantity production and of uniform product quality even though the inspection test be destructive, immediate applicability as part of inspection routine, and utter simplicity of application.

Fundamentally, the problem is one of controlling variability in some directly measurable quality characteristic, for example, dimension, weight, tensile strength, electrical resistance, hardness, etc. In practice this means analysing the variability observed and comparing it with some objective standard. Thus, provided a product is known beforehand to be stable, limits may be assigned within which practically all observed values of the variable quality characteristic are expected to lie. If measurements on a succession of piece-parts, produced supposedly under the same essential conditions, are found to give dimensional values lying outside these limits, then it may be inferred that they were not, in fact, so produced, that is, the production process was not stable in the first place. This leads to the very heart of quality control as a technique enabling preventive action to be taken before trouble develops; and the basis of this is the so-called quality control chart which is, in effect, a continuous graphical record of product quality. The article discusses the use of the control chart and makes reference to the recent British Standards Institution publications, *B.S.* 600–1942 and *B.S.* 1008–1942.

Electrical Instruments

IN his chairman's address to the Meter and Instrument Section of the Institution of Electrical Engineers (*J. Inst. Elec. Eng.*, 89, Pt. 1, No. 13, January, 1942), W. Phillips surveys the design and performance of electrical instruments. Development since the 1890's has been twofold: first in widening the limits of measurement, and secondly in accuracy. Switchboard moving-coil instruments are now available to give full-scale deflection for 10 μ amp. or less, and ammeters having a range of 30,000 amp. are in use. In voltage, the range is from a few micro-volts, with apparently no upper limit, the sensitivity of D.C. moving-coil instruments now being limited only by the non-magnetic quality of the moving system. The standardization of frequency at 50 c./s., and its close regulation by supply undertakings, has fostered the design and use of testing apparatus for the measurement of power factor, peak factor, and current; and also of voltage testing sets and similar apparatus for use at fixed frequency. The Electricity Supply (Meters) Act created an immediate demand for standard and sub-standard instruments of all types, large sums being expended by supply authorities in equipping meter-testing stations. Great improvements in wattmeter performance have been made, particularly in the reduction of self-heating error and D.C./A.C. change-over error.

One of the recent major troubles with which instrument makers have had to cope is the almost complete stoppage of supplies of sapphire jewels. An English company now manufactures sapphire jewels from rough boules, but it cannot yet meet the demand. Substitutes are being provided, consisting of nitralloy steel jewels for meters, while for instruments a specially hard glass jewel is available requiring no expensive or elaborate manufacturing plant. The jewels at present being manufactured are mainly for use in miniature instruments, a small number only having been made for larger instruments.

Electric Heating of Premises

MR. W. GILCHRIST, in a paper read recently before the Institution of Electrical Engineers on the above subject, deals with the various methods of applying electricity to space-heating, water-heating and sundry special applications with particular reference to large-scale space- and water-heating installations. The author records the fundamental principles of design and some of the results obtained from certain methods of heat application which do not, in some respects, follow existing practice. The possible economic limits of using electricity for direct heating are related to the capacity of both commercial and domestic buildings, there being a definite limit to the size of such installations both from the consumer's and supplier's points of view. Details are given of certain combinations of radiant and convection heating to achieve maximum comfort conditions at a lower cost to consumer and supplier than other existing methods. Examples are given of installations using a combination of thermal storage, local thermal storage and direct heating, and a method of applying water-heating to large installations is described which considerably improves the