fashioned, they may be regarded as essays in the harmony of orange and red, and the employment of suitable contrasts and discords. So far as one may judge from the background of "Reclining Figure" (No. 678), the artist himself would prefer the latter theory.

Purple in its lighter tones has ruined many acres of canvas in pictures of the 'sheep-among-the-heather' type, but in its deeper tones it is rich and magnificent, though still dangerous. The State portraits by Gerald Kelly (Gallery III) are noteworthy for the skill with which the imperial purple is rendered, a skill which cannot be fully appreciated without the realization that instead of the usual foils of green and brown these great masses of colour are displayed in a setting of parian coolness, and yet never for one stroke of the brush does the colour get out of control. True, the gold embroideries are a help in achieving this end, but they are by no means the whole of the story.

On an adjacent wall in the same gallery, "Dr. Clive Forster-Cooper, F.R.S., Director of the Natural History Museum", by Meredith Frampton (No. 165), blends complete mastery of the painter's materials with consummate draughtsmanship. For the former, reference may be made to the contrast in texture between the surfaces of the dog's jaw in the left lower corner and of the series of plaster models of some upper molars of primitive mammals scattered over the table in seeming disarray, while the drawing is summed up by the open book in which is epitomized a whole course of perspective and line. Another excellent portrait hangs in the far corner of the same room. It is L. Campbell Taylor's portrait of "The Rt. Hon. the Lord Macmillan, G.C.V.O., LL.D." (No. 205), whose voluminous black robes, set against deep green curtains, are relieved by an edging of silver lace. A more intimate type of portraiture is "Professor A. G. Tansley, F.R.S.", by W. G. de Glehn (No. 302), in which the sitter is shown, pipe in hand, in the quiet of a book-lined study.

Of the war pictures, "Torpedoing of the *Tirpitz* by Midget Submarines" by Richard Eurich (No. 569) gave me most pleasure. No minefields, even in the clear waters of the Norwegian fiords, were ever so visible as these—never was there such a whelk as crawls on the bottom of this sea, yet all have their place in this picture, and no one would wish them away. Whether or not we have here an echo of the Futurist 'plastic interpenetration of matter' I neither know nor care; drawing, design and painting are all good, and the picture pleases me.

As usual, the sculpture is a very mixed lot. To the zoologist the more or less naturalistic works such as "Tarka", by P. E. Norman (No. 1248), "Leopard" by Hermon Cawthra (No. 1281), and "Rhesus Monkey" by Josephine Hunt are the most attractive, and he will probably find that most of the horses are better than usual. On the other side of the account he will put "Long-nosed Hedgehog" (No. 1293), if only on account of the unpleasant colour of the marble, as well as the lumpy "Messenger" (No. 1359) and the brutish "Infant Dionysus". One cannot complain of the stone in which the two last are worked; it successfully conceals the sculptures.

The architectural exhibits are fewer than last year. In the main they are pleasantly uninspired, but two of them call for particular comment. "Durham City Replanned", by Thomas Sharp (No. 1201), is ambiguous. If the new buildings in the foreground are really meant to be of the boot-box style, then the incongruity between them and the castle and cathedral in the background is so violent as almost to be bad manners and not merely bad art; if, on the other hand, they are mere symbols to indicate where new building will be necessary, one must defer judgment until the designs for the actual buildings have been produced. The other doubtful case is Sir Giles Gilbert Scott's design for the new Coventry Cathedral, of which the interior does not strike one as suitable for an ecclesiastical building, neither does it appear to be in keeping with the exterior.

Taking the exhibition as a whole, it is lively, varied, and of good quality. To expect it to indicate a definite trend in any particular direction, or in favour of any one school, is unreasonable, since to do so would be to upset the general balance of the whole; but any visitor with some knowledge of the development of European art during the past fifty years will say of the Royal Academy, as was said of another body on an earlier occasion, "E pur si muove".

OBITUARY

Sir Napier Shaw, F.R.S.

SIR NAPIER SHAW, whose death occurred on March 23, was born on March 4, 1854, in Birmingham, the son of Charles Thomas Shaw, manufacturing goldsmith and jeweller. He was the sixth child in a family of eight, four brothers and four sisters. He married in 1885 Sarah Harland, lecturer in mathematics at Newnham College and daughter of Dr. Thomas Harland of Salford.

Shaw received his school education at King Edward's School in his native city, and throughout his long life retained a lively interest in his old school, serving on its governing body for many years. In 1872 he won a scholarship to Emmanuel College, Cambridge, and went into residence with the avowed intention, as he often told his friends, of entering the Indian Civil Service. He read mathematics, coaching under Routh, and was 16th Wrangler in the Tripos of 1876. Later in the same year he obtained a first class in the Natural Sciences Tripos, with distinction in physics. In the following year the College elected him to a fellowship and that seems to have been the end of the suggestion to embark on an administrative career in India. Cambridge was to be his home for the next twenty-two years apart from a short time spent in Berlin, working under Helmholtz.

Shaw soon made his mark in college and university. Lord Rayleigh appointed him demonstrator at the Cavendish Laboratory, jointly with R. T. Glazebrook, and to that combination we owe the "Practical Physics" which became a standard text-book in schools and colleges up and down the country wherever experimental work formed part of the physics course. He gave up the demonstratorship in 1887 to become University lecturer in experimental physics and in 1898 was appointed an assistant director of the Cavendish. His early scientific work was along lines that have little connexion with what was to become his life work. His first published paper (*Proc. Cambridge Phil. Soc.*, 1879) dealt with experiments with mercury electrodes, and was followed a few years later by one in the *Philosophical Magazine* on the atomic weights of silver and copper. Miscellaneous papers on various subjects followed. Ventilation was

a subject in which he took an early interest which persisted throughout his life. In the course of his career he was asked to advise on the ventilation of many public buildings, among them the House of Commons, the Stock Exchange and the Metropolitan poor-law schools.

The first contact Shaw made with official meteorology came in the form of a request from the Meteorological Council to prepare reports on the performance of evaporimeters in current use and on the more general question of hygrometric methods. The latter report was published in the *Philosophical Transactions* in 1888 and was the first contribution from Shaw's pen to the Royal Society's publications. His reputation in the scientific world was advancing steadily and was recognized in 1891 by election to the fellowship of the Royal Society. He was a frequent attendant at the meetings of the British Association. In his later years he was to act as president of Section A in 1908 and of Section L in 1919.

While at Cambridge, Shaw took a very active part in the affairs of college and university. At Emmanuel he held the offices of steward, tutor and senior tutor (1890–99), and a long list of pupils has to thank him for kindly guidance and wise advice. Two important achievements in the University organization stand to his credit. In 1892 he was the prime mover in inducing a group of colleges to combine their scholarship examinations and thus abate the competition for the most promising candidates which had become a source of embarrassment to tutors, school-masters and candidates alike. His second opportunity came towards the end of his time at Cambridge. As tutor, Shaw had repeatedly come up against the difficulty his pupils experienced in getting a start in life after taking their degrees. Apart from an agency which confined itself to scholastic appointments, there was no machinery for helping them. There was an obvious opportunity for beneficial work for an office or agency that would make it its business to find out what openings were available in commerce, industry or Government service, and on the other hand would inform itself as fully as possible of the qualifications and competence of young graduates seeking employment. A certain amount of crusading to induce prospective employers to take graduates lacking *ad hoc* business experience into their service was also a promising field of activity. Shaw set out to enlist support for a scheme on such lines both within and outside the University. On the commercial side he received valuable assistance from the late Nathaniel Cohen, a member of the London County Council, whose wide business connexions enabled him to suggest many useful lines of approach. As a result of these efforts, a Cambridge Appointments Association was started in 1899. It was eventually formally incorporated as part of the official organization of the University under the name of the Cambridge University Appointments Board.

Shaw left Cambridge towards the end of 1899 to become secretary of the Meteorological Council, which post was about to become vacant through the retirement of R. S. Scott. The change involved some financial sacrifice, but his early work for the Council had aroused his interest, and in 1897 the Royal Society had appointed him a member of the Council. When Shaw took charge, the Meteorological Office was at a low ebb. Strachey and Buchan, the two most active members of the Council, were advanced in years, and the drive which they and men of the calibre of Stokes and Galton had put into the scientific work had spent itself. The staff consisted largely of middle-aged and elderly men who had been attracted to the subject as youngsters, but now found themselves carrying on their routine on salaries that were certainly not generous and with no superannuation to look forward to. Nevertheless, Shaw soon gained the unstinted loyalty of his staff and rekindled their interest. One of his first administrative tasks was to bring into operation a superannuation scheme for the clerical staff, even though it had to comply with the Treasury's instruction that if the Council felt it must make some provision for staff who had long and faithfully served them, it, like other employers, should see what it could do from its available resources. Recruitment of new staff also required much thought. Great care was exercised in the selection of junior clerks as vacancies arose, and gradually new posts were created that could be offered to graduates. By the time Shaw left the Office it had a considerable graduate staff.

In 1905 Shaw secured an overhaul of the constitution of the Meteorological Office. The Council, which had been responsible to the Royal Society, was replaced by a committee directly responsible to the Treasury, with himself as chairman of committee and director of the Office. The design of the new premises in Exhibition Road, South Kensington, to which the Office moved in 1910, took up much time during the following five years. It must have been a source of regret to Shaw that the building on which he had lavished so much thought and embellished at some personal expense should so soon prove inadequate to house all the activities of the Office. At the time of its design the top floor, to be occupied temporarily by the administrative staff of the Science Museum, seemed to offer ample space for expansion.

Under Shaw's vigorous guidance and the pressure of events, the activities of the Office increased rapidly. On the climatological side the network of voluntary stations that supplied reports to the Registrar-General and also those associated with the Royal and the Scottish Meteorological Societies came under the control of the Office. Summaries for all stations were included in the *Monthly Weather Report*, which thus became an index of the climatological information available in Britain month by month. Later on, but not until 1919, the British Rainfall Organization was absorbed. Kew and Eskdalemuir Observatories were transferred and with them came responsibilities for terrestrial magnetism, atmospheric electricity and seismology. The demands of aviation for meteorological help were beginning to press. With R. T. Glazebrook (the close co-operation, started in the early days at the Cavendish, continued up to the time of Glazebrook's death) Shaw started the Advisory Committee for Aeronautics, which brought much grist to the mill. With J. S. Owens's assistance, the work of the Committee on Atmospheric Pollution was got going. In the sphere of international meteorology Shaw also became a figure of importance. His election to the International Meteorological Committee on becoming head of the Office was little more than a matter of form, but in 1906 he succeeded Mascart as president of the Committee, an office he was to hold until 1923.

Despite the pressure of administrative work and of calls incidental to his position, Shaw found time for authorship and for making his contribution to the science of meteorology. In 1911 appeared the first edition of "Forecasting Weather", in which he

set himself the task of bringing together the physical laboratory and the daily weather. His contributions in the form of papers and articles covered most aspects of the subject and are too numerous for individual mention here, but we may perhaps single out "The Life History of Surface Air Currents", in which the method of using synoptic charts to construct trajectories and so trace different air supplies to their origins was developed. It led up to the modern ideas of air-mass analysis which have yielded such valuable results, both theoretical and practical, through the labours of the Norwegian school of meteorologists.

Shaw's influence went far beyond the immediate output of his pen. He was a great advocate of a rational system of units, and never tired of ventilating the subject. If some of his efforts in this direction, such as the use of the absolute or tercentesimal scale of temperature which he introduced into the "Observatories' Year Book" and followed in his later scientific writings, have found few imitators, he had the satisfaction of seeing the millibar, first advocated by V. Bjerknes, find wide acceptance. After Shaw had introduced it in the British *Daily Weather Report* in the issue of May 1, 1914, other services followed suit, and its use is now firmly established in the international exchange of synoptic data and in upper air work.

The need for investigating meteorological problems on a world-wide basis led to another of his successful crusading efforts. Backed by the late Sir Norman Lockyer, he induced the International Committee to form a "Reseau Mondial Commision", and what is perhaps more important, he managed to arrange for the Meteorological Office to act for the Commission and collect monthly summaries on a basis of two stations to each square of 10° of latitude and longitude and publish them in annual volumes, thus providing raw material for investigations on seasonal forecasting and kindred problems by many workers. About the turn of the century, when Shaw took charge of official meteorology in Britain, the investigation of the upper atmosphere by means of kites and balloons was opening up a new field of research and turning meteorology from a two-dimensional into a three-dimensional science. Shaw saw to it that Britain played its part in the new field. Much of his work was done in association with the late W. H. Dines, whose home, transferred successively from Oxshott to Pyrton Hill and thence to Benson, became more or less a branch establishment of the Office. Not least among Shaw's gifts must be reckoned his power to interest others in his work. To that we owe the contributions of men like C. J. P. Cave and P. Y. Alexander to upper air research.

All these activities were rudely interrupted by the outbreak of war in 1914. It was not long before the Fighting Services felt the need for meteorological help, and new and unexpected demands were made on an Office struggling to maintain its essential routine. A greatly increased staff had to be recruited and hurriedly trained, and that raised a difficulty of its own. There was no suitable text-book on which to base the training. The writing of a comprehensive manual of meteorology had long been one of Shaw's ambitions and from time to time he had discussed ways and means with the Committee and found them sympathetic; but leisure for starting the work had been lacking. The desire had now become an urgent need, which the Committee met by suggesting that Sir Henry Lyons should take over the day-to-day administration, as acting director, thus setting Shaw free for the labours of authorship. The arrangement came into operation early in 1918, the Treasury having given its consent and marked its approval by appointing Shaw scientific adviser to H.M. Government on meteorology. To meet the most urgent demands work was started on Part 4 of the full scheme, which presently appeared, though not until after the cease fire had sounded, under the sub-title "The Relation of Wind to the Distribution of Atmospheric Pressure". Lyons retired from the acting directorship soon after hostilities ceased and Shaw had to resume full control up to the time of his own retirement in September 1920, and so it fell to his lot to carry through the transfer of the Office to the Air Ministry. In anticipation of rather earlier retirement he had consented to become president of the Royal Meteorological Society for the two years 1919 and 1920, a post he had consistently refused when asked to serve during the earlier years of his directorship.

Shaw left the Meteorological Office to become the first professor of meteorology in the Imperial College of Science and Technology. It had always been his ardent wish that universities in Britain should take part in the teaching and development of meteorology, and for some years he had been reader in meteorology in the University of London. The new post went considerably further in meeting his desire. True, it was not a full professorial chair, but it was at any rate a beginning. He held it until 1924, when he was succeeded by Sir Gilbert Walker.

His teaching post was not the only call on his time. The Atmospheric Pollution Committee pressed him to continue to act as its chairman, and the Ministry of Agriculture invited him to preside over a committee it appointed to foster agricultural meteorology. Even more exacting were the calls of international work. Meteorologists were among the first to get together again after the War of 1914–18. An open conference was held in Paris in the autumn of 1919, and Shaw was the obvious person to act as president. The conference reappointed a permanent committee with Shaw as president. He was re-elected in 1921 despite the fact that he was no longer director of a national service. His release from the office did not come until 1923. The Upper Air Commission also insisted on Shaw becoming its president and that offered further opportunities for impressing his ideas—or should it be ideals?—on meteorology. Among the tasks which the Commission sets itself is the publication of data collected on a world basis on 'international days'. Before the War of 1914–18 the issue of this publication was in German hands. It was decided to resume operations by printing the information available for 1923. Shaw presented it in *de luxe* style. He intended his volume to serve as a model of what the Commission should aim at. Unfortunately, *editions de luxe* are expensive. The Commission was able to print the data for 1924 in somewhat similar form, but for subsequent years Prof. Hergesell, who again became president after the Commission met in Leipzig in 1927, fell back on the expedient of setting it out in code.

Shaw's work for the Upper Air Commission also gave us the tephigram, a diagram for plotting the data from balloon ascents in which entropy and temperature are used as co-ordinates. It lends itself to rapid plotting, and the resulting graph, considered in relation to the grid, shows up regions of poten-

tial instability very clearly. The form is now in regular use in the forecast service of Great Britain and other countries.

During the years that followed his retirement from the Meteorological Office, the newly formed International Union of Geodesy and Geophysics also made calls on Shaw's time. He became president of its Meteorological Section and acted in that capacity at the meetings in Rome (1921), Madrid (1924), Prague (1927) and Stockholm (1930).

When he retired from his professorship, what Shaw himself regarded as one of his most important tasks still lay before him, the completion of the "Manual". A serious illness in 1928 threatened to prevent the fulfilment of his hopes but he lived to see all four volumes completed. The last, a revised and enlarged edition of Part 4, now with the more concise title "Meteorological Calculus : Pressure and Wind", was signed for press on March 31, 1931, when Shaw had entered on his seventy-eighth year. Even then his capacity for writing was not exhausted. In 1933 he gave us "The Drama of Weather", a fascinating book addressed to the general reader rather than the specialist. Three years later a revised edition of Vol. 2 of the "Manual", bringing up to date the statistical information, was called for. He signed the preface to this on March 4, the eighty-second anniversary of his birth. Two years later, when a second edition of the "Drama" was required, he still had the vitality to make considerable additions.

Shaw was the recipient of many honours. He was knighted in 1915. Honorary degrees were conferred on him by the Universities of Aberdeen, Edinburgh, Athens, Dublin, Harvard and Manchester, and foreign membership by the Academies of Boston, Oslo, Rome and Stockholm. His gold medals included the Symons Medal of the Royal Meteorological Society (1910), the Buys Ballot Medal of the Dutch Royal Academy (1923) and a Royal Medal of the Royal Society (1923). He was an honorary fellow of the Royal Society of Edinburgh and of Emmanuel College, Cambridge. He was made Commander of the Order San Tiago da Espada (Portugal) in 1921.

R. G. K. LEMPFERT.

NEWS and VIEWS

Prof. C. Leonard Huskins

PROF. C. LEONARD HUSKINS, professor of genetics in McGill University, has been appointed professor of botany in the University of Wisconsin, in succession to Prof. C. E. Allen, who is retiring. Prof. Huskins' appointment takes effect from September 1. Prof. Huskins was born in Walsall, England, in 1897 ; he went to Canada with his parents at the age of ten, and was educated at Red Deer, Alberta, and the University of Alberta, Edmonton, obtaining the degrees B.Sc. Agr. in 1923 and M.Sc. in 1925. As Overseas Scholar of the Royal Commission for the Exhibition of 1851, he went to the University of London (King's College) during 1925–27, when he obtained a Ph.D. in botany. He was then research cytologist at the John Innes Horticultural Institute until 1930. In 1930 he was appointed associate professor of botany in McGill University. Then he established the Department of Genetics and was appointed professor of genetics in 1934. Prof. Huskins has worked chiefly on the cytogenetics of cereals and liliaceous plants, the origin of species through polyploidy and on chromosome structure. At the University of Wisconsin his teaching and research will be devoted mainly to cytology.

Academy of Sciences of the U.S.S.R. : Anniversary Commemoration

THE Academy of Sciences of the U.S.S.R. celebrates this year the 220th anniversary of its foundation by Peter the Great. At first the Academy was not only a learned society and centre of research, but also a university or public school where Russian youths were trained for various vocations and even crafts. The first scientific debate was held at the Academy in November 1725, when Newton's theorem on the spheroidal shape of the earth was discussed. In 1745, that is, twenty years after its foundation, Mikhail Lomonosov, famous chemist, geographer and poet, whose work had an important bearing on modern science in most varied fields of knowledge, was elected to the Academy, where he founded a chemical laboratory. Peter the Great gave the Academy his private library, which formed the basis of the present library, now numbering about ten million volumes. The Academy also received Peter's famous "Kunstkammer" with its great collection of fossils, mineralogical specimens and curios, which in time developed into the present geological, zoological, mineralogical and palæontological museums. Almost on his deathbed, Peter drafted a plan for an expedition to Kamchatka to discover whether Asia and America were connected by land. The exploration of Russia and the study of its mineral, plant and animal resources played a large part in the scientific activities of the Academy at its inception. Its geographical department produced a series of maps of Russia and Siberia.

To commemorate the anniversary of its foundation, the Academy held a special session during May 25–June 6. The programme included meetings in Moscow and Leningrad, visits to various research institutes, and sight-seeing expeditions. More than a thousand guests from at home and abroad were invited. The session was opened by the President of the Academy, Vladimir Komarov, who spoke on the growing importance of the Academy. Papers were read on the history of Russian science in various fields and on the part played by Russian scientific workers during the War, and the contribution which they hope to make towards rebuilding the world. The geographical and geological expeditions of the Academy were the subject of special reports, as was the work of Russian men of science in the fields of organic chemistry, aerodynamics, mechanics and physiology. The problems now under investigation in the twelve departments of the Academy were discussed. The programme provided for a visit to the site of the famous Pulkovo Observatory, which was destroyed by the Germans. There was an exhibition of standard works printed by the Academy or written by its professors and published elsewhere. Some interesting manuscripts and other documents illustrating the history of the Academy were reprinted for the anniversary.