

a suitable equatorial mounting, though it is hoped that this may be done before the eclipse of 1922.

The results, to some extent, but, fortunately, not entirely, justified these apprehensions. The eclipse plates taken with the 13-in. (stopped down to 8 in.) are out of focus. Since the focus was good on photographs taken at night a few hours earlier, and also on the check plates taken before sunrise in July, the explanation appears to be a change of figure of the cœlostast mirror, due to the heat of the sun. These plates were compared with the July check plates by using a duplex micrometer. They show an undoubted gravitational shift, the amount at the sun's limb being $0.93''$ or $0.99''$, according to two different methods of treatment. The probable error, as estimated by the individual discordances, is about $0.3''$, but there is reason to suspect systematic error, owing to the very different character of the star-images on the eclipse and check plates. This instrument supports the Newtonian shift, the amount of which is $0.87''$ at the limb. There is one mode of treatment by which the result comes out in better accord with those of the other instruments. Making the assumption that the bad focus did not alter the scale, and deducing this from the July plates, the value of the shift becomes $1.52''$.

The results with the 4-in. lens are much more satisfactory. The star-images are well defined, and their character is the same on the eclipse and check plates. As the duplex micrometer would not fit these plates, a key-plate, on which the film was placed away from the lens, was taken in July, and all the plates in turn were placed in contact with this plate and compared with it. The resulting shift at the limb is $1.98''$, with a probable error of $0.12''$. The values from the separate stars are in good accord, and they support the fact of the shift varying inversely as the distance from the sun's centre; they are thus unfavourable to its being due to refraction, as was suggested by Prof. Newall at the meeting. Moreover, Prof. Lindemann pointed out that the comets of 1880 and 1882 had traversed this region without giving the slightest evidence of having encountered resistance; as their speed was about 300 miles per second, a vivid idea is given of the extreme tenuity of any medium that they encountered.

The Principe expedition was less fortunate in the matter of weather, but a few plates showed five stars. Since no check plates of the eclipse field could be taken there, another field near Arcturus was photographed, and both it and the eclipse plates were compared with plates of the same fields taken at Oxford with the same object-glass. It was, moreover, necessary to assume that the scale of the eclipse plates was the same as that of the check plate. This is justified by the fact that the diurnal variation of temperature in Principe is only some 4° F., and that there had been no bright sunshine on the mirror before totality. The measures indicate a shift at the limb of $1.60''$, with a probable error of $0.3''$.

It will be seen that the mean of this result and

that with the 4-in. at Sobral agrees very closely with Einstein's predicted value $1.75''$. It was generally acknowledged at the meeting that this agreement, combined with the explanation of the motion of the perihelion of Mercury, went far to establish his theory as an objective reality. Sir J. J. Thomson, who presided, spoke of the verification as epoch-making; he suggested that it would probably have a bearing on electrical theory, but he regretted the very complicated form in which Einstein expressed his theory, and hoped that it might be possible to put it into a form in which it would be more generally comprehensible and useful.

Dr. Silberstein laid great stress on the failure to confirm Einstein's third prediction, that of the displacement of lines in the sun's spectrum towards the red, to the amount of $1/20$ Ångström unit; this had not been verified, in spite of the careful search made by Dr. St. John and Mr. Evershed. As the probable error of their measures was much less than the quantity predicted, he looked on this result as final; some people had suggested that the shift might be veiled by a systematic outward movement of the photosphere, but as Dr. St. John made measures both at the sun's centre and limbs, that suggestion was not tenable. Prof. Eddington admitted that the failure threw doubt on the validity of some of the steps which led Einstein to his gravitational result; but he contended that the two other successes indicated that the result was right, even if reached by a wrong method.

There was some discussion on Prof. Lindemann's method of photographing stars in daylight by the use of red screens. However, the eclipse method seems more trustworthy, and the Astronomer Royal expressed the hope that the eclipse of 1922 might be observed with equatorials. The star-field is not so rich as in the late eclipse, but with longer exposure much fainter stars could be recorded. The eclipse-track crosses the Maldivé Islands and Australia, and is therefore fairly accessible.

A. C. D. CROMMELIN.

THE JUBILEE OF "NATURE": CONGRATULATORY MESSAGES.

IT is with a certain amount of diffidence that we give here a number of cordial messages which have reached us upon the attainment of the fiftieth anniversary of the foundation of NATURE. We believe, however, that many readers will be interested not only in the friendly greetings expressed in these messages, but also in the references to the work of science, and its expanding field of usefulness. To the official representatives of scientific societies and university institutions, and to the other men of light and leading who have honoured us with their congratulations, we offer our sincerest thanks. Such appreciation of past efforts affords the strongest stimulus to future endeavour.

While NATURE has the advantage of the active

interest and co-operation of so many distinguished leaders in the world of science, the columns of the journal will continue to represent with authority the position and claims of progressive knowledge. In sending us best wishes for continued fulfilment of this function, Dr. Hilda Brade-Birks and the Rev. S. Graham Brade-Birks, of the South-eastern Agricultural College, Wye, refer us to some striking verses in the seventh chapter of the Wisdom of Solomon in the Apocrypha, and the words are of such interest as expressing the human outlook upon natural knowledge that we are glad to reproduce them:—

God hath granted me to speak as I would, and to conceive as it meet for the things that are given me: because it is He that leadeth unto wisdom, and directeth the wise.

For in His hand are both we and our words; all wisdom also, and knowledge of workmanship.

For He hath given me certain knowledge of the things that are, namely, to know how the world was made, and the operation of the elements:

The beginning, ending, and midst of the times: the alterations of the turning of the sun, and the change of seasons:

The circuits of years, and the positions of stars:

The natures of living creatures, and the furies of wild beasts: the violence of winds, and the reasonings of men: the diversities of plants, and the virtues of roots:

And all such things as are either secret or manifest, them I know.

SCIENTIFIC AND OTHER SOCIETIES.

Royal Society. *President:* SIR JOSEPH THOMSON, O.M.—The council of the Royal Society offer to the Editor and publishers of NATURE their congratulations on the fiftieth anniversary of the publication of that journal. They desire to express their appreciation of the services rendered to science by NATURE during the past fifty years, both by the promotion of research and especially by providing an efficient and convenient means for workers in one branch of science to keep in touch with the progress made in other departments of scientific activity. They recall with satisfaction the fact that the jubilee of the election into the society of their distinguished fellow, Sir Norman Lockyer, coincides with that of his jubilee as Editor of NATURE.

Royal Society of Edinburgh. *President:* DR. JOHN HORNE, F.R.S.—I am glad to have the opportunity of expressing my high appreciation of the invaluable services rendered by NATURE in promoting scientific research in Scotland during the last fifty years. In 1862 a distinguished Scottish man of science deplored the progressive decay, during the previous half-century, of the once illustrious Scottish school of geology. Since that time the progress in each department of geological investigation in Scotland has been remarkable through the labours of English and Scottish geologists. The publication of NATURE has been a powerful stimulus to geologists and other men of science in North Britain to test all previous work in the light of the most recent research.

Royal Irish Academy. *President:* THE RIGHT HON. AND MOST REV. J. H. BERNARD, D.D., D.C.L., PROVOST OF TRINITY COLLEGE, DUBLIN.—The jubilee of NATURE marks the completion of fifty years' useful aid to science, and the proprietors are heartily to be congratulated on the fruitfulness of their undertaking. The application of science to the practical needs of mankind is taking a wider range every year, and the president of the Royal Irish Academy wishes all success to the Editor of NATURE in his efforts to encourage and give publicity to the aims of scientific research and its importance to the nation.

Royal Dublin Society. *Vice-President:* PROF. J. JOLY, F.R.S.—In furthering scientific progress, NATURE has played no small part, for it has supplied a vital necessity: early publication of new ideas, new results, and new projects. We who now write know that our earliest efforts found encouragement in its columns. May the early efforts of our successors continue to gather from its columns the same encouragement and the same stimulus! Looking back, we recognise and acknowledge that NATURE has played an important part in our lives.

Royal Anthropological Institute. *President:* SIR EVERARD IM THURN, K.C.M.G.—The council of the Royal Anthropological Institute has commissioned me to convey to the Editor of NATURE very hearty congratulations on the jubilee of that journal and on fifty years' successful furtherance of science generally, and not least of anthropology. Our subject may be said to have developed during the same period from a merely interesting to a scientific stage. We anthropologists foresee a very special task lying before us in the immediate future, in the betterment of the almost innumerable races included in our world-wide Empire. We look to NATURE for continued and increased help in the furtherance of this work.

Royal English Arboricultural Society. *President:* MAJOR G. L. COURTHOPE.—May I offer my congratulations to NATURE upon attaining its jubilee, and upon the excellent work it has done, during its fifty years of life, in the promotion of scientific study? The passing of the Forestry Act opens a fresh vista of useful possibilities to the student of natural science—a vista in which, I am sure, NATURE will play its part. In the United Kingdom scientific forestry has been the rare exception rather than the rule, with the result that our 3,000,000 acres of woodlands produce only a fourth of the yield which we might expect from them if scientific principles had been applied to the varying natural conditions of our countrysides. Let us hope that the next fifty years will make up for our shortcomings in the past.

Royal Institute of British Architects. *President:* MR. JOHN W. SIMPSON.—Many congratulations will be received on the issue of the jubilee number of NATURE, and I shall feel privileged by being allowed to add my own tribute. The journal has achieved a great position in the scientific world by reason of its sane and unprejudiced attitude towards research; and, in common with all highly specialised technical callings, the architectural profession is greatly indebted

to it. To the Science Standing Committee of the Royal Institute, and its various committees which are occupied with scientific research into matters connected with heating, lighting, construction, and building materials, NATURE is especially valuable. Pray accept my sincere good wishes for a long-continued prosperity.

Royal Astronomical Society. *President:* PROF. A. FOWLER, F.R.S.—The field of scientific investigation is ever widening with the advance of knowledge, and those who are engaged in research are fortunate in being always able to look with confidence to NATURE to keep them well-informed as to the latest developments in their own and other branches of science. By its timely announcement of approaching phenomena and its record of current work and thought the journal has rendered important services to astronomers, and can scarcely have failed to stimulate an intelligent general interest in the results of their work.

Royal Engineers Institute, Chatham.—The president and council of the Royal Engineers Institute offer their most sincere congratulations to NATURE on the attainment of its jubilee. They recognise with a lively sense of appreciation the high standard consistently set in its columns. They offer the Editor their thanks that he has never failed to enforce the great lesson: that the search for knowledge, pursued for its own ends and with no immediate thoughts of material gain, should be one of the most potent driving forces in the life of a nation. Without this impulse no material advance in civilisation is possible. Now at the present time, at the end of a devastating war which finds many exhausted and some despairing of the future, it is more than ever necessary to hold this beacon aloft and to convey a message of encouragement to all workers engaged in the great search for natural knowledge, bidding them remember that, whatever be the temporary distractions of the time, they should never lose sight of the central truth: that with them lies, in no small degree, the future of the world.

Royal Horticultural Society. *Chairman of Council:* MR. HARRY J. VEITCH. *Secretary:* REV. W. WILKS.—Like most ancient arts, the practice of horticulture was rooted in tradition and hedged about by empiricism. Advancing knowledge gradually lets in light upon its many branches, stimulates its dormant buds into growth, and surrounds its roots with the vitalising environment of experiment. It is an art that lays all Nature under contribution; that can flourish best where knowledge of Nature is deepest. In the name of British horticulturists we congratulate NATURE, which has done so much to spread knowledge, upon its fifty years of usefulness, and wish it and those whose work it tells of continued diligence and success.

Royal Society of Medicine. *From the PRESIDENT.*—During the fifty years that NATURE has provided a weekly summary of science the changes in medicine, particularly as regards diagnosis and treatment, have been without parallel. This is shown by a comparison of the toll of disease, on one hand in the late war, and on the other in the Crimean, North and South, and Franco-Prussian Wars. The changed picture is due

to the practical application of science. Pasteur's researches gave us bacteriology and a knowledge of the nature of infection, and rendered possible the modern treatment of wounds, introduced by Lister, and the use of serums and vaccines. The diagnostic and therapeutical use of X-rays, the employment of radium, and many other advances are further gifts from science. But this transformation of medical practice only reveals a multitude of important problems concerned with the prevention, early detection, and effective treatment of disease, and for their solution we must look to scientific research.

Royal College of Surgeons. *President:* SIR GEORGE H. MAKINS, G.C.M.G.—The realm of science may well acclaim the jubilee of NATURE, and no less all those concerned in the promotion of the public good. The occasion arrives opportunely, for at no time has the public sense been so forcibly awakened to the influence of the applications of science to such divergent objects as trade, medicine, war, or the feeding of the population. If important changes founded on the progress of science are to be effectively introduced, those who will be affected must be educated and prepared beforehand. In this great work NATURE has taken and must take a prominent part, an aim no less wide-reaching than that of bringing students in every branch of science into association and establishing a common bond of sympathy and mutual understanding between them.

Royal United Service Institution. *Chairman of the Council:* ADMIRAL SIR F. C. D. STURDÉE, BART., K.C.B., K.C.M.G., C.V.O.—As chairman of the council of the Royal United Service Institution, I wish to convey the congratulations of the council and myself to the proprietors and Editor of NATURE on attaining its jubilee. We all recognise the excellent service that the journal has rendered to science during the last fifty years. Science, while aiming at the development of human progress, was ready to turn its thoughts and genius to helping the Empire in its time of trial. This fact is most thoroughly appreciated by the Navy, Army, and Air Force, and as one of their representatives I wish to express my thanks, and trust that NATURE will continue its help to the fighting Services for the defence of the Empire.

Highland and Agricultural Society of Scotland. *Chairman of Directors:* MR. CHARLES DOUGLAS, C.B.—It gives me great pleasure to congratulate the Editor of NATURE on the attainment by that journal of its jubilee. Writing as a representative of the agricultural industry, I desire to acknowledge the immense benefits which that industry has received from the development of science, and especially in the field of chemistry. It is universally recognised that the future success of the industry depends in large measure on the further application of scientific discovery. Both fundamental and practical research in bacteriology promise to give invaluable results, whether in the near or remote future; and the further development of engineering in its application to agriculture offers great prospects of economy and increased efficiency in production. I offer my most sincere good wishes for the future of NATURE.

Society of Public Analysts and Other Analytical Chemists. *President:* DR. SAMUEL RIDEAL.—As president of the Society of Public Analysts, I beg to offer you congratulations on reaching the jubilee of NATURE. The journal has always been the pioneer of scientific progress in this country, and has contributed not a little in its development at the present time. It looks as if the Government and the daily Press are still far from realising what the promotion of science and its value to the national needs means. Members of my society, who are for the most part Government officials under Acts passed so long ago as 1875, a few years after your first number appeared, have recently been, I believe, transferred to a new Government Department, the Ministry of Health, which starts on its new career, like its predecessor, without any adequate representation of pure science on its councils. Your weekly numbers must have a beneficial effect upon the national development, and I hope that your circulation will increase and that the knowledge which you reveal will be assimilated and rendered more and more available for the general good.

Anatomical Society of Great Britain and Ireland. *President:* PROF. ARTHUR KEITH, F.R.S.—NATURE is the link which binds British men of science together. It is essential, and I wish it long life and prosperity.

Institution of Automobile Engineers. *President:* MR. THOMAS CLARKSON.—A lover of science is content to follow devotedly the object of his affection regardless of whether his revenue is likely to be speedily augmented thereby. He should, nevertheless, take a broad view that does not exclude the consideration of probable benefit to the community as a result of his endeavours. In other words, the true man of science is a public servant in the widest sense, and his work is directed to bettering the conditions of life, reducing its toil, evil, and "dis-ease," while increasing its pleasure and charm: for example, by adding to our knowledge and power of controlling the forces and amenities of Nature; by solving the problem of increased production with greater leisure to the worker; by increasing cultivation; by reducing the cost of transport, and thereby facilitating intercourse.

Biochemical Society. DR. ARTHUR HARDEN, F.R.S.—The recognition of biochemistry—linked on one hand with chemistry, and on the other with biology—as a distinct branch of science has gradually come about during the half-century covered by the publication of NATURE. To students of this borderland science NATURE, with its comprehensive and impartial treatment of the physical and biological sciences, has always been of special value, bringing within their reach the opinions and discoveries of other workers, whose results, obtained in fields beyond their own boundaries, are yet of great interest and often of supreme importance to them. It is precisely this universality of scientific interest which constitutes the chief value of NATURE to the investigator, and as long as this is maintained, so long will the journal continue to flourish and earn the gratitude of its scientific readers.

British Academy. *President:* SIR F. G. KENYON, K.C.B.—The jubilee of NATURE is not a matter of

interest to students of natural science alone. It is, I hope, generally recognised now that the interests of science and of the humanities are not hostile, and that the welfare of the nation depends on the advance of knowledge in both these spheres, and in a fuller recognition of the necessity of both. NATURE, I am sure, under its present administration, will, without prejudice to the subjects with which it is specially concerned, continue to advocate the cause of knowledge and intellectual culture as a whole; and all friends of the humanities will wish it God-speed.

British Association. *President:* SIR CHARLES A. PARSONS, K.C.B., F.R.S.—The British Association sends its most cordial greetings to NATURE on the completion of its fiftieth anniversary. The influence of NATURE on the advancement of science for half a century has been wide and comprehensive, and a powerful factor in popularising scientific thought and progress. To men of science also it has been of great assistance by chronicling contemporary progress in the advance of the sciences and arts, and has been a medium for the interchange of information, knowledge, and ideas.

Chemical Society. *President:* SIR JAMES DOBBIE, F.R.S.—The advance of chemistry takes place to-day along a front which has been enormously extended since the first number of NATURE was issued. Moreover, it is supported by forces so vastly superior in number, in organisation, and in equipment to those existing in 1869 that scientific workers may go forward in the confident anticipation that the progress of the next fifty years will be even more wonderful than that of the half-century which has witnessed the elucidation of the constitution of the most complex organic compounds and the formulation of the periodic law, and has revealed the structure of the atom. Amongst the agencies to which the improvement of the position of science in this country is due NATURE takes an important place, not only by the opportunities it has afforded scientific men for interchange of views, but also by the force and persistency with which it has advocated the cause of scientific education and brought the claims of science before the attention of the Government.

Institute of Chemistry. *President:* SIR HERBERT JACKSON, K.B.E., F.R.S.—It gives me very great pleasure to offer, on behalf of the Institute of Chemistry, hearty congratulations to NATURE on fifty years of work in the best interests of science. At no part of that period has the importance of applying science to industry been more evident than it is to-day, and at no time, perhaps, has it been more abundantly clear that sound and broad training in pure science is imperative if real progress is to be made in its applications. May NATURE flourish and continue to spread knowledge of science, to show its necessity in education, and to point out how prolific a source it is of benefits to mankind.

Institution of Electrical Engineers. *President:* MR. ROGER T. SMITH.—NATURE attained its jubilee within a few days of the first full meeting of the International Electrotechnical Commission held since peace was signed. Well-known electrical engineers representing twenty-one foreign countries

met in London to standardise, for those nations participating, some of the fundamental constants and relations on which the applications of electrical science to industry depend. NATURE throughout its career has stood in the first place for pure science, and since most of the important applications of science to industry have grown from the discoveries of the worker in pure science, I recognise the high standard of NATURE's work and of its ideals, and hope that both may long continue in the same happy combination.

North-East Coast Institution of Engineers and Shipbuilders. *President:* MR. A. ERNEST DOXFORD.—I have the greatest pleasure in congratulating NATURE upon the attainment of its fiftieth birthday. Throughout the past half-century the journal has maintained its character as the organ of workers in fields where science is studied mainly for its own sake, and has refused to sacrifice accuracy to the demands of what is understood as "popular" science. It is a healthy sign that the periodical should be so prosperous, testifying to the existence of a constant and active desire for British scientific literature of a high standard. I sincerely wish continued prosperity to the good work which NATURE is undoubtedly doing. The development of the journal along its present lines cannot but be beneficial to scientific progress.

Institution of Engineers and Shipbuilders in Scotland. *President:* DR. T. BLACKWOOD MURRAY.—As president of the Institution of Engineers and Shipbuilders in Scotland, allow me to express our congratulations on the occasion of the jubilee of NATURE. While perhaps the journal, dealing as it does largely with questions of pure science, may be said to be at the extreme pole from that occupied by the intensely practical applications of science which form the life-occupation of us engineers, still I think every day it is being more and more realised that it is largely due to the pioneer in pure science that we owe all modern developments in engineering. The worker in pure science may be likened to the explorer making excursions into virgin country, while we follow along after as the builders of towns and founders of industry. The day has passed when the practical engineer was inclined to scoff at science and theory, and was too prone to point to apparent contradictions of practice as against theory. Nowadays no engineer can hope to succeed unless he takes advantage of all that science can teach him. It therefore gives me much pleasure to take this opportunity of wishing NATURE continued prosperity.

Faraday Society. *President:* SIR ROBERT HADFIELD, BART., F.R.S.—It is with much pleasure I learn of the jubilee of NATURE—a publication which has done so much in the past to assist science and scientific development; in fact, its name has been a household word throughout the world. I should like to offer my best wishes for the future success of this valuable aid to those who strive to promote science and scientific interests. There never has been a time in the history of our nation when it was more desirable that the best possible stimulus should be afforded to those who guide the destinies of the British Empire in educational matters, especially matters relating to science

and its development, which surely in the near future will have its proper position allotted to it in our Government Departments and establishments. It has been well said that, of developments in such Departments, Science is the "Cinderella." It is therefore to be hoped that steps will be taken to remedy this crying injustice, which is so damaging to the true interests of the nation.

Geological Society. *President:* MR. G. W. LAMPLUGH, F.R.S.—During the past fifty years NATURE has faithfully mirrored for us the advance of science all along the line, and epitomised and discussed the new results, both observational and speculative. It has enabled the individual worker to keep in touch with the main currents of progress in branches other than his own; moreover, it has served him as a general chronicler of happenings in the sphere of science, and has gratified his desire to know something about the personality of the leading investigators, past and present. I congratulate the Editor on the sustained skill with which the complex task has been accomplished, and I look forward with confidence to its successful continuance.

Illuminating Engineering Society. *President:* MR. A. P. TROTTER.—Maxwell, at the British Association meeting in the year after NATURE first appeared, referred to the reciprocal effects of the progress of science. "When the student has become acquainted with several different sciences, he finds that the mathematical processes and trains of reasoning in one science resemble those in another so much that his knowledge of the one science may be made a most useful help in the study of the others." The expansion of all branches of science in these fifty years has compelled most of us to specialise, not in one branch, but in a bough or a twig of the tree of knowledge. The pages of NATURE have enabled this broad acquaintance to be made and this useful help to be rendered, not only between mathematics and physics, but also between all the natural sciences.

Institute of Journalists (Scientific and Technical Circle). *Chairman:* MR. LEON GASTER.—I gladly take this opportunity of congratulating NATURE on the attainment of its jubilee, and expressing my great appreciation of the work it has done, and is doing, for the promotion of science and the encouragement of education. NATURE in many respects occupies a unique position. It speaks with an authority on scientific matters that is unrivalled; it has been fortunate in enlisting the help of experts in every field of science; and its treatment of subjects is invariably up to date. At the same time its outlook is sufficiently broad for it to interest many persons outside strictly scientific circles, and thus to promote that general appreciation of the value of science which is so essential in these times. I am sure that this useful record of work, extending for fifty years, has established the position of NATURE as a permanent and indispensable publication in the interests of the advancement of science.

Linnean Society. *President:* DR. A. SMITH WOODWARD, F.R.S.—The president and council of the Linnean Society desire to associate themselves in the congratulations due to the Editor and publishers of

NATURE on the attainment of the jubilee of the journal. It is a noteworthy achievement of British science to have maintained for fifty years an organ of intercommunication for scientific workers perused and recognised by the men of learning of all nations. In these modern days of high specialisation it is more than ever important that those engaged in research should have the easy access to a summary of all current progress, such as NATURE affords, and naturalists unite with other men of science in expressing their best wishes for the continued success of the weekly publication to which they are already so much indebted.

Manchester Literary and Philosophical Society.—The council of the Manchester Literary and Philosophical Society desires, on the occasion of the completion of fifty years issue of NATURE, to express its high appreciation of the valuable aid which that journal has given to the development of science during that period. The council hopes and believes that the high standard of the reviews, reports, and original articles which has always characterised the journal in the past will be fully maintained in the future, and that with the growing recognition of the vital importance of scientific knowledge the journal will exert a constantly increasing influence for the diffusion of true learning.

London Mathematical Society. *President:* MR. J. E. CAMPBELL, F.R.S.—The London Mathematical Society is just four years older than NATURE; in the early days and later the work of the society was promoted by a brief report of its activities in that journal. The volumes of NATURE with their indexes, especially the earlier ones, have permanent value as one of the most effective sources of reference for the general history of scientific progress in the last half-century. It is much to be desired that this very essential service to the scientific world may be maintained unimpaired.

Institution of Mechanical Engineers. *President:* DR. EDWARD HOPKINSON, M.P.—The jubilee of NATURE is an event of more than passing interest. During the last fifty years NATURE has been a potent factor in the diffusion of scientific knowledge. The realm of science is vast. Its boundaries are being constantly pushed further into the unknown. Of necessity, scientific workers must become more and more specialised in particular lines of research, and they need the help of some organ through which they can watch the progress of science in general. Such a survey NATURE has provided, always up-to-date and always discriminating, and in so doing has helped to raise the status and strengthen the fellowship of scientific men throughout the world. To a much wider circle of men engaged in profession and industry, whose daily work is so exacting as to preclude serious scientific study, NATURE affords the opportunity of keeping in touch with scientific discovery and thought. Lastly, NATURE has done much, though much remains to be done, towards convincing our administrators and politicians that to neglect science and to fail to act upon its precepts is to doom the national life to decay.

Mineralogical Society. *President:* SIR WILLIAM PHIPSON BEALE, BART.—Among the many scien-

tific societies which will be moved to express gratitude and goodwill on the occasion of the jubilee of NATURE the Mineralogical Society of Great Britain and Ireland finds a place. The society was founded in February, 1876, under the presidency of Henry Clifton Sorby; and in December, 1883, under the presidency of Prof. Bonney, it absorbed the Crystallological Society. It is a proud thing to be able to say, in recalling these two names, that the society has seen, and taken some part in, the development of the domain of the mineralogist and crystallographer into the wide fields of molecular physics, the exploration of which has been the most marvellous work of distinguished men of science in recent years. It is equally pleasant to recognise the co-operation of NATURE, associated with the name of Lockyer, in stimulating interest in, and sustaining the work of, such research, cultivating the ground some years before the Mineralogical Society came into existence.

Institution of Mining and Metallurgy. *President:* MR. HUGH K. PICARD.—For fifty years NATURE has provided a link between workers in the fields of pure and applied science. During the war the achievements of chemistry and metallurgy, many of which have been recorded in its pages, were nothing short of astounding; indeed, no branches of scientific learning were more thoroughly tested or gained greater victories over almost insuperable difficulties. Urgency demands that *results* should be secured at any cost; consequently economics had to take second place. In the coming peaceful fight for the world's trade the metallurgist and chemist are faced with a new set of difficulties brought about primarily by the high costs of fuel and labour. They cannot look forward to well-earned rest, but must devote themselves anew to the problem of reducing the cost of production, always having before them the important economic factors which can no longer be put in the background.

Optical Society. *President:* PROF. F. J. CHESHIRE.—There is only one NATURE, as there is only one *Punch*—each supreme in its own sphere.

Institution of Petroleum Technologists. *President:* SIR FREDERICK BLACK, K.C.B.—In earlier days men with scanty knowledge, if any, of science found, and in crude fashion utilised, natural petroleum. To-day large production and economical utilisation demand the services of the geologist, the chemist, and the engineer, all of whom have a common platform in the pages of NATURE. The geologist, by his study of strata, directs effort to the more likely places. The chemist, by research and analysis, ascertains the proportions and properties of the constituent fractions of the crude oil. The applied science of the engineer and the chemist turns laboratory methods and apparatus into those of the commercial refinery. Contrast the early crude methods with those of to-day, and some realisation will result of the work already done by science in guiding the utilisation of a great gift of Nature. The field for similar effort is still great.

Physical Society. *President:* PROF. C. H. LEE, F.R.S.—As president of the Physical Society I desire to offer

my congratulations to NATURE on attaining its jubilee. There are, unfortunately, few physicists left who read the first number on its appearance, and it is hard for those of us who have grown up to expect NATURE as regularly as Friday morning to realise how difficult it was fifty years ago to get trustworthy information on any scientific subject of special interest at the moment without going to original sources and reading at great length. To the specialist who is anxious to keep in touch with the world of science outside his own groove NATURE comes as a refresher, and to the general reader who finds his daily paper too untrustworthy on scientific matters it is an invaluable authority.

Physiological Society. PROF. W. D. HALLIBURTON, F.R.S.—The Physiological Society has no president, and has never had one. At a recent meeting of the society I was deputed (as the oldest member present) to convey to the Editor of NATURE our hearty congratulations to that journal on having reached its jubilee, and to thank its staff for all they have so successfully done in the promotion of scientific interests during the last fifty years. The position of science to-day is very different from what it was in 1869. There still remains much to be done in the education of the public in reference to the value of science to the nation at large, but we anticipate that in the future, as in the past, NATURE will occupy a prominent place in this branch of education. The recent war has during the last five years brought home to the people a keener appreciation of the national value of science than the preceding forty-five years of peace, and in the time of "reconstruction" now entered upon all will hope that both rulers and ruled will realise and act upon the imperative nature of the study of science, both pure and applied, if our efforts to make the world a better place are to be successful. The Physiological Society desires me to allude in conclusion, when sending a message to a literary journal, to the fact that it also has undertaken the publication of a periodical entitled *Physiological Abstracts*, by means of which its own particular part of the gospel may be spread. It was a direct outcome of the powerful stimulus of war, and we trust when the time of its jubilee arrives it may be able to show as good a record as its elder sister NATURE.

Röntgen Society. *President:* GEORGE B. BATTEN, M.D.—"Work is worth doing for work's sake." Twenty-four years ago Röntgen, following the work of Crookes and Lenard, discovered X-rays, and a translation of his paper appeared in the columns of NATURE (January 23, 1896) within a few days of the announcement of the discovery. In less than a quarter of a century the discovery has been of inestimable benefit to mankind not only in diagnosis and treatment, but also in metallurgy, and has created quite a new and extensive industry. Moreover, the investigation by Rutherford and a host of workers of the properties of X-rays and of the kindred rays of radioactive substances has increased our knowledge to such an extent that our conceptions of the ultimate constitution of matter and of the universe have been enlarged and revolutionised.

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FOREIGN ACADEMIES AND SCIENTIFIC SOCIETIES.

Belgium.

Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique. *Permanent Secretary:* M. PAUL PELSENEER.—It is a great satisfaction for the Royal Academy of Sciences of Belgium to greet the first jubilee of NATURE. The Academy highly appreciates what NATURE has done for the promotion of science, especially in helping the speedy diffusion of the most important discoveries in every department. The Academy wishes the next period of fifty years to be still more fruitful, and that NATURE may assist scientific progress in the future as much as in the past. The Academy thinks that the "Entente Cordiale" of the inter-Allied academies and the newly instituted International Council for Scientific Research, in Brussels, will be, by a methodical co-ordination of work, the best and quickest means of promoting scientific knowledge. Lastly, the Academy thinks all scientific workers understand that it is urgent to compensate for five years' interruption by a renewal of activity and production.

France.

Société d'Encouragement pour l'Industrie nationale. *Le Président:* M. L. LINDET.—La Société d'Encouragement pour l'Industrie nationale a suivi avec intérêt les publications scientifiques du journal NATURE; elle y a souvent rencontré des articles de science industrielle dont elle a fait son profit, en même temps qu'elle se félicitait de voir NATURE faire à son Bulletin des emprunts fort bien sélectionnés. Son ancienneté, qui remonte à 1801, lui donne toute autorité pour souhaiter à NATURE, aujourd'hui cinquantenaire, une longue et glorieuse existence.

Société de Géographie, Paris. *Le Président:* LE PRINCE BONAPARTE, DE L'INSTITUT DE FRANCE. *Le Secrétaire Général:* M. G. GRANDIDIER.—La Société de Géographie ne saurait demeurer indifférente à la célébration du cinquantenaire de NATURE. En effet, depuis le jour où elle a commencé de paraître, NATURE s'est toujours intéressée à la géographie; elle lui a fait sa place parmi les sciences dont elle s'occupait, et, par nombre d'études publiées dans ses différents fascicules, elle a, d'autre part, indirectement contribué à ses progrès. Aujourd'hui, NATURE peut encore agir de même, et même plus efficacement que jamais; il n'y a plus à réaliser de grandes découvertes géographiques; mais, par contre, que d'études minutieuses sur le relief, le climat, la flore, la faune, l'homme aussi, s'imposent aux travailleurs! En publiant des travaux originaux, en donnant les conclusions des principaux mémoires parus ailleurs, NATURE continuera de bien servir la géographie après 1919, exactement comme elle l'a fait précédemment durant le demi-siècle écoulé depuis 1869.

Holland.

Dutch Academy of Sciences, Amsterdam. *President:* PROF. H. A. LORENTZ.—On the occasion of the jubilee of NATURE I have great pleasure in expressing my high appreciation of the important services it has rendered to science during the fifty years of its existence. The

wonderful progress that has been made in all directions has been faithfully recorded in the columns of this journal, which has been a most valuable source of information and a great aid in their work to scientific men all over the world. I heartily hope it may remain so for many years to come.

Norway.

Bergens Museum. *President:* DR. JOHAN LOTHE.—During the war natural science amply proved what immense powers it wields and what great ends it can attain. In the work of reconstruction and peaceful development which is before us we shall look with greater expectations to science and to the results of scientific research. A highly trained staff of scientific workers, with well-furnished laboratories at their command, will then be an invaluable asset to any nation. At the same time we may entertain a hope that science, which is of necessity international, will in course of time be able to renew the bonds of international intercourse and co-operation which have been broken by the war, and thus enable mankind to bring the work for peace among nations to a happy end.

Portugal.

Academia das Ciências de Lisboa. *President (Class of Sciences):* JOSÉ JOAQUIM DA SILVA AMADO.—The great advances of science since the second half of the eighteenth century which are enjoyed by us, and the benefits of which are increasing every day, have been the result of three essential conditions, namely:—(1) The progressive triumph of the freedom of thought over the old tyranny of a dull scholasticism and its metaphysics, by which intellectual advancement was retarded for so long; (2) the establishment of the fertile and sound principles of experimental method; and (3) the wide publication, with comments and criticisms through books and periodicals, of the valuable scientific conquests obtained by the genius of man. In the group of periodicals which have contributed so powerfully to bring the extensions of natural knowledge in their diverse manifestations before a wide circle of readers NATURE, the fiftieth year of which is now celebrated, has contributed very greatly. The journal must be considered an active promoter of scientific learning, and of the spirit by which the treasury of human knowledge is enriched. Associating ourselves with its jubilee feast, we send our very hearty compliments to NATURE'S Editor and publishers.

Switzerland.

Société de Physique et d'Histoire Naturelle de Genève. *Le Président:* M. J. CARL. *Le Secrétaire:* M. E. JOURKOWSKY.—Les naturalistes genevois ont appris avec plaisir que le périodique NATURE fêtait prochainement le cinquantenaire de sa fondation. Ils apprécient les immenses services que ce journal a rendu à la diffusion des sciences naturelles par ses comptes rendus judicieux de l'activité des académies, par ses critiques des publications scientifiques et surtout aussi par des articles originaux dûs à la plume des savants anglais et étrangers les plus éminents. Tout en se mettant au service de la science pure, NATURE s'est toujours efforcé de tenir ses lecteurs au

courant des progrès réalisés dans la technique et dans l'enseignement des sciences naturelles. Persuadés que votre journal continuera à occuper un des premiers rangs parmi les périodiques scientifiques, nous rendons hommage au travail que vous avez accompli et souhaitons à votre entreprise le meilleur succès dans l'avenir.

Société Helvétique des Sciences Naturelles.

Central President: PROF. DR. ED. FISCHER.—I beg to offer my hearty congratulations on the fiftieth anniversary of NATURE. The journal has always in a remarkable manner understood how to present an extraordinarily complete survey of the position and development of the various branches of the natural sciences. It has also had the good fortune to number among its contributors the most distinguished naturalists and thinkers of Great Britain. To our congratulations we add the expression of our grateful recognition of the fact that the journal has repeatedly directed the attention of its readers to Swiss research work and the activity of our society. May NATURE ever succeed in awakening and retaining interest in the high importance of the natural sciences in the widest circles.

United States.

The Franklin Institute, Philadelphia. *President:* MR. WALTON CLARK. (By cable.)—The Franklin Institute extends to NATURE heartiest congratulations on the attainment of its jubilee. No journal has contributed more in the past fifty years to stimulate interest in physical and natural science. May you be as successful in the future; for a widespread knowledge of science is to-day imperative if the civilised nations are to continue to exist.

National Academy of Sciences, Washington. *Foreign Secretary:* PROF. G. E. HALE. (By cable.)—The president, Dr. Charles D. Walcott, requests me to offer his congratulations to NATURE on the occasion of its jubilee and on behalf of the Academy to express the deep appreciation felt in the United States for the work accomplished by NATURE in the advancement of research in the world. During a period of specialisation NATURE'S extensive survey of the progress of research has stimulated wider vision and larger effort in spite of repeated discouragement. It has urged upon the statesmen of two generations the vital importance of science to the nation. At a time when the branches of science, no longer isolated, are uniting in common channels, and when Governments once unappreciative are recognising the bearing of research on national security and public welfare, we rejoice in NATURE'S expanding influence and the higher opportunities for services opening to it in a newly ordered world.

UNIVERSITIES.

Queen's University of Belfast. *Vice-Chancellor:* REV. THOMAS HAMILTON, D.D.—Most heartily do I congratulate the Editor and proprietors of NATURE on its jubilee. The progress of science in the half-century which has passed since November 4, 1869, when the first number of NATURE appeared, has undoubtedly been more illustrious than that

of any previous fifty years (or, for that matter, any previous one hundred and fifty years) of the world's history, and there can be no question that, in that progress, NATURE has been indeed *pars magna*. All the indications, however, point to the conclusion that, splendid and memorable as has been the advancement of science in that half-century, the next fifty years will see the chariot wheels revolving with a vastly increased velocity. That being probably so, it is equally clear that the services of such a journal as NATURE will, in the future, be more needed than ever before. I congratulate, *ex imo pectore*, all concerned in its publication on the conspicuous ability with which it has been conducted, the splendid progress it has made, and the value of the work it has done since the issue of its initial number. But I also congratulate, with equal cordiality, the entire scientific world, at the commencement of another vitally important half-century, on the possession of such a very ably conducted and enlightened organ, and I fervently pray that, when the year 1969 arrives, it will find our beloved NATURE still holding on its way and, in its very old age, still bringing forth such fruit as it now yields from week to week with ceaseless regularity, acceptance, and success.

University of Birmingham. *Vice-Principal:* SIR WM. ASHLEY.—The influence of NATURE on the welfare of modern universities is matter for grateful acknowledgment. It has fostered that local generosity and enlightened opinion which led to their foundation and endowment. Through its columns there has appeared an informed and helpful criticism that has furthered university growth and development, and its records of progress in science have been of value to all graduates, and specially to those scattered in distant centres. The list of universities is not yet complete. A new age of learning has begun. New centres for promoting "humane" and scientific knowledge are arising. Meanwhile, as one of recent growth, the University of Birmingham cordially congratulates NATURE on its successful advocacy of higher learning, and sincerely hopes that its influence may continue to help those who are shaping the educational future of the Empire during the fateful years that are coming.

University of Bristol. *Vice-Chancellor:* SIR ISAMBARD OWEN, D.C.L., M.D.—I hope I may be permitted to offer my hearty congratulations to NATURE upon the attainment of its jubilee. Since its first appearance in 1869 NATURE has occupied an essential place in the scientific life of this country, and may pride itself on having attained the rare position of an indispensable publication. I shall but be voicing the feeling of the whole scientific world in wishing it a long career of continued prosperity and usefulness.

University of Cambridge. *Vice-Chancellor:* DR. P. GILES.—It must be a great satisfaction to all who admire and wish well to British learning to know that at the end of its fifty years of successful career NATURE remains as it has so long been: a most valuable medium of opinion and criticism on scientific subjects. To NATURE the man who is remote from academic centres looks for the first information on new dis-

coveries and for a sound judgment on the publications of the scientific world. One result of the war has been an advance, rapid beyond past experience, in many fields of knowledge. Of all such advances may NATURE continue to be the herald as heretofore!

University of Durham. *Vice-Chancellor:* MR. J. S. G. PEMBERTON.—The Vice-Chancellor, on behalf of the University of Durham in general, and the Dean of the Faculty of Science, on behalf of the Science Faculty at Armstrong College in particular, send hearty congratulations to NATURE on the celebration of its jubilee. NATURE, in the past, has occupied a unique position in forming a connecting link between workers in various branches of science the world over. Many a time discussions on subjects of interest to more than one scientific section have been carried on in its columns. A notable case was when the late Lord Rayleigh in 1892, in a letter to NATURE, asked for suggestions from chemists as to the reason for the discrepancy he had found between the densities of "atmospheric" and "chemical" nitrogen. This led eventually to the successful co-operation of Lord Rayleigh and Sir William Ramsay in the discovery of "argon." Such interlinking between the sciences promises to be of even greater importance in the future.

University of Edinburgh. *Principal and Vice-Chancellor:* SIR ALFRED EWING, K.C.B., F.R.S.—My debt to NATURE extends back to the 'seventies, when we were both very young. From time to time I have been a contributor; always an interested reader. In the steady advance and diffusion of scientific knowledge during half a century NATURE has taken an honourable part, maintaining a standard which has never failed to command the respect and gratitude of serious workers. That its usefulness may long continue is the confident hope of many who in a double sense are students of Nature.

University of Glasgow. *Vice-Chancellor:* SIR DONALD MACALISTER, K.C.B.—I attended the dinner given to the Editor of NATURE five-and-twenty years ago, when Huxley and other contemporary leaders in science bore strong testimony to the great part which the journal had played in furthering the cause of natural knowledge and inquiry in this country. NATURE has, in the fateful years since then, maintained and enhanced its influence and usefulness. It has become, indeed, an indispensable factor in the development of British science. It still furnishes "solid ground" to "the mind that builds for aye." It still informs, chastens, and stimulates the scientific worker and the scientific teacher. None interested in modern higher education in particular can afford to overlook a single weekly number, except at the risk of missing a link in the evolution of the subject.

The University, Leeds. *Vice-Chancellor:* SIR MICHAEL SADLER, K.C.S.I.—We bring our tribute of gratitude and honour to those who have made the columns of NATURE during its fifty years of public service a source of indispensable help and stimulus to students of science and to those engaged in scientific education. The exacting care with which it has been

edited, the impartiality and precision of its judgments, the wide range of its information, the accuracy of its reports, have given NATURE in its own sphere unique distinction and authority. These have been used for the disinterested furtherance of investigation and for the support of the claims of science upon national attention and support.

University of Liverpool. *Vice-Chancellor:* PROF. J. G. ADAMI, F.R.S.—Looking backwards over the last quarter of a century spent overseas in Canada, I cannot but realise the heavy debt owed by me and other university teachers there to NATURE for keeping us in touch with the advances made in the various fields of science. Here, in Britain, the great dailies deal increasingly with the latest scientific developments. It is not so with the daily Press in North America. That is becoming more rather than less local and provincial. The broad survey given in NATURE fills a void in the New World that is in part bridged over in the Old. Perhaps more abundant illustrations and one or two articles each week upon the application of science and the laws of Nature to industry, added to the present contents, would widen the circle of its readers, increase its influence, and reflect the spirit of the age.

University of Manchester. *Vice-Chancellor:* SIR HENRY A. MIERS, F.R.S.—In common with all readers of NATURE, I regard its jubilee as a great event. Life would have been a different thing to us without our weekly NATURE, which has become an old friend because it has preserved its character unchanged. This is a great achievement and a testimony to the wisdom with which it was originally planned. Always a real scientific journal, it has continued to be also a popular journal in the best sense, and a great help in these days of increasing specialisation. A new and complete index to the first 100 volumes would be invaluable to all scientific workers.

University of Oxford. *Vice-Chancellor:* REV. DR. H. E. D. BLAKISTON.—The Vice-Chancellor of the University of Oxford is interested to hear that NATURE attains its jubilee in November, and offers his congratulations to the Editor. He cannot profess to be a constant reader of any scientific periodical; but when he wants clear information on any topic of scientific interest which is attracting public attention, or details of the career of any member of the University or of his own college who has obtained distinction in natural science, his first thought is to obtain the loan of a copy of the current number of NATURE.

University of Sheffield. *Chancellor:* THE MOST HON. THE MARQUESS OF CREWE, K.G.—I am happy to add my name, as Chancellor of Sheffield University and chairman of the Governors of the Imperial College, to the long list of those who are congratulating NATURE on its life of fifty years. As the nation becomes more and more conscious of its need for scientific training and the encouragement of research, it will continue to set an increasing value on NATURE, both as a record of progress and as the trusted vehicle for the expression of scientific opinions.

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PERSONAL.

PROF. ISAAC BAYLEY BALFOUR, F.R.S.—NATURE, founded in the period of revolution in scientific thought following Darwin, by presentation of the work and aims and its advocacy of the claims of science, has been a powerful factor during fifty years in securing recognition by the nation of the importance of science which the lessons of the war have enforced. The world of science is proud of it. May its influence in this new period of reconstruction continue to operate forcefully, so that congratulations at its centenary may be as gratefully tendered as are those we offer now.

SIR GEORGE BELBY, F.R.S.—I gladly record my grateful appreciation of the services rendered by NATURE to the cause of scientific culture in the best sense. The increasing tendency to specialisation by individual workers makes it more and more desirable that their touch with science in its widest aspects should be maintained with the minimum of effort on their part. This, it appears to me, will continue to be—as it has been in the past—one of the most valuable functions of NATURE.

SIR JAMES CRICHTON-BROWNE, F.R.S.—For fifty years NATURE has held the mirror up to Science and faithfully reflected her every movement. Each volume has been a record of the best brain-work of the year, ranging from the simplest observations to the most recondite abstractions. Recent issues have revealed the tremendously destructive forces that science wields, and have suggested that it has been owing to the lack of science in high places, and to the blundering that ignorance and arrogance beget, that these malign forces have been let loose on mankind. But science unperverted is beneficent, and nothing is more urgently needed at this hour than its teaching and popular exposition. Great is Science—"mightiest in the mightiest"—and NATURE is its handmaid. *Floreat Scientia! Floreat "Natura"!*

RIGHT HON. LORD BRYCE, O.M., F.R.S.—The amazing, and indeed unprecedentedly rapid, progress made during the last half-century in practically every branch of physical science, together with the increasing specialisation of most branches, has made it more and more difficult for those non-scientific persons who watch with eager curiosity the steps in that progress to follow its developments. Such persons, and especially those who occupy themselves with the study of the humanistic departments of knowledge, have long valued highly the help they receive from your journal. As one of these, I desire to congratulate the conductors of NATURE on the services it has rendered, and to express cordial wishes for its continued prosperity.

SIR FRANCIS DARWIN, F.R.S.—NATURE has for a number of years seemed to its many readers to be a beneficent natural phenomenon occurring weekly. It is wisely variegated so as to give just the type of information and criticism that we need. I warmly congratulate the Editor on its jubilee.

PROF. WYNDHAM R. DUNSTAN, C.M.G., F.R.S., DIRECTOR, IMPERIAL INSTITUTE.—I gladly take this opportunity, on the occasion of its jubilee, to congratulate NATURE on the important aid it has given to scientific work and interests, and on the position

it has achieved as an organ of scientific opinion, not only in this country, but throughout the world.

SIR F. W. DYSON, F.R.S., ASTRONOMER ROYAL.—The advancement of science owes a great deal to NATURE, which keeps men of science in constant touch with one another's work. The outstanding feature of the journal is the combination of thoroughness and trustworthiness with readability and attractiveness of form. Grateful recognition should be accorded to NATURE for its able championship of the necessity of scientific research and the claims of workers in science. It was pointed out to me recently how closely the first number published fifty years ago resembles in form and contents the current numbers. Evidently great care and thought were given to the design and scope of the journal. In offering congratulations to the Editor and publishers, I should like to express the hope that NATURE may be as useful and successful in the next fifty years.

RIGHT HON. H. A. L. FISHER, M.P., PRESIDENT OF THE BOARD OF EDUCATION.—NATURE is one of the authoritative voices of current scientific opinion. It provides the members of the scientific community with the means of publishing newly discovered facts of general interest and importance, and enables them to follow the current work and thought in their own and in other branches of science. To those dwelling on the outskirts of the scientific community, the non-professional men of science, it furnishes a valuable *résumé* of scientific news and progress, while in its columns the general public can never fail to find intelligible references to facts of interest and importance. For fifty years NATURE has most successfully performed this important function. Victory in the war could not have been achieved without the aid of science; and the vigorous pursuit of science, both pure and applied, is essential to the welfare of the nation in peace. And now we find that a general interest in science has been reawakened by its successes in the war, while our universities and colleges are crowded with students whose keenness has never been equalled, and from whom science will recruit the workers lost during the war. I trust that a new era of progress and prosperity has opened for British science, and I hope that in this era NATURE will continue to play its important part and to add to its success of the past.

M. CAMILLE FLAMMARION.—La collection de NATURE brille aux meilleurs rayons de la bibliothèque de mon observatoire. C'est une opulente et précieuse mine scientifique, admirablement composée. Dès la première page, du 4 novembre 1869, nous avons sous les yeux son vaste programme, dans un éloquent commentaire de Huxley sur les aphorismes de Goethe : "Nature! We are surrounded and embraced by her : powerless to separate ourselves from her, powerless to penetrate beyond her." Oui, la Nature nous enveloppe de ses merveilles ; la Science a pour mission de l'interpréter. "Un demi-siècle passera," ajoutait Huxley, "et nous jugerons notre œuvre." Ce demi-siècle est passé. La Rédaction de cette revue peut être fière de son œuvre. J'ajouterai que NATURE est souvent en avance de plus d'un demi-siècle. Ainsi, dans ce premier volume, de 1869, on

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peut voir, p. 304, une carte du "railway tunnel under the Channel," p. 407, une dissertation sur la 4^e dimension, et p. 14, une étude de Norman Lockyer sur la couronne solaire, le tout en avance sur nos réalisations actuelles! Félicitations et vœux pour un nouveau demi-siècle.

RIGHT HON. SIR AUCKLAND GEDDES, K.C.B., G.B.E., M.P., PRESIDENT OF THE BOARD OF TRADE.—I should like to congratulate NATURE on its long life now extending to half a century, and to wish it an even more vigorous and fruitful existence in the future. Any influence which at the present time directs the English mind to the facts of science is of service to the State. Industry, which we must now develop both in scientific economy and in volume to a level undreamed of in the days of our national pre-war wealth, needs every inspiration which science can give. NATURE is one of the possible vehicles of that inspiration, and therein lies its immediate practical importance. Of its importance to science it is unnecessary for me to speak.

DR. J. W. L. GLAISHER, F.R.S.—I was an undergraduate in my third year of residence when I saw the first number of NATURE in a shop-window, and I remember well its purchase and my interest in reading it, and how a little group of undergraduates criticised its name and discussed its contents and future. I now contemplate with admiration the hundred and three volumes and their services to science, and I am impressed by their perfect uniformity and absolute consistency of purpose. The "Notes" date from the first number, and have supplied scientific information, English and foreign, such as did not exist before, and is still unique. From the first, astronomy occupied a prominent place, and the "Astronomical Column" has been a most valuable feature from the early 'seventies. The reviews and accounts of the British Association meetings have always seemed to me especially important. The study and teaching of natural science in the University of Cambridge were in 1869 just making a feeble beginning. I read in the first number of NATURE that Mr. Bonney, of St. John's (still among us), would lecture on natural science, and that Mr. Trotter (Coult's Trotter of the "Coult's Trotter Studentship," who died in 1887) would lecture on electricity, magnetism, and botany, and the Editor added the remark that he congratulated the University on the increased desire for instruction in these subjects, but asked whether the number of men in the University competent to teach them was so small that it was found necessary to entrust electricity and botany to the same lecturer. Well, so it was. Trotter, a fellow of Trinity, had just returned from a course of study in Germany, and had induced the college to let him give these lectures. Though a mathematical man, I (perhaps induced by the paragraph in NATURE) was one of the three persons who attended Trotter's lectures on physiological botany, then an absolutely new subject in the University. The other two students soon ceased to attend, and I was the sole lecturee until Trotter considered that he had carried the subject far enough. This illustrates the vast change that fifty years have made in the University. Not many persons are now living who can remember

—and those of a later generation must find it difficult to credit—the almost complete lack of interest in natural science that existed in the University when NATURE was founded; and even in mathematics (though included in the arts) there was no encouragement—quite the reverse—to research of any kind. The progress that has been made from the stagnation of the 'sixties is enormous, and to this great expansion of thought, study, and learning NATURE has largely and worthily contributed.

SIR R. T. GLAZEBROOK, F.R.S., LATELY DIRECTOR OF THE NATIONAL PHYSICAL LABORATORY.—Those of us who have read the pages of NATURE weekly for nearly the full period of its life can realise very keenly its value and appreciate the influence it has had on the progress of natural science. It fills, and that in a most admirable manner, an important place in scientific literature; it has served as the means whereby many of the most marked advances of science have been made known to the world, and in its pages will be found the account of discoveries of the highest value to mankind. It is a privilege to send to its veteran founder the heartiest congratulations on its jubilee.

SIR DANIEL HALL, K.C.B., F.R.S., PERMANENT SECRETARY, BOARD OF AGRICULTURE.—Looking back even so far as one's earliest student days, I see NATURE as a continuous and essential part of my scientific life. It has been especially so to me, because most of my time has been spent in the country, remote from the ordinary scientific meeting grounds, and with few opportunities of learning by conversation what was going on in the scientific world. Thus one became dependent upon NATURE for information as to the changing currents of scientific opinion and for the necessary knowledge of what work was being done in other fields of science than one's own. During the period in which I have known it, the notable features of NATURE have been its catholicity, its fairness, and its dignity. It has worthily stated the case of science to the English-speaking world.

MR. W. B. HARDY, SEC. R.S.—I congratulate NATURE on its fifty years' record. Since the journal was founded science has advanced to an extent which will be realised only by the historian of the future. The advance has been made possible by intense specialisation, and the greatest service which NATURE has rendered (and indeed, in my opinion, can render) is that it has kept its readers in touch with the general progress in natural knowledge. Every movement of importance has found an expression in its pages.

PROF. W. A. HERDMAN, F.R.S., PRESIDENT-ELECT OF THE BRITISH ASSOCIATION.—NATURE is now a firmly established institution in the world of science, bringing us week by week welcome additions to knowledge, news of work in progress, helpful discussions of new views, and sound critical judgments on affairs scientific and educational. Throughout the past fifty years this journal has consistently and authoritatively upheld the freedom, dignity, and practical importance of science, and has established a splendid record of scientific progress and a fine tradition of disinterested service to the advance and diffusion of natural knowledge.

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SIR ALFRED KEOGH, G.C.V.O., G.C.B., RECTOR, IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY.—The attainment by NATURE of its jubilee is a notable event. Fifty years of labour in the furtherance of those principles by which, in many departments of work, unsubstantial axioms were to yield pride of place to scientific truth is no mean achievement. We may well think that the burden of the future, if different from that of the past, is no less difficult. The stimulation of inquiry, the spreading of knowledge, and the demonstration of the necessity of not merely thinking, but of thinking scientifically, are amongst the most important achievements which NATURE has successfully attempted. The interests of science are the interests of the State, and in the vista which is now opening we can all perceive a future in which the well-being of humanity is entirely dependent upon the progress of knowledge and discovery. To aid, encourage, and stimulate progress and to record advancing knowledge is henceforward, as in the past, the task of NATURE. As we look back with pride, so we may look forward with an expectant hope.

SIR JOSEPH LARMOR, M.P., F.R.S.—The early volumes of NATURE especially formed an admirable, indeed still indispensable, record of the progress of scientific discovery in our times. They were interesting without ceasing to be exact, and thereby potent to mitigate the specialisation that is inevitable for the secure and fruitful advancement of knowledge. The journalistic and discursive tendencies of the present time render such an authoritative organ, of type purely scientific, more than ever desirable.

PROF. A. LIVERSIDGE, F.R.S.—Having been a subscriber to NATURE from its first appearance, and having read every number, I wish to offer my congratulations upon its jubilee, as well as my best wishes for its continued usefulness and success.

SIR OLIVER LODGE, F.R.S.—I well remember the appearance of the first number of NATURE, when I was eighteen years old and an enthusiastic amateur student of science. The comprehensive character of the new journal was typified by an eloquent introduction by Huxley at the request of Sir Norman Lockyer. And many a man of science must have been grateful to one of the few periodicals which at a high level keeps its readers in touch with practically all branches of scientific knowledge. Over-specialisation is a real danger, and most publications necessarily cater for a limited group only, thus preventing free and easy interchange of thought across the boundary, and excluding the ordinarily educated public from participation in the current progress of science. Comprehensiveness has been the note of NATURE, and consequently it has been able to render conspicuous service. Even our rulers and literary men may occasionally find time to glance at a periodical such as this, and thereby the disastrous divorce between science and letters and public affairs is mitigated. Long may NATURE flourish, and continue to be read in all civilised countries.

PROF. W. C. MCINTOSH, F.R.S.—NATURE, with which I have been familiar from its first number onward to date, has filled an important place in the scientific literature of our country, and in a

manner which has won the confidence and elicited the help of every department of science. Moreover, its reputation is as solid abroad as at home. Its long series of volumes is indispensable in every university library and in every scientific institution or laboratory. The attainment of its jubilee, therefore, is an occasion for cordially congratulating the Editor and publishers on their long and successful labours, and for wishing them a future as fertile as the past.

SIR PHILIP MAGNUS, M.P.—As one of the early contributors to NATURE, I welcome the celebration of its jubilee as indicating its value to an ever-increasing number of readers, and the permanent place it has made for itself in the scientific world. During the past half-century the progress of science has been even more rapid than the most sanguine of its devotees could have anticipated. Towards that progress the publication of NATURE has largely contributed. It has stood in close touch with the results of the most recent scientific investigations, and one may truly say that no journal has been more ably conducted; none has been more successful in realising and satisfying the requirements of those who are actively engaged in scientific work. To the Editor of NATURE and his staff I venture to offer my sincere congratulations.

RIGHT HON. SIR HERBERT MAXWELL, BART., F.R.S.—As one of what must be but a small remnant of those who remember the birth of NATURE, let me offer humble, but cordial, tribute to the great service it has rendered to science throughout half a century. Born in a period of fierce controversy, it has proved faithful to the purpose of its sponsors, shedding a clear and steady light on the pathway of research, maintaining a lucid record of modern discovery, and stimulating the appetite for knowledge in many minds. The hand of its veteran Editor, Sir Norman Lockyer, has indeed been steady on the helm. May NATURE long retain its pre-eminence among English scientific journals!

RIGHT HON. SIR ALFRED MOND, M.P., FIRST COMMISSIONER OF WORKS.—I heartily congratulate the Editor of NATURE on the fact that his periodical, which has done so much to awaken and foster interest in science, should now be celebrating its jubilee. It has always presented the progress of scientific activities in a readable, popular, and accurately scientific manner. The readers of NATURE have been enabled to keep abreast of scientific progress, and always knew that they could rely upon the soundness of the information to be found in its pages. I hope that the general recognition of the importance of science to the progress of humanity which is now manifesting itself will extend still further in the future the valuable work and influence of this excellent journal.

PROF. JOHN PERRY, F.R.S.—I congratulate NATURE on its jubilee. I have read with interest the greater part of almost every copy issued in the fifty years, and this interest has not been confined to my own subjects, for NATURE is constantly enticing me across the borders into biology. I cannot recollect a single copy which has been much below the standard which the paper has established

for itself, and I can recollect many which exceeded even that very high standard. If England were idealistic, it would bestow a decoration much higher than O.M. upon NATURE.

SIR WILLIAM J. POPE, K.B.E., F.R.S.—During the last fifty years the great truth that all human progress is dependent upon scientific knowledge has gained much more general recognition than it previously enjoyed. The life-work and the writings of our foremost men of science of the last half-century—Huxley, Tyndall, Kelvin, Roscoe, Meldola, and a host of others—have been largely instrumental in clarifying popular opinion as to the value and significance of scientific research. Throughout this period NATURE has devoted itself persistently to the task of presenting the case for science, both by systematically recording the conclusions of scientific men and by editorial elucidation and comment. Although much has been achieved, far more remains yet to be done. We look to NATURE in the future, as in the past, to impress public opinion with the necessity for giving scientific methods and results a prominent place among the activities and in the councils of the nation.

SIR DAVID PRAIN, C.M.G., C.I.E., F.R.S.—Among the services rendered by NATURE to science during the half-century which has passed since its foundation, one of the greatest will appear to the thoughtful to have been the adoption of the attitude consistently maintained in its pages towards the application of natural knowledge to everyday affairs. Launched at a dismal time when the philistinism of the nineteenth-century attitude of men of affairs towards science was only equalled by that of men of science towards affairs, NATURE had the courage to revert and adhere to that more humane perception of the seventeenth century: that the first duty of Science herself is to improve her new knowledge for use. The wider acceptance of this old doctrine which we welcome to-day NATURE may fairly claim as an abiding reward.

SIR HARRY R. REICHEL.—Hearty greetings to NATURE on its fiftieth anniversary! Science is now becoming the guiding principle of material progress, and its pursuit is justified and recommended to the public by the promise of material returns. Among those who still regard science as a branch of philosophy and worthy for its own sake, NATURE will always hold its own peculiar and honourable place. In its pages the worker whose horizon is not restricted by exclusive devotion to his own subject can follow the lines of advance along other paths of inquiry. A journal which can serve such a wide range of interests without falling into "popular" science must always occupy a unique place in the intellectual life of the nation.

PROF. J. EMERSON REYNOLDS, F.R.S.—I beg to offer my hearty congratulations to the Editor of NATURE on the jubilee of that valuable journal. NATURE has long filled so important a position in British scientific journalism, and reflected scientific progress so fully in the past, that I doubt not it will continue to do so in the future with even greater success.

PROF. W. RIPPER.—I desire to add my tribute of congratulation and thanks to the many which

you will doubtless receive on the occasion of the attainment of NATURE's first jubilee. The whole scientific community of this country is indebted to you for the great service you have rendered to science in recording with wise discrimination the progress of science and the growth of natural knowledge. Your journal is welcomed week by week as a very real friend, and we trust it may long continue to serve the great cause of science with the same distinction and ability as in the past.

SIR RONALD ROSS, K.C.B., K.C.M.G., F.R.S.—I write as editor of *Science Progress* to congratulate NATURE on attaining its jubilee. It is with warm feelings that I do so, because NATURE has been the medium of publication for almost all scientific men, whether as regards their scientific work or their personal difficulties, or even questions of organisation, emolument, and so on, for fifty years. It is pre-eminent as a scientific organ, and the editorship of it is universally recognised as being extraordinarily efficient. I myself know the difficulties, and appreciate, therefore, the way in which they are completely overcome.

PROF. ARTHUR SCHUSTER, SEC. R.S.—I desire to convey to the Editor of NATURE my sincere congratulations on the completion of the first fifty years of life of the periodical which under his guidance has attained a unique position in the scientific world. By a well-balanced combination of scientific articles, reviews, discussion by correspondence, personal notes, and general information, it soon established and continued to maintain a distinguished reputation wherever science is pursued. If continued in the same spirit of liberal thought and impartial criticism, NATURE may look forward to an equally prosperous future.

DR. D. H. SCOTT, F.R.S.—The fifty years of NATURE's brilliant career have seen great developments in botany, as in every other science. It is true that the previous half-century, which witnessed the birth of the cell theory and the acceptance of evolution, was a greater era; it was then that scientific botany, as part of biology, was created; the succeeding period has been one of vigorous and manifold growth. When NATURE started Darwinism had already won its first triumphs; it maintained and strengthened its position down to the end of the century, and then came a change. The rediscovery of Mendel's work in plant-breeding established the new science of genetics and transformed current ideas of evolution. Another new science, cytology, the intimate study of the cell, and especially of the nucleus, arose, to work hand-in-hand with genetics, revealing the nature of fertilisation and, in a certain degree, the mechanism of segregation. These are matters of fundamental significance, common to both the biological sciences. In the same field, but within the stricter limits of botany, we have the discovery of the spermatozooids of the maidenhair-tree and the Cycads, linking these primitive seed-plants with the Cryptogams, and through them with the animal kingdom, and of the strange phenomenon of double fertilisation in the higher flowering plants. Other new developments are the growth of a comparative anatomy of plants,

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now extended to the oldest fossil remains, and the advent of ecology, or physiology in the field. Of all this and much more a record will be found in the long series of the volumes of NATURE.

SIR AUBREY STRAHAN, K.B.E., F.R.S., DIRECTOR OF THE GEOLOGICAL SURVEY OF GREAT BRITAIN.—I am glad to avail myself of the opportunity of sending my congratulations on the attainment by NATURE of its jubilee. The high standard aimed at in the earliest issue has been well maintained, and NATURE has now for half a century been our leading weekly journal on pure science. As regards geological literature, apart from the valuable original articles which appear in its columns, its reviews especially supply a want which is not provided for elsewhere. I venture to express the hope, which I believe will be shared by all scientific men, that NATURE may continue to fulfil its high functions for many years to come.

SIR J. J. H. TEALL, F.R.S., LATELY DIRECTOR OF THE GEOLOGICAL SURVEY OF GREAT BRITAIN.—That NATURE has rendered great services to science in general and to all its branches is universally admitted. I have followed its development from the time of its first appearance until now with interest, sympathy, and admiration; and it is with a profound feeling of gratitude that I offer my hearty congratulations on the celebration of the jubilee of the great journal which has been edited with so much tact and ability for fifty years.

PROF. H. H. TURNER, F.R.S.—The benefits of such work as yours are absorbed into the scientific system so naturally that, for the most part, they excite no attention. All the more is it, therefore, appropriate that at certain epochs notice should be expressly directed towards them and an attempt made to integrate what we have been quietly receiving for so many years in order that we may be truly thankful. It gives me great pleasure to be one of those invited to put our thanks into words.

DR. HENRY DE VARIGNY, SCIENTIFIC EDITOR OF THE "JOURNAL DES DÉBATS."—As an old and very faithful reader who has never failed throughout forty years to read NATURE, I beg to send my thanks to the Editor, contributors, and publishers for the pleasure and information they have given me. NATURE has been, and remains, the organ of British scientific thought and progress. All the work of Britain's magnificent team of naturalists, astronomers, physicists, chemists, biologists, etc., has been made known to the world by NATURE. Sincere thanks are due for the good work done in the interest of scientific progress, and cordial congratulations to the Editor on this anniversary. May both he and NATURE live long to pursue their task, one which becomes more useful and essential than ever before to culture, *haud teutonico sed humano sensu*; and may we all, on both sides of the Channel, maintain that cordial understanding so firmly maintained through the ordeal of blood and fire for the freedom of civilisation.

SIR H. TRUEMAN WOOD.—I have been a regular reader of NATURE since 1870—for forty-nine out of its fifty years of existence. There can-

not be very many now left who can say as much, so I hope I may be allowed to add my voice to the chorus of congratulation which I am sure will greet the completion of its first half-century. Others may be better qualified to testify to the value of its services to various branches of science, but nobody can be more appreciative of the help it has given to the progress of science generally, especially in this country, which is fortunate in possessing what is admittedly the leading scientific newspaper in the world. The thanks of all associated with scientific matters are due alike to its eminent founder, still happily amongst us, and to the publishers who co-operated with him in what at the time can scarcely have been regarded as a very promising speculation.

DR. HENRY WOODWARD, F.R.S.—Having been present at a dinner at the Garrick Club in 1869 to inaugurate the birth of NATURE, now in its fiftieth year, I feel proud to be permitted to offer by hearty congratulations to the Editor and the publishers upon this memorable occasion of its jubilee. It is no small undertaking to have produced more than 2600 weekly numbers of a journal embracing every branch of natural knowledge during half a century. Long may NATURE flourish, and long may the founder be spared to see its prosperity and, with the eminent firm of Macmillan, enjoy its cosmopolitan honours and high scientific reputation.

NOTES.

THE KING has been pleased to approve of the following awards this year by the president and council of the Royal Society:—Royal medal to Prof. J. B. Farmer for his notable work on plant and animal cytology, and Royal medal to Mr. J. H. Jeans for his researches in applied mathematics. The following awards have also been made by the president and council:—Copley medal to Prof. W. M. Bayliss for his contributions to general physiology and to biophysics; Davy medal to Prof. P. F. Frankland for his distinguished work in chemistry, especially that on optical activity and on fermentation; Sylvester medal to Major P. A. MacMahon for his researches in pure mathematics, especially in connection with the partition of numbers and analysis; and Hughes medal to Dr. C. Chree for his researches on terrestrial magnetism. The following is a list of those recommended by the president and council of the Royal Society for election to the council at the anniversary meeting on December 1:—*President*: Sir J. J. Thomson, O.M. *Treasurer*: Sir David Prain, C.M.G. *Secretaries*: Mr. W. B. Hardy and Mr. J. H. Jeans. *Foreign Secretary*: Prof. W. A. Herdman. *Other Members of the Council*: Mr. J. Barcroft, Mr. C. V. Boys, Sir J. J. Dobbie, Sir F. Dyson, Prof. J. B. Farmer, Sir W. M. Fletcher, K.B.E., Prof. F. W. Gamble, Sir R. T. Glazebrook, Prof. J. W. Gregory, Dr. A. C. Haddon, Sir R. A. Hadfield, Bart., Sir A. T. Kempe, Sir W. J. Pope, K.B.E., Dr. S. H. C. Martin, Prof. A. Schuster, and Prof. W. P. Wynne.

THE President of the French Republic, accompanied by Mme. Poincaré, received a cordial welcome upon his arrival in London on Monday, on a visit to the King and Queen. British men of science would wish to convey to President Poincaré the expression of their high regard for the influence France has always exerted in the cause of science and civilisation in Europe, and of fraternal greetings to the eminent

leaders in intellectual activity who are preserving this great heritage. A banquet in honour of President and Mme. Poincaré was given by the King and Queen at Buckingham Palace on Monday evening. On Tuesday the President, accompanied by Mme. Poincaré, visited the City and were presented with an address by the Lord Mayor. To-day the President is to be installed as Lord Rector of Glasgow University, and, with Mme. Poincaré, will be entertained at luncheon at the University, after which he is to be presented with the freedom of the city.

A CORRESPONDENT informs us that the Village Club at Wimbledon, wherein, as Sir Norman Lockyer explained in our jubilee number, the idea of NATURE was born, was founded by Dr. Joseph Toynbee (father of Arnold Toynbee), and one of his intentions was to have a local museum in the building. Such a museum is now there, brought together by the more recently established John Evelyn Club for Wimbledon. The Village Club premises were occupied by the military during the war, but the collections have now been replaced and are again open to the public. They include prints, pictures, maps, and a photographic survey, as well as many antiquities, bygone, and natural history specimens, all connected with the locality. It is hoped that the portrait of Sir Norman Lockyer will soon adorn the walls of the museum.

SIR E. RAY LANKESTER has just completed fifty years' editorship of the *Quarterly Journal of Microscopical Science*, and the current issue of that well-known periodical (vol. lxiv., part 1) contains a brief summary by Prof. G. C. Bourne of the contents of the journal for the last half-century, demonstrating very clearly the important part that it has played in the development of modern biological science. We offer our hearty congratulations to Sir Ray Lankester on this notable occasion, and hope that many more volumes may appear under his distinguished editorship.

IN reply to a question by Sir Philip Magnus, Mr. Bonar Law has announced that the Commissioners to be appointed under the Forestry Acts are as follows:—Lord Lovat (chairman), Director of Forestry, B.E.F., France, and member of Forestry Reconstruction Sub-Committee and of the Interim Forest Authority; Mr. F. D. Acland, M.P., chairman of the Home-grown Timber Committee, chairman of the Forestry Reconstruction Sub-Committee, and chairman of the Interim Forest Authority; Lord Clinton, formerly president of the Royal English Arboricultural Society and member of the Interim Forest Authority; Mr. L. Forestier-Walker, M.P.; Sir John Stirling-Maxwell (hon. secretary), formerly president of the Royal Scottish Arboricultural Society and member of the Forestry Reconstruction Sub-Committee; Mr. T. B. Ponsonby, member of the Interim Forest Authority; Mr. R. L. Robinson, member of the Interim Forest Authority, secretary of the Forestry Reconstruction Sub-Committee, and formerly head of the Joint Forestry Branches of the Board of Agriculture and Office of Woods; and Col. W. T. Steuart-Fotheringham, member of the Interim Forest Authority.

AFTER a successful military campaign the House of Commons has frequently voted large sums of money from public funds to the commanders under whose guidance the conquest was won. National recognition of a like kind was given to Jenner by a grant of 10,000*l.* made by the House in 1802, and by a further grant of 20,000*l.* five years later, the intervening period having strengthened the opinion as to the efficacy of vaccination and its great benefits to the nation at large. Sir Ronald Ross has long