in geological discussion and the little petulances and whims that made his society so irresistibly amusing. His beneficent influence was long one of the great features of the service, and we owe to him, not only the recollection of his delightful personality, but the guidance and encouragement which have carried us through our work.

To my colleagues in the Survey who have prepared and signed this beautiful address my heartiest acknowledgments are due. It will remain with me as a precious memorial of many close and enduring friendships. Each signature will remind me, now of some delightful ramble in the country when geological problems were eagerly discussed on the ground, now of some momentous conference in the office when the plan of campaign or the details of maps and memoirs were fully considered and settled.

During my tenure of office as Director-General I have been ever supported by the loyal and unstinted devotion of the staff. It has been an honour and a pleasure to be placed at the head of such a body of men—so enthusiastic in their whole-hearted consecration to science and so unwearied and loyal in their efforts for the interests of the service. I feel sure that in no branch of the public service could the *esprit de corps* be higher than it has been among us. You can well understand that it is impossible without regret to sever one's connection with comrades such as these. At the end of my official career, however, I can truthfully claim to have striven to the utmost of my power for the welfare of the staff and for the scientific renown of the service. I have sought to secure the very best men whom it was possible to obtain, and I feel very confident that the Geological Survey, as regards the zeal, capacity and attainments of its members, may challenge comparison with any scientific institution in any country of the world. I rejoice to think that the service is being now put on a firmer footing than it has ever held before, that the prospects of pay and promotion have been lately broadened and brightened, and that, under the guidance of my distinguished friend and successor, the Survey may look forward to a future even more illustrious and more useful than its past. Gentlemen, I thank you all once more from the very bottom of my heart.

THE ROYAL SOCIETY SELECTED CANDIDATES.

FOLLOWING our usual course, we print the qualifications of the fifteen candidates selected by the Council of the Royal Society on Thursday last, for election into the Society :—

ALFRED WILLIAM ALCOCK,

Major, I.M.S., M.B., C.M.Z.S. Superintendent of the Indian Museum; Professor of Zoology in the Medical College, Calcutta. Distinguished as a zoological investigator and teacher, and as a museum curator. Was Surgeon Naturalist to the Marine Survey of India, from 1888 to 1892, on board the Royal Indian Marine Ship *Investigator*, also to the Pamir Boundary Commission in 1895. Has devoted himself chiefly to the study of marine zoology with especial reference to fishes, crustacea, echinoderms and madreporaria, and to problems connected with the geographical distribution of the Indian representatives of these groups, and the phenomena of viviparity in fishes. Author of an extensive series of memoirs, papers and reports dealing with the aforementioned subjects, published during the past ten years in the *Proceedings* of the Royal Society, the *Journal* of the Asiatic Society of Bengal, the *Annals and Magazine of Natural History*, and in the series of publications of the Indian Museum, and "Scientific Memoirs" by the Medical Officers of the Indian Army, and elsewhere. Some of these (*e.g.* the series entitled "Materials for the Carinological Fauna of India") are revisionary monographs of the groups with which they deal, and in others (*e.g.* the Survey of the Deep Sea Zoological work of H.I.M.S. *Investigator* for 1884–1897, and the "Deep Sea Madreporaria") the general bearing of the zoogeographical problems arising out of the work are fully discussed in their association with the facts and theories of oceanographical research. In connection with the work of the *Investigator* he originated, in 1892, the serial publication, "Illustrations of the Zoology of the *Investigator*," now progressing.

FRANK WATSON DYSON,

M.A. (Cantab.), Chief Assistant (since 1894) Royal Observatory, Greenwich. Late Fellow of Trinity College, Cambridge. Secretary of Royal Astronomical Society. Author of various papers on mathematics and astronomy, among which may be mentioned :—"The Potential of Ellipsoids of Variable Densities" (*Quart. Journ.*, Pure and Applied Mathematics, No. 99, 1891); "The Potential of an Anchor Ring" (two papers—*Phil. Trans.*, 1893, pp. 43–95 and 1041–1106); "The Motion of a Satellite about a Spheroidal Planet" (*Quart. Journ.*, Pure and Applied Mathematics, No. 105, 1894); "The Effect of Personality in Observations of the Sun's Right Ascension on the Determination of the Position of the Ecliptic" (with W. G. Thackeray, *Monthly Notices, Roy. Astron. Soc.*, vol. liv., 1894); "Account of the Measurement and Comparison of a set of four Astrographic Plates" (with W. H. M. Christie, *ibid.*, vol. lv., 1894); "On the Determination of the Positions of Stars for the Astrographic Catalogue at the Royal Observatory, Greenwich" (with W. H. M. Christie, *ibid.*, vol. lvi., 1896); "New Division Errors of the Greenwich Transit Circle and their Effect upon the observed N. P. D.'s (with W. G. Thackeray, *Mem. Roy. Astron. Soc.*, vol. liii., 1899); "Comparison of the Diameters of the Images of Stars on the Greenwich Astrographic Plates, with the Magnitudes given in the 'Bonn Durchmusterung'" (with H. P. Hollis, *Monthly Notices, Roy. Astron. Soc.*, vol. lx., 1899). Distinguished as an astronomer.

ARTHUR JOHN EVANS,

M.A. Hon. Fellow of Brasenose College, Vice-President of the Society of Antiquaries, Keeper of the Ashmolean Museum, Oxford. Distinguished as an archæologist and anthropologist. Mr. Evans's recent discoveries in Crete have been of the highest importance as throwing an entirely new light on the early civilisation of the Ægean and Mediterranean areas, and proving the hitherto unknown fact that a Præ-Phœnician form of writing was in use within those areas during the Mycenæan period. Starting from certain engraved gems, some of them found in Crete, the figures on which he suspected to be alphabetic or syllabic signs, he was led by inductive reasoning to infer that in that island there must exist monuments of a præ-historic system of writing. For some years he has carried on investigations in Crete, with the final result of bringing to light, in what seems to be the Palace of King Minos, or the famous Labyrinth, upwards of a thousand clay tablets, inscribed with documents in both a pictographic and a linear system of writing, as well as remains of artistic work of remarkable interest. The existence of a high stage of Mediterranean culture, about 2000 B.C., has thus been established, and the use of writing among Hellenic peoples has itself been carried back to a date at least 500 years earlier than has hitherto been regarded as possible. Of Mr. Evans's other published works may be cited his researches in the anthropology and antiquities of Illyricum and Dalmatia, and his numerous memoirs relating to the Iron Age, the Mycenæan Period, the late Celtic or Early Iron Period, and generally the connection of Egypt and the East with the dawn of European civilisation. His works on the coinages of Tarentum and Sicily are standard authorities, and after the death of Prof. Freeman he completed that eminent writer's "History of Sicily."

JOHN WALTER GREGORY,

D.Sc., F.G.S. Professor of Geology in the University of Melbourne. Explorer of Mount Kenya, and author of "The Great Rift Valley." Has contributed a large number of papers to scientific publications on Palæontological, Petrological and Physiographical questions; for example, on the Maltese fossil Echinoidea (*Trans. Roy. Soc.*, Edin.); on British Palæogene Bryozoa (*Trans. Zool. Soc.*); on the Echinoidea of Cutch and on the Corals of Cutch (Palæont. Indica); on Pseudodiadema Jessoni; on Archæodiadema; on Echinocystis, &c., besides the volumes in the British Museum Catalogue on the Jurassic and the Cretaceous Bryozoa. In Petrology he has written in the *Quarterly Journ. Geol. Soc.* on the Tudor specimen of Eozoon, the Variolites of the Fichtelgebirge, the Waldensian Gneisses, the Schistes Lustrées of Mont Jovet, the Geology of British East Africa (three parts), and (in collaboration) the Variolites of the Mont Genevre, the Geology of Monte Chaberton, the Eozoonal structure of ejected blocks, Monte Somma, &c., and among several papers in Physical Geology, the Glacial Geology of Mount Kenya, and (in collaboration) Contributions to the Glacial Geology of Spitzbergen.

HENRY BRADWARDINE JACKSON,

Captain, R.N., Naval Attaché to the British Embassy, Paris. Invented (1886) a practical system of electrically illuminating gun sights for firing at night, which was adopted and used for some years in H.M. Navy, but has since been replaced by later methods. Proved (1888) that considerable stability is necessary in order that a totally submerged automobile torpedo may maintain a straight course. Has given much attention to the theory and practice of aerial telegraphy. Invented a serviceable apparatus for signalling between ships at sea without wires. Proved that if the Hertzian oscillations are transmitted and received by vertical wires, the distance to which effective signals can be sent tends to vary within limits as the product of the lengths of the wires.

HECTOR MUNRO MACDONALD,

M.A., Fellow of Clare College, Cambridge. University Lecturer in Mathematics. Distinguished for original work in Mathematics and Mathematical Physics. Author of the following papers:—"Torsional Strength of a Hollow Shaft" (*Proc. Camb. Phil. Soc.*, viii.); "Self-induction of two Parallel Conductors" (*Trans. Camb. Phil. Soc.*, xv.); "Waves in Canals" (*Proc. Lond. Math. Soc.*, xxv.); "Waves in Canals and on a Sloping Bank" (*ibid.*, xxvii.); "Electrical Distribution on a Conductor bounded by two Spherical Surfaces cutting at any Angle" (*ibid.* xxvi.), and a Note on the same (*ibid.*, xxviii.); "Electrical Distribution induced on a Circular Disc placed in any Field of Force" (*ibid.*, xxvi.); "Electrical Distribution induced on an Infinite Plane Disc with a Circular Hole in it" (*ibid.*, xxvii.); "Electrical Distributions on Cones" (*Camb. Phil. Soc. Trans.*, "Stokes memorial" volume); "Note on Bessel Functions" (*Proc. Lond. Math. Soc.*, xxix.); two papers on the Zeroes of the Bessel Functions (*ibid.*, xxix. and xxx.); "Zeroes of the Harmonic $P_n^m(\mu)$ considered as a Function of μ" (*ibid.*, xxxi.).

JAMES MANSERGH,

M.Inst.C.E., Civil Engineer. President of the Institution of Civil Engineers. Author of "Lectures on Water Supply, Prospecting for Water, Prospecting and Boring," delivered at the School of Military Engineering, Chatham, also of "The Supply of Water to Towns," and other works. The designer of the waterworks and sewerage of Lancaster, Lincoln, Stockton, Middlesbrough, Rotherham, Southport, Burton-on-Trent, Melbourne (Australia), Birmingham and many other towns. These designs include some of the largest schemes of water supply and drainage ever carried out. Author of about 140 reports upon schemes of water supply, sewerage or sewage disposal for Halifax, Hereford, St. Helens, Darlington, Whitby, the Potteries, Derby, Southampton, Durham, Shrewsbury, Malvern, Cambridge, Edinburgh, Plymouth, York, Antigua, Philadelphia (U.S.), and other places. Was a member of the Royal Commission on Metropolitan Water Supply. Eminent as a hydraulic engineer.

CHARLES JAMES MARTIN,

M.B., D.Sc. (Lond.). Professor of Physiology in the University of Melbourne. Is eminently distinguished as an original investigator in Physiology. His chief original papers deal with the Chemistry and Physiological Action of Snake Venom, and with the action and reaction of Toxins and Antitoxins. Author of:—"The Chemistry of the Venom of the Australian Black Snake" (*Proc. Roy. Soc.*, N.S.W., 1892); "The Physiological Action of the Venom of the Australian Black Snake" (*ibid.*, 1895); "Curative Action of Calmette's Serum against Australian Snakes" (*Internat. Med. Journ.*, 1897–98, and *Proc. Roy. Soc.*, 1898); "Nature of the Antagonism between Toxins and Antitoxins" (*ibid.*, 1898, joint Author); "Separation of Colloids and Crystalloids by Filtration" (*Journ. of Physiology*, 1896); "Observations on the Anatomy of the Muzzle of *Ornithorhynchus*," with Dr. Wilson (Linn. Soc., N.S.W., 1892); "Observations on the Femoral Gland of *Ornithorhynchus*," with Dr. Tidswell (Linn. Soc., N.S.W., 1894); "An Investigation into the Effects of the Darling Pea, *Swainsonia galegifolia*" (Agricultural Department of N.S.W.); "Cerebral Localisation in Platypus" (*Journ. Physiol.*, 1899).

RONALD ROSS

Major (I.M.S., retired), M.R.C.S. (Eng.). D.P.H. (United Colleges, London). Pathological Investigator. Distinguished for work on Malaria and Kala-azar (Assam). Commenced these special studies in Tropical Hygiene and Parasitology in 1891. Papers on these subjects and on Histology of Blood, Indian Medical Societies and Journals. Parkes Memorial Prize and Gold Medal (Netley) for Essay on Malaria, 1894. Same year commenced experimental examination of Manson's Mosquito-Malaria theory, and studied malaria parasites at Secunderabad. Determined evolution of "crescents" in stomach cavity of gnats (Manson, *Brit. Med. Journ.*, March, 1896). Established animate nature of the flagellate bodies (*ibid.*, Jan., 1897). Finally succeeded in cultivating malaria parasites in gnats (*ibid.*, December 18, 1897; Feb., 1898). Next year elucidated life-history of a malarial parasite (*Proteosoma Grassii*) of birds; infected numerous healthy birds by bites of gnats, thus establishing mosquito theory. Also investigated Kala-azar (Reports to Govt. of India, 1898–99). Appointed Lecturer in Tropical Medicine, Liverpool School of Tropical Medicine, 1899. Continued malaria investigations in Sierra Leone (Report of Liverpool Expeditions, 1900). Author also of Notes on *Amoeba coli* and *Cercomonas intestinalis* (*Indian Med. Gazette*, 1897); Report on Sanitation of Bangalore, 1896. Also contributor to Quain's Dictionary of Medicine), and wrote "Instructions for Prevention of Malaria," 1900 (used by Government).

WILLIAM SCHLICH,

Ph.D., C.I.E., Doctor of Philosophy of the University of Giessen; Companion of the Order of the Indian Empire: Principal Professor of Forestry in the Royal Indian Engineering College, Coopers Hill. Dr. Schlich is well known for the impetus which he has recently given to the study of Forestry in England. Between 1871 and 1880 he was Conservator of Forests in Sind, Bengal and the Punjab successively, and in 1881 he was appointed Inspector-General of Forests to the Government of India. From 1885 to 1889 he was employed specially in England in organising the first English Forest School; and in 1889 he was appointed to his present office. He is a man in thorough sympathy with Science, and has attained great eminence in that branch of it to which he has devoted most of his life-work. Besides his well-known and comprehensive "Manual of Forestry," he is the author of the following papers:—Various Articles on Scientific Forestry, in the *Allgemeine Forst und Jagd Zeitung*, 1864–67; "The Pyinkado Forests of Aracan," 1869; a Series of Reports on the Forests of Bengal and Assam, 1872–75 [in 1875 he was honorary editor of *The Indian Forester*, which is the leading monthly journal of Forestry]; "The Forests of Darjeeling, Central Provinces, Hyderabad Assigned Districts, Chota Nagpore," 1882–85; "Afforestation in Great Britain and Ireland, Yield Tables for the Scotch Pine, the Douglas Fir, Effects of Forests on Climate, Forestry in the Colonies and India" (*Trans. of Colonial Institute*, 1886–89); "Forestry Education" (*Trans. Royal Arboricultural Soc., Scotland*, 1897); "Timber Supply of the British Empire" (*Imperial Institute Gazette*, 1897).

ARTHUR SMITHELLS,

B.Sc.(Lond.), F.C.S. Professor of Chemistry in the Yorkshire College, Leeds. Distinguished for his Investigations on the Chemistry of Flames. Author of the following Papers (among others): "Some Fluorine Compounds of Uranium" (*Journ. Chem. Soc.*, 1883); "Structure and Chemistry of Flames" (*ibid.*, 1892); "Structure of Luminous Hydrocarbon Flames" (*ibid.*, 1892); "Flame" (Discourse to Brit. Assoc., 1893); "Luminosity of Flames" (*Phil. Mag.*, 1894); "The Structure and Chemistry of the Cyanogen Flame" (*Journ. Chem. Soc.*, 1894, with Dr. Dent); "The Luminosity of Gases,"; "Spectra of Copper and Gold Salts" (*Phil. Mag.*, 1895); "Flame Temperatures and the Acetylene Theory of Luminous Hydrocarbon Flames" (*Journ. Chem. Soc.*, 1895); "The Source of Light in Flames" (*Proc. Roy. Inst.*). Has also taken an active part in improving science teaching in schools. Has edited revised edition of Schorlemmer's "Rise and Development of Organic Chemistry," 1894.

M. R. OLDFIELD THOMAS,

F.Z.S., F.R.G.S., M. Anthrop. Inst. Senior Assistant, Zoological Department, British Museum. In charge of the collection of Mammals in the British Museum since 1878, during which period it has increased materially in extent and completeness. Distinguished for his acquaintance with the structure, history and distribution of Mammals. Author of the

"Catalogue of Marsupialia and Monotremata" in the British Museum, 1888. Joint author with Dr. Sclater of "The Book of Antelopes." Author of upwards of 200 memoirs and papers in various journals on Mammals, their structure and distribution, amongst which are:—"On the Dentition of *Ornithorhynchus*" (*Proc. Roy. Soc.*, 1889); "A Milk Dentition in *Orycteropus*" (*ibid.*); "On the Species of *Hyracoidea*" (*Proc. Zool. Soc.*, 1892); "On Cœnoles, a still existing survivor of the *Epanorthidae* (*ibid.*).

WILLIAM WATSON,

B.Sc., Associate, Royal College of Science, London, and Assistant Professor of Physics. Late University Scholar in Experimental Physics, London University. In conjunction with Mr. Boys and Mr. Bristoe he published a paper on "The Measurement of Electro-Magnetic Radiation" (*Phil. Mag.*, 31-44, 1891). In conjunction with the late Mr. J. W. Rodger he published a paper "On the Magnetic Rotation of the Plane of Polarisation of Light in Liquids" (*Phil. Trans. Roy. Soc.*, 1895). This paper represented the results of four years' work. As Secretary of a Committee of the Brit. Assoc. he has, in conjunction with Prof. Rücker, been conducting a series of comparisons between the Magnetic Instruments in use in the British Observatories, and the results have been published in the Report of the Brit. Assoc. He is still at work on an instrument for comparing Thermometers (see his paper, *Phil. Mag.*, 44-116, 1897). He is now engaged in investigating the connection between the magnetic units employed in Observatories and the Ampere and Ohm.

WILLIAM CECIL DAMPIER WHETHAM,

M.A. Lecturer in Physics. Fellow of Trinity College, Cambridge. Author of the following scientific papers, &c.:—"On the Alleged Slipping at the Boundary of a Liquid in Motion" (*Proc. Roy. Soc.*, xlviii., p. 225, 1890, and *Phil. Trans.*, 1890, A., p. 559); "Note on Kohlrausch's Theory of Ionic Velocity" (*Phil. Mag.*, July 1891); "Ionic Velocities" (*Proc. Roy. Soc.*, lii., p. 283, 1893, translated *Zeits. für Physikal Chem.* xi., p. 220, 1893, also *Phil. Trans.*, 1893, A., p. 337); "On the Velocity of the Hydrogen Ion through Solutions of Acetates" (*Brit. Assoc. Reports*, 1894, p. 568): "On the Velocities of the Ions and the Relative Ionisation Powers of Solvents" (*Phil. Mag.*, 1894); "The Velocities of the Ions" (*Proc. Roy. Soc.*, lvii., p. 182, 1895, and *Phil. Trans.*, A., 1895, p. 507); "The Ionising Power of Solvents" (*Phil. Mag.*, July, 1897); "Report to the British Association on the Present State of our Knowledge in Electrolysis and Electro-Chemistry"; "The Theory of the Migration of the Ions and of Specific Ionic Velocities" (*Brit. Assoc. Report*, 1897, p. 227); "The Coagulative Power of Electrolytes" (*Phil. Mag.*, November, 1899); "The Ionisation of Dilute Solutions at the Freezing Point" (a paper read before the Royal Society); an elementary text-book on "Solution and Electrolysis" (Camb. Univ. Press, 1895); Letters and Articles in NATURE and *Science Progress*.

ARTHUR SMITH WOODWARD,

F.G.S., F.L.S., F.Z.S., F.R.G.S., &c. Assistant-Keeper of Geology, British Museum, Natural History, Cromwell Road, S.W. Studied at the Owens College, Manchester, 1880-82; entered British Museum, August 24, 1882; awarded Wollaston Fund by Geological Society, 1889; and the Lyell Medal in 1896. Distinguished for his knowledge of Fossil Fishes. Author of 150 separate papers, mostly on Vertebrate Palæontology: (142 on Fossil Fishes; 14 on Reptilia; 4 on Mammalia; and 14 on General Palæontology). Author of two monographs (1890-95) on the Fossils of the Hawkesbury Series (*Mem. Geol. Survey*, New South Wales (Palæontology), Nos. 4 and 9, Museum, Sydney, New South Wales); and on Fossil Crocodilia from the Cretaceous Rocks of Neuquen, Argentine Republic (*Anales Mus. La Plata*, 1896). Author of a British Museum Catalogue of Fossil Fishes, comprising: Part I. "The Elasmobranchii" (pp. i.-xlvii. and 1-474, plates i.-xvii. and 13 woodcuts, 8vo, 1889); Part II. "The Elasmobranchii" *continued* (pp. i.-xliv. and 1-567, plates i.-xvi. and 58 woodcuts, 8vo, 1891); Part III. "The Actinopterygian Teleostomi" (pp. i.-xliii. and 1-544, plates i.-xviii. and 45 woodcuts. (Printed by order of the Trustees, 1895.) Part IV. now preparing for press. Also "Outlines of Vertebrate Palæontology" (Camb. Univ. Press), 1898, pp. i.-xxiv. and 1-470, with 228 illustrations in the text.

REV. JAMES CHALMERS ("TAMATE").

FEW missionaries have been so widely known and so deservedly appreciated as the Rev. James Chalmers, of the London Missionary Society, whose death has recently been reported. Mr. Chalmers was transferred from Raratonga in the Hervey Group to New Guinea twenty-three years ago, and it is in connection with his later field that he has earned a recognition in scientific journals.

Tamate, as Mr. Chalmers loved to be called by his white as well as by his black friends, was a man of tremendous energy and enthusiasm, and he possessed a rare sympathy with the natives that was due to a deep knowledge of their nature and a personal love for them. His name was a password along very nearly the whole of the southern coast of British New Guinea, and in many places for some distance into the interior. Those natives who had only heard of him longed to see him, those who knew him loved him. Till Sir William Macgregor's arrival he had travelled more in British New Guinea than any other man, and, without appliances, he had increased our geographical knowledge of the possession.

It was always a regret to his scientific friends that Tamate did not publish more about the natives concerning whom he knew so much; but he confessed that he greatly disliked the effort of writing down his experiences, though when he did so he could write in a very vivid manner. His first book, "Work and Adventure in New Guinea" (1885), was written in collaboration with the Rev. Dr. W. Wyatt Gill, to whom anthropologists owe so much. In 1887 Chalmers published his very interesting "Pioneering in New Guinea." In the same year he published a paper "On the Manners and Customs of some of the Tribes of New Guinea" in the *Proc.* Phil. Soc. Glasgow, xviii. p. 56. A valuable "Report on the Toaripi and Korari Tribes" was printed in the *Report Austral. Assoc. Advanc. Sci.* ii. 1890, p. 311. In vol. xxvii. (1897) of the *Journal* of the Anthrop. Inst. he published "Vocabularies of the Bugilai and Tagota Dialects, British New Guinea" (p. 139), "Toaripi" (p. 326), "Anthropometrical Observations on some Natives of the Papuan Gulf" (p. 335). Mr. Chalmers has frequently sent ethnographical specimens to various museums. The bulk of one large consignment was acquired by the British Museum. These objects were carefully labelled and were accompanied by a descriptive catalogue, and many of his labels have been copied by Edge-Partington and Heape in their "Ethnographical Album of the Pacific Islands." These collections contained many specimens and the descriptions much information that was not previously known; for example, the collection included the first bull-roarer obtained on the mainland of British New Guinea.

Mr. Chalmers greatly assisted the Cambridge expedition to Torres Straits by lending his mission boat on more than one occasion, and he hospitably entertained several members of the expedition and otherwise rendered valuable aid.

A noble life of self-sacrifice was laid down for the cause of peace, for, according to the telegram, he met a glorious death while endeavouring to stop a tribal fight on the Aird River, a region which had not yet come under missionary influence and over which the Government had no control. A very promising young coadjutor, the Rev. Oliver Fellows Tomkins, who was dearly loved by Chalmers, and twelve students, are reported to have been murdered at the same time.

Since the above was written a telegram has been received confirming the former rumours. Mr. Chalmers, like several other missionaries in New Guinea, has falsely been reported to have been murdered on more than one occasion; but we fear this time the news is only too true.

A. C. HADDON.