

with very satisfactory results. But the most remarkable fact is that irrigation has been found to pay, even where the rainfall is heavy enough to grow luxuriant crops of cane. This can only mean that the duty of water has been very carefully worked out.

Such, indeed, is the case. Every estate is mapped out with contour lines, and a whole series of canals, ditches, and so on, is drawn on these plans; and the amount of water given to each field or section is frequently measured, and recorded throughout the growth of the canes. Numerous curves are prepared, on which a great deal of information is presented. One of the most remarkable of these is the curve of *profitable*

irrigation which can be applied for each month of the twenty-four during which the cane is in the ground. Few countries can follow Hawaii in the vast expense involved in its irrigation system, but many useful suggestions would doubtless be obtained from a careful study of the work done in this group of islands by all interested in the duty of water. The difficulty, mentioned by Dr. Keen, as experienced in cultivation because of the irrigation channels, lastly, is got over in various ways: by the obvious one, of using elongated plots as units; by movable pipes for the last distribution of water; and even by the use of overhead water sprinklers, also removable, in place of irrigation furrows. C. A. B.

The Future of the Smithsonian Institution, Washington.

MEN of science in Great Britain had regretfully known for some time, through correspondence with friends in the United States, and by sundry opportunities of personal intercourse and discussion, that all was not well with the Smithsonian Institution in respect of its future scope and activities—that, notwithstanding the achievements of the past eighty years (it received its charter in 1846), perplexing uncertainties had now arisen regarding the specific objects which the organisation should direct and control. The Smithsonian is, in fact, at the cross-roads of endeavour, largely due to the very magnitude and completeness of its early conceptions.

Aware, in fullest measure, of their onerous responsibilities, the Chancellor of the Institution, Chief Justice Taft, and his colleagues on the Board of Regents, decided to summon a conference of representative American citizens, professional and lay, "To advise with reference to the future policy and field of service of the Smithsonian Institution." This conference took place at Washington on Feb. 11 last. Only three days earlier the death had occurred of Dr. C. D. Walcott, who had been Secretary of the Institution since 1907. From the report of the proceedings, which is now available, it is evident that the problem set, in chief, the provision of adequate funds for maintenance and continued development, received sympathetic recognition. Among those present were such well-known men as Dr. W. W. Campbell, President of the University of California; Mr. Robert W. Bingham (Kentucky); Mr. Charles F. Brush (Ohio); Dr. Simon Flexner, Director of the Rockefeller Institute for Medical Research; Mr. Robert P. Lamont (Illinois); Dr. Merriam, president of the Carnegie Institution; Mr. Ogden L. Mills (New York); Dr. H. F. Osborn; Dr. S. W. Stratton, president of the Massachusetts Institute of Technology; Dr. George E. Vincent, president of the Rockefeller Foundation; Dr. W. H. Welch, of Johns Hopkins University; and Mr. Robert Winsor (Massachusetts).

The Smithsonian Institution is everywhere such an accepted factor in the world of science that few, perhaps, are immediately prepared to recall its

initial testamentary story, or the genesis of the foundation which perpetuates the name Smithson.

James Smithson was an Englishman. In his earlier years he was known as James Lewis Macie, his mother being the widow of James Macie, a country gentleman, who had resided near Bath. Born in 1765, young Macie was in due course entered at Pembroke College, Oxford, as a gentleman commoner, graduating there in 1786. Chancellor Taft, in his opening address to the recent Conference, recalls, neglecting needless reticence, that Macie was the natural son of that Hugh Smithson who, from the baronetcy of the realm, became the first Duke of Northumberland. At Oxford, Macie showed a marked predilection for scientific studies, and, as Dr. R. T. Gunther has recently pointed out (*NATURE*, April 2, p. 492), opportunities for such pursuits actually existed at Oxford at the period of his entry. Finally, in digression, the bar sinister on Macie's escutcheon was met, after his father's death—the precise date is unknown—by a successful application to the Crown to assume the name of Smithson.

Our Royal Society elected Macie a fellow on April 19, 1787, when twenty-two years old, and on the subjoined certificate: "James Lewis Macie, Esq., M.A., late of Pembroke College, Oxford, and now of John Street, Golden Square, a gentleman well versed in various branches of Natural Philosophy, and particularly in Chymistry and Mineralogy, being desirous of becoming a Fellow of the Royal Society, we whose names are hereunto subscribed do, from our personal knowledge of his merit, judge him highly worthy of that honour and likely to become a very useful and valuable member—Richard Kirwan, C. F. Greville, C. Blagden, H. Cavendish, David Pitcairn."

The first scientific paper of the newly elected fellow was read on July 7, 1791, before the Royal Society, and in the name of Macie. It was published in the *Philosophical Transactions*. According to the late Dr. S. P. Langley, the name of Smithson is first certainly known to have been used by him in connexion with his second communication to the Royal Society, read on Nov. 18, 1802.

Smithson died on June 27, 1829, at Genoa. Three years earlier he had made a will whereby he bequeathed (in case of the death of a nephew without heirs) his entire estate "to the United States of America, to found, at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men."

The proposed gift was first publicly announced by President Jackson in a message to Congress in 1835. The amount of the fund devolving was £111,389. We see that the donor had relegated his *alma mater*, and had passed over an ancient scientific foundation. Born in France, brought to England and naturalised, and in later years living among foreigners, Smithson may have become so detached in thought and habit that old ties, old associations, were forgotten. Conjecture surrenders to fact. But the use made of the gift as the keystone of an arch of knowledge was altogether unprecedented in character and optimism.

Ten years of travail and debate preceded the launching of the Smithsonian. The problem was to define knowledge and determine how best to increase and diffuse it. What was to be inscribed on the arms of the direction post? Five successive Congresses discussed the question. Many diverse propositions were made. Towards the end of 1846 a charter passed into law.

The first secretary was Joseph Henry, professor of physics and of natural history, at Princeton. To his vision, zeal, and resource was due the organisation and the planning of projects for the Smithsonian Institution. Henry was succeeded by Prof. Spencer F. Baird (1878), biologist; he in turn by Dr. Samuel Pierpont Langley (1887), physicist and astronomer; next by Dr. Charles D. Walcott (1907), geologist and palaeontologist.

Activities of great public value arose through Henry's influence; for example, the Weather Service, the U.S. Fish Commission, the system of International Exchanges of Scientific Literature, and the Bureau of Ethnology. There followed, under later leadership, the National Zoological Park, an Astrophysical Observatory, and other notable enterprises, each fostering research and progress. For long they were financed from the income of the private Smithsonian endowment. Congress now apportions certain sums for their maintenance, because, Dr. C. G. Abbot remarks, "the public needs them." Most of them are, however, still under Smithsonian administration. With reference to Congressional appropriation, we gather from Senator Reed Smoot, who spoke at the Conference, the unwelcome information that "the handicap under which the Smithsonian Institution labours in its relations with Congress is that Congressmen know so little about it." The Institution co-operates through specimens, instruments, men, and advice, with scientific agencies throughout the world. It has promoted the scientific survey of North America, and has taken part in no fewer than 1500 expeditions in

various regions. Researches by men not directly connected with the Institution are subsidised at intervals; these not Americans alone, but Englishmen, Frenchmen, Germans, and other nationals. The Smithsonian publishes new knowledge gained by its own and outside workers in the form of large memoirs and smaller original papers, which, with unique liberality, it distributes to 1500 libraries and learned bodies in every country of the world. Its reprints in the familiar Annual Report of informing articles of distinction are well known. This was a matter in which Dr. S. P. Langley took personal pride and interest. Here it may be recalled that during Secretary Henry's term of office, he addressed a letter to the British Association pointing out the advantage of publishing systematic lists of the titles of scientific papers. As a sequel the Royal Society began its well-known "Catalogue of Scientific Papers."

Some quotations from recorded speeches at the Conference will serve to convey the general views of at least a few of the representatives present. Characteristic throughout was the enthusiastic affection entertained for the Smithsonian. Dr. C. G. Abbot gave an able summary of accomplishment. "Considering," he said, "the immense benefit which the foundation has brought to our country, it would be ungrateful to transform the private memorial character of the Institution into a Government agency. The Smithsonian is not just another institution; it is not just another museum, not just another university." Dr. Flexner is of opinion that "the Smithsonian makes an appeal on the one hand strongly to Government and equally to private philanthropy; because the fruits of science, however garnered, are something of which the public as a whole, without distinction, enjoys the benefit." Again, Dr. W. W. Campbell: "Men of the type of university professors or investigators are in need of favourable environment; they are in need of tranquillity; they must be men without worries; there should be a continuing financial policy." Dr. Osborn, as regards scientific research: "I remember well when Secretary Langley was laughed at for diverting the funds of the Institution to experiments in flight. Who would suggest that they were not valuable to-day, when the world is covered with airplanes?" Also Dr. George E. Vincent: "I am sure that out of this Conference there will develop a plan by means of which private citizens and the Government of the United States will combine to make this great Institution still more influential in the future."

In Great Britain many friends will watch with deep interest the effort that is being made to re-awaken and intensify appreciation of the Smithsonian Institution. The Conference delegates stand high in public esteem in the United States; they are of the type capable of moving men to action where action is imperative. It may be hoped that a satisfactory response will ensue respecting the 'field of service' under discussion.

T. E. JAMES.