PAPERS.

OPENING ADDRESS OF HIS EXCELLENCY SIR J. H. LEFROY, C.B., K.C.M.G., F.R.S., PRESIDENT.

[*Read 12th April*, 1881.]

Gentlemen,—The profound sense which I have of my slender qualification for the honourable position which the constitution of this society assigns to Her Majesty's representative, and of my inability to address you with the authority of a master in any field of the vast domain of science, shall not tempt me to take up your time with vain excuses for allowing myself to be placed in such a position. There has been, as you are aware, a considerable interval of time since my predecessor delivered an inaugural address upon a similar occasion. I should be unwilling to see the custom of an occasional presidential address abandoned, and I ask your indulgence for the remarks which, at the request of your Council, I have committed to writing, upon subjects of immediate interest to this Society, however wanting in scientific value.

Museum and Gardens.—I am afraid that I cannot congratulate the Society upon the prosperous state of its finances. We may be regarded in a double capacity: First, as a body of men cultivating natural science for the sake of the pure and inexhaustible pleasure derived from the study of nature, and of its value to mankind, in that capacity we ought to be and we are self-supporting; secondly, as trustees for the public in the maintenance and management of two institutions which may be fairly said to be necessary, and indeed indispensable in these days, but in which we have only incidentally a greater interest than the rest of the community, viz., the Museum and Public Gardens. These the public ought to support, and it admits the obligation. Does it do so adequately? I fear I must reply in the negative. Our Botanic Gardens are not even mentioned in a recent review, by Professor Thisleton Dyer, of the botanical enterprise of the Empire. Want of skilled labour, arising from want of funds, throws them out of all possible competition with other establishments. They are defective in native plants, although about one-fourth of our species are peculiar to Tasmania, and still more so in plants eligible for industrial culture or naturalisation in this island; and I cannot but refer to the condition of the plant labels, which are so necessary for popular instruction, as a standing reproach. Very many interesting flowering trees

and plants are without labels; those that there are, are mostly old, defaced, and illegible. A larger and better conservatory is much required; and an economic museum, such as is now connected with most other establishments of the kind, could not fail to be of public utility in this colony also. These improvements cannot perhaps be expected until the public mind is more alive than it now seems to be to the importance of more widely diffusing natural knowledge, a direction in which the influence of this Society ought to weigh. I observe that our Museum had over 10,000 visitors in six months, of whom rather more than half were Sunday visitors. Better labels and fuller descriptive particulars are here also much required; and I may remark that I find we are much in arrears with binding, without which it is difficult to consult our scientific serials.

Members and Papers.—Our numbers, I am glad to observe, keep up, and have slightly increased, There are, I am confident, many gentlemen not yet enrolled whose adhesion would strengthen the Society, which needs to, as I conceive, rest upon a comprehensive basis, and to embrace a wide range of literary as well as scientific interests, if it is to outlive the first harvest of Tasmanian discovery. When I turn to what, after all, is the test of the vitality of any scientific society, the number of original contributions from its members, I find that we have received 60 since my predecessor addressed you. It would be improper, and it is needless, for me to allude, except for a passing expression of gratitude, to those two Fellows to whose indefatigable industry we are indebted for a very large number of them. They may be classified as follows. I think the list is interesting as indicating the present direction of scientific activity here:—Botanical subjects, 13; subjects of geology, 10; land and sea shells, 16; our domestic pest, the codlin moth *(Carpocapsa pomonella)*, 4; other subjects of Natural History, 11; miscellaneous, 6; total, 60. Remembering that we have no endowed chairs of Natural History or Philosophy, and but a limited number of workers, the Society is to be congratulated on such substantial results; and when we remember what considerable additions have been made to the lists of species, more particularly of land and marine shells, and what extensive tracts in the west are either imperfectly examined, or not yet examined at all, we may reasonably hope that the harvest is far from being exhausted. Certainly, as regards Geology, it cannot be so; not only is the exact place in geological sequence of some of our formations still undetermined, but there are some thousands of square miles which have not been, and cannot be, interrogated, so long as they are hidden by a dense forest growth. And it seems as if this broken fragment of the great Australian

Continent, or of some of the lands of a great archipelago, were destined to throw a light on the history of the whole, which it will take many years' study to bring to a focus.

The late Mr. Gunn.—Our Society, gentlemen, has sustained great losses, to some of which, as already noticed by the Council, it is needless for me to refer. I may, however, remind you of the very recent death of the late Mr. Ronald Campbell Gunn, who for nearly half a century did honour to this and earlier societies. The infirmities which attended the close of his career prevented my ever having the pleasure of making his acquaintance, but I allow myself to quote from the pen of his illustrious friend and fellow-worker, Sir Joseph Hooker, the tribute his scientific labours had earned twenty years ago:—"Ronald Campbell Gunn, F.R.S. and L.S., to whose labours the Tasmanian Flora is so largely indebted, was the friend and companion of the late Mr. Lawrence, from whom he imbibed his love of botany. Between 1832 and 1850, Mr. Gunn collected indefatigably over a great portion of Tasmania, but especially at Circular Head, Emu Bay, Rocky Cape, the Asbestos and Hampshire Hills, Western Mountains, Flinders, and other islands in Bass' Straits, the East Coast, the whole Valley of the Derwent, from its sources to Recherche Bay, the lake districts of St. Clair, Echo, Arthur Lakes, and the country westward of them to Macquarie Harbour, and the Franklin and Huon rivers. There are few Tasmanian plants Mr. Gunn has not seen alive, noted their habits in a living state, and collected large suites of specimens with singular tact and judgment. These have all been transmitted to England in perfect preservation, and are accompanied by notes that display remarkable powers of observation, and a facility for seizing important characters in the physiognomy of plants such as few experienced botanists possess." "I had the pleasure," continues Sir J. Hooker, "of making Mr. Gunn's acquaintance at Hobart, in 1840, and am indebted to him for nearly all I know of the districts I then visited; for we either studied together in the field or in his library; or when he could not accompany me himself, he directed one of his servants, who was an experienced guide and plant collector, to accompany me, and take charge of my specimens. I can recall no happier weeks of my various wanderings over the globe than those spent with Mr. Gunn, collecting in the Tasmanian mountains and forests, or studying our plants in his library, with the works of our predecessors, Labillardière and Brown."* Such men are not too often met with in any community, and are rarely honoured as they deserve until they are gone. We can at least offer the expression of our respect and high appreciation to the friends he has left.

* "Flora Tasmaniæ," I., p. cxxv.

Recent Inventions.—Residents in Hobart are already familiar with one of the most surprising of recent discoveries—I mean the power of conveying the sounds and tones of the human voice to great distances by means of the telephone—through its daily employment for many months past in communication between the city and signal station at Mount Nelson, a distance of six or seven miles. It is, perhaps, not so generally known that conversation has been held, although with difficulty, between Hobart and Low Heads, at the mouth of the Tamar, a distance of 160 miles. The facility with which we accept these discoveries, and almost cease to wonder at them, is itself not the least remarkable feature of our times. We are losing a sense of the limits of possibility in nature, and are as ready to believe the most incredible things, if they wear the garb of science, as our ancestors were in their simple and child-like ignorance. A very few years probably will elapse before telegraph poles will form a necessary accompaniment of every road, and civilised men will communicate verbally at a distance as habitually as we now do face to face. Involving, in fact, as the instruments in use here do, the application of the microphone, we have two philosophical instruments of great complexity, and full of instruction, at our command: a mind that can clearly follow and fully comprehend the principles of their construction, the functions of their several currents, has learned much of physics, and of physics in a direction of ever widening application. It is to be regretted that we have no physical lectures; and here, I think, the State might step in, not by the endowment of any chair, but by the provision of such honorariums to be placed at the disposal of this Society as would induce competent persons to give them the intellectual pleasure, and the distinction attending them being a large part of the reward. The time and trouble involved, and usually the expenses of preparing diagrams, illustrations, models, and apparatus, quite preclude most persons, not being professors or professed lecturers, from imparting their knowledge in this way. I can scarcely pass this subject without alluding to two applications of the fertile discovery of Professor Graham Bell, which must have quickened in many minds an intense desire to witness them—I mean that beautiful but costly toy, the phonograph, which I have heard reproduce an Italian song, on turning a handle, in the exact tones of the singer; and, more recent still, the discovery by which light itself is made instrumental to the transmission or reproduction of sound — the photophone. This instrument, as you are aware, depends upon the peculiar property of selenium, which is not a conductor of electricity in general, to become an imperfect one when fused and cooled slowly. Another property is required, which it also has been

found to possess. Its resistance to electricity is much reduced by the action of light; a selenium pile being then interposed in an electric circuit, and a beam of light of varying intensity being made to fall upon it, the current is more or less resisted in proportion to that intensity. The light is made to vary by the effect of the voice in rendering the diaphragm of a telephone more or less convex or concave, and thus sounds have been reproduced at distances up to 800ft. It is not, however, as a substitute for the ordinary telephone that this beautiful instrument is likely to be of value, but for its applications in rendering molecular vibrations audible wherever they occur, opening up quite a new field of experimental research. It is not necessary for me to enlarge on these subjects. The sources of popular information on all these inventions are numerous, and ample to satisfy curiosity; what is rather wanted, perhaps, is the curiosity itself. I mean an active-minded interest in such subjects, to be created by systematic instruction; and here I must remark that I much approved of a suggestion that one of the Tasmanian Scholarships should occasionally be awarded to attainments in mathematics and physics, with only a pass qualification in classics, if we cannot afford to add to their number. Competent teachers would soon be forthcoming. From such students the colony would in time be furnished with mining, telegraph, and other engineers, surveyors of a high class, well-educated men, in fact, in many departments of applied science, for whom it must have a demand, as its industries develop, and who are not turned out from existing schools.

Mr. Crooke's Researches.—At the risk of exhausting your patience, I must allude to one other field of new research, appealing to the imagination, and amazing the spectator more perhaps than telephones or photophones,—I mean Mr. William Crooke's researches* into what he has denominated the ultra-gaseous state of matter. That an absolute vacuum is a thing no art or apparatus can produce, is of course acknowledged. What must then happen when something so near a vacuum is produced that the gaseous pressure within a glass vessel is reduced to a few thousandths of an inch? It follows that the atoms still remaining will disperse, and fill the whole space, not of necessity at equal distances, but at greatly augmented distances from each other. The denser they may be in any one part—as where they are attracted to the walls of the enclosure—the sparser must they be in other parts. These invisible atoms, moving among themselves at inconceivable velocities, can be made to manifest their pressure to the eye: and as a skilful blacksmith can heat a rod of iron

* Vol. 30, Proc. R. Soc., 1879, p. 469.

red hot by hammering it, so can they be made to heat a piece of platinum foil red hot by impinging upon it off a reflector properly disposed. Into the field of physics and dynamics opened by these exquisite experiments, by which I have seen the Royal Society of London almost entranced; into the behaviour of these bodies under the influence of electric or magnetic currents, I am not in the least competent to enter. I only refer to them as matters as new, as they are profoundly interesting; and suggestive of our own need for physical instruction to keep up with the discoveries of the day.

The Survey Department.—To pass to what is more germane to our business. It is, I think, from this Society that the responsible guides of public affairs may reasonably expect to hear from time to time of subjects whose importance, being scientific rather than political, is not likely to be pressed upon them by outside interest. Among these I venture to name the imperfection of our county maps, especially those which include new mineral districts, and the poverty of the topographical information they convey. Indeed, I must go a step further, and say that from a scientific point of view, the organisation of our Survey department cannot be pronounced satisfactory. The office of Surveyor-General being merged in that of Minister of Lands and Works, there is no longer a professional chief to direct and combine the work of the numerous district surveyors discharging duties of great present, and still greater future, importance. Under such circumstances, it will be no wonder if serious discrepancies are found to exist hereafter between surveys of different dates, or that we ask in vain for a good map of the country within 20 miles of Hobart. The maps accompanying Mr. Gould's Geological Reports give more detail than the county maps; but besides being mere sketches, and of a fragmentary character, they are scarcely to be procured. These reports I find scattered through no less than twelve bulky volumes of Parliamentary papers, and it appears to me that the time has come for collecting and reprinting them in a more convenient form.

Meteorological Returns.—The advancing years and infirmities of our Fellow, Mr. Francis Abbott, F. R. A. S., have, as the Society was informed by the last report of the Council, led to the discontinuance of the meteorological register kept by him for the long term of 35 years, an instance of self-devotion and gratuitous service to science which it would be hard to surpass. The only register now regularly kept that I know of, except those at the lighthouses, is that of Mr. W. E. Shoobridge, at New Norfolk, commenced in 1874. We are much behind other colonies in this respect. Meteorology requires more and more a multiplication of ob-

servations. The excessive humidity of our climate on the West Coast has not, I think, been done justice to. It is stated that the rainfall at Macquarie Harbour exceeds 100in.* It averaged 67in. on the Hampshire Hills, 1837-9,† and in one year exceeded 80in. How much of this is due to the vast forests which still clothe that region, covering 5000 or 6000 square miles, and how much to permanent physical conditions, cannot now be guessed, but it is of considerable importance to ascertain the facts before any material change is effected in the aspect of the country by settlement. With regard to these instruments which only require attention once a day, such as registering thermometers and rain-gauges, I cannot imagine that there would be any difficulty in multiplying them. In some colonies, as, for example, Canada, use is made of the masters of the common schools, who are highly intelligent men, very stationary, and can all be instructed; and I am disposed to recommend, as a beginning, the provision of instruments for instructional purposes at the Central School. Attention was pointedly called, as you are aware, at the Intercolonial Meteorological Conference, held at Sydney in November, 1879, to the importance of this colony in relation to weather telegrams. I have reason to believe that we shall shortly be invited to take part in a general plan of intercolonial observation, receiving and interchanging them, and otherwise contributing our share to a species of Australian confederation, which can alarm no susceptibilities and arouse no jealousies.

Gentlemen, I feel that I have taken up a great deal of your time, and have said very little; I have only now to thank you for the kindness and attention with which you have listened to me.

NOTES SHOWING THAT THE ESTUARY OF THE DERWENT WAS OCCUPIED BY A FRESH-WATER LAKE DURING THE TERTIARY PERIOD.

By R. M. Johnston, F.L.S., etc.

[*Read 12th April*, 1881.]

Apart from the circumstance that the extensive tertiary fluviatile and lacustrine formations of Australia have been the principal sources from which we have derived our rich treasures of gold and tin in the free state, their study from a naturalist's point of view is also peculiarly interesting from the nearness of their deposition to our own time.

* "Wallace," p. 244. † "Backhouse," p. 126.