

of hydrogen, are spectroscopically invisible in the sun and stars—though they doubtless exist there—and that these new gases scarcely yet glimpsed, have already, in all probability, supplied us with many points of contact between our own planet and the hottest part of our central luminary that we can get at, and stars like Bellatrix, are full of hope for the future, not only in relation to the possibility of more closely correlating celestial and terrestrial phenomena, but in indicating that a terrestrial chemistry founded on low density surface products in which non-solar gases largely enter, is capable of almost infinite expansion when the actions and reactions of the new order of gases, almost, it may be said, of paramount importance in certain stages of stellar evolution, shall have been completely studied.

With regard to the differences indicated between the results of the chromospheric and eclipse observations in the above table, it may be useful to remark that Prof. Young's "frequencies," invaluable though they are, must necessarily be of less importance, from the present point of view, than the eclipse observations obtained, it may almost be said, at the same instant of time. There may be, and doubtless are, two perfectly distinct causes for the appearance of the so-called chromospheric lines. First, the tranquil condition of the lower strata of the sun's atmosphere which gives us the pure spectrum produced at a constant—and the highest that we know of in the sun—temperature. Secondly, the disturbed condition which fills the spectrum with lines of a so-called prominence. Formerly it was universally imagined that the prominences were shot up from below; and in that case the lines added would indicate a temperature *higher* than the normal. But I have sent many papers in to the Society indicating the many arguments against this view,<sup>1</sup> and to me, at the present time, this view is almost unthinkable. If these disturbance-lines are produced from above, they may represent the effects of many stages of *lower* temperature. Hence a list of chromospheric lines loses most of its value unless the conditions of each observation are stated, and the phenomena appearing at the same place at the same instant of time are recorded.

Now, this same place and same time condition is perfectly met by eclipse photographs, and hence I attach a great value to them. But the comparison between such eclipse observations and the spectra of certain stars indicates that the latter in all probability afford the best criteria of all.

#### THE MARQUIS OF SAPORTA.

IN the study of palæobotany we may concern ourselves with the various problems of distribution, the geologic sequence of plant types, the value of fossil plants in comparative stratigraphy, and as tests of climatic conditions; or our attention may be concentrated on the important facts revealed by a microscopic study of petrified plant tissues. The latter field of research, in which Prof. Williamson has laboured with remarkable success during the last twenty-five years, is gradually being recognised by botanists as a branch of their science which they cannot afford to neglect in dealing with the wider problems of plant life. Fascinated by the almost incredible perfection in which Palæozoic, and more rarely Mesozoic, species have been preserved, the student of vegetable morphology is apt to take too little heed of the wealth of material which can only be studied in the form of structureless casts or impressions. In the majority of fossil floras the geologist or botanist must perforce confine himself to an examination of the few isolated and imperfect fragments that have escaped destruction in the process of denudation and rock-building, and have been preserved by fossilisation as meagre representatives of a past vegetation. As a specialist in this latter branch of palæobotany, there has been no more ardent worker since the days of Adolphe Brongniart, whom we may regard as the founder of palæobotanical science, than the Marquis of Saporta. Saporta's recent death, at his home in Aix-en-Provence, at the age of seventy-two, has deprived botanical and geological science of an unusually able and vigorous worker.

<sup>1</sup> They are set out at length in the "Chemistry of the Sun," which I published in 1887.

A perusal of Saporta's numerous contributions to scientific literature affords abundant evidence of critical and detailed investigation during a long period of years; nearly the whole of his published work has been in the domain of fossil botany. The Tertiary vegetation of France forms the subject of several of his contributions to science. From an early stage of his career the Cainozoic plant-bearing strata of Provence have occupied a prominent position in his palæobotanical studies; the Eocene flora of Aix, a valuable monograph on the remnants of an Eocene flora preserved in the tuffs of Sézanne, and various other writings on Tertiary plants, bear eloquent testimony not only to a remarkable power of detailed systematic work, but to a striking aptitude for a broad and philosophic manner of treatment. Students of Mesozoic botany soon learn to appreciate Saporta's memoirs on Cretaceous and Jurassic plants, and especially the splendid series of monographs on the Jurassic flora of France, published as separate volumes of the "Paléontologie Française" from 1873-91; in this profusely illustrated work, dealing primarily with French vegetation, we have to a large extent a general handbook of Oolitic botany. One feature which sets a high value on Saporta's palæobotanical work, is his wide and thorough acquaintance with the facts of distribution and taxonomy of living plants. Palæontological records are often in themselves of no special interest to zoologists and botanists, but if interpreted as indices of plant distribution in past ages, and applied to the wider problems of the evolution and dissemination of plant types, they assume considerable importance. Saporta's knowledge of recent floras, and his keen enthusiasm as an evolutionist, led him to regard fossil plants not simply as convenient aids to the stratigraphical geologist, but as affording indispensable data to the student of plant phylogeny. In "Le Monde des plantes avant l'apparition de l'homme" (Paris, 1879), we have a series of articles originally published in the *Revue des Deux Mondes* and *La Nature*, in which Saporta's encyclopædic information and finished literary style combine to render attractive to the layman and the specialist a retrospect of plant life during the geologic ages. Unfortunately the elaborate frontispiece to this volume, described as the "oldest known land plant," and named *Eopteria Morierei*, is merely a representation of an iron pyrites infiltration on the surface of a Silurian slate, and cannot be retained as a plant impression. In a more recent and smaller volume, "Origine paléontologique des arbres cultivés ou utilisés par l'homme" (Paris, 1888), we have an interesting sketch of the geological history of existing forest trees; and in another and more ambitious work,<sup>1</sup> in collaboration with Prof. Marion, an attempt is made to follow the lines of descent of the several subdivisions of the vegetable kingdom. The palæobotanist who is bold enough to venture on the task of tracing out the ancestry of plant forms, and of attacking the problems of development, is exposed to the very serious danger of allowing unsound links to form part of his chains of life. Saporta's constant desire to treat fossil plants from the point of view of a sanguine evolutionist, who wishes to press into his service all possible pieces of evidence towards the better understanding of the process of plant evolution, has in certain instances been led beyond the limits of accurate scientific reasoning. The majority of the so-called fossil algae, to which he has devoted considerable attention, have been put out of court by Nathorst and others, as having no claim to consideration as records of thallophytic life; and it is generally agreed that the value of his work in this direction is seriously discounted, by the more than doubtful specimens which are described as vestiges of the lower and more primitive forms of plants. A few months before his death, Saporta completed an exhaustive monograph on

<sup>1</sup> Saporta and Marion: "L'évolution du règne végétal" 3 vols 1881-1885.

the Mesozoic flora of Portugal;<sup>1</sup> this work marks an important advance in our knowledge of Lower Cretaceous and Upper Jurassic vegetation; and of special interest are the various forms of "archetypal angiosperms" closely resembling similar fossils from the Potomac beds of North America. This last monograph, full of elaborate botanical and stratigraphical work, affords a striking proof of the energy and youthful enthusiasm of the veteran student. Saporta's name will ever be held in respect by succeeding generations as that of a pioneer of palæobotanical science; and by those who were privileged to know him personally, or as a correspondent ever ready to render assistance to younger workers, the death of the Marquis of Saporta must be felt not merely as the termination of the labours of one of the foremost palæobotanists, but as the removal of a generous friend and colleague, whose wide knowledge and untiring devotion to science will stimulate younger investigators to more vigorous efforts in the rich field of palæobotanical study.

A. C. SEWARD.

#### SIR GEORGE BUCHANAN.

THE death of Sir George Buchanan removes from our midst a leader in that branch of medical science which concerns itself with the prevention of disease. His death came very unexpectedly, for the circumstances of his ill-health were known only to a circle of intimate friends; and his great desire to go on working as long as work was practicable, made him sufficiently cheerful to disguise the suffering which he at times experienced. It is some three years since he resigned the post of medical officer to the Local Government Board, this step having been taken by him on account of failing health. But he still found plenty of pleasurable occupation in connection with the various learned and scientific bodies with which he was associated, and he also served on the Royal Commission on Tuberculosis, of which he became chairman on Lord Basing's death. He was a pupil of University College, of which body he became a Fellow; he graduated B.A. and M.D. at the University of London, and at his second M.B. he distinguished himself by carrying off several gold medals and scholarships. Later on he became medical officer of health to the district of St. Giles, where he laboured hard for years to improve the conditions of public health and to amend the then terribly faulty circumstances under which the people lived. It was here that he attracted the attention of Sir John Simon, then medical officer of the Privy Council, and under him he served both as a temporary and, later on, as a permanent medical inspector. During this period, and subsequently when he himself directed the public health department of the State, the investigations which he carried out, and the reports which he presented to Parliament, embodied the results of work of which England may feel proud. As a type of the class of work we refer to, we may instance his prolonged investigations into the influence on health of large public works, of water-supply and sewerage, and his discovery of the lessening of mortality from pulmonary consumption wherever the construction of sewers had led to a lowering of the sub-soil water. Some of his papers on the subject of vaccination in relation to small-pox are also of the greatest value; they were the result of most careful labour, as well as of an earnest desire to eliminate all possible sources of error, and to arrive at the truth alone; and the more he studied the subject, the more convinced he became of the value of vaccination as a measure of public health. He sought to secure for all the work he did or supervised a truly scientific basis; and he always attached the greatest importance to the auxiliary scientific work for which a special, but only a small, grant is annually made to the medical depart-

<sup>1</sup> "Flore fossile du Portugal (Direction des travaux géologiques du Portugal)." Lisbon, 1894.

ment of the Local Government Board. He had a marked literary talent, and a conspicuous power of setting out the salient points of the work done by his inspectorial staff; with the result that his annual reports have gradually come into great demand by sanitarians and public health authorities in almost every part of the world. The result of all his labours is by no means accomplished, in some places work on the lines he has indicated has hardly commenced, and it must almost necessarily be that much that he has taught, will, in the lapse of time, fail to be associated with his name. But those who know the nature of his work, and who appreciate the thoroughness which always characterised it, will readily understand how far-reaching and beneficial the results must in the end be. In 1882 he was elected to the Senate of the University of London, and in the same year he was made a Fellow of the Royal Society; but otherwise distinctions came to him mainly at the close of his official career. This was doubtless largely due to all absence of self-seeking in his character. As head of a department he was always trying to promote the welfare of those under him, and it was only when he retired on a comparatively small pension that he asked for some consideration in view of the long services he had rendered to the State before he gave his whole time to his official duties. But the Treasury gave their usual answer, and he said no more. At this date he was made a Knight Bachelor, and in 1893 he received the honorary degree of LL.D. of the University of Edinburgh. He was a past President of the Epidemiological Society, a Censor of the Royal College of Physicians of London, and he acted as adviser in scientific and other matters to several other bodies. If such a characteristic can be deemed a fault, Sir George Buchanan's most prominent failing was an inability to conceal his sense of those who, as he thought, sacrificed principles and, at times, the truth itself in matters relating to the advancement of public health, for purposes of notoriety or of policy. But, on the other hand, no chief of a public department ever won the affection as well as the esteem of his staff better than Sir George Buchanan did; and he made it no secret that in regard to this he was always desirous to recall the example of his own former chief, who, happily, still lives, and to whom he was devotedly attached.

#### NOTES.

OUR readers will be glad to know that Prof. Huxley continues to improve in health. A telegram received from Eastbourne as we go to press states that he is progressing favourably, and is able to get up daily, but is hardly strong enough yet to leave his room.

THE Bill, which was introduced into the House of Lords on Thursday last by Lord Playfair, on behalf of the Government, may be fairly said to bring the reconstruction of the University of London on the lines of the Gresham Commissioners' Report within the sphere of practical politics. The exact terms of the Bill have not yet transpired, but it is understood that the four Commissioners appointed to administer the Act are, in the first place, empowered to make modifications in the scheme if deemed expedient after consultation with the Senate and Convocation of the University of London, and other bodies affected; and in the second, enjoined to adequately safeguard the interests of the external or non-collegiate students. The Government having at last taken action on this question, it is the more satisfactory to note that the attempt made in Convocation on Tuesday last to rescind the resolutions passed at the January meeting (vol. II. p. 298), has completely failed, a resolution to the effect that "if a local Teaching University for London be desirable, it ought to be constituted apart from the existing University of London," being rejected by 238 against 117, or by a majority of 121 votes.