FRIDAY, MARCH 30, 1883.

SCIENCE AND THE NEWSPAPERS.

WE hear a great deal about the educating influence of the press, and it cannot be denied that this influence is very great. Every one reads the newspapers, and is more or less affected by them. To say that the press exerts a great educational influence is, however, not necessarily praise; for this influence may be bad, and in some respects it undoubtedly is bad. Leaving out of consideration the obvious illustrations of this truth, it seems to be desirable to call special attention to one direction in which the newspapers, as a rule, signally fail in their attempts to educate the public; and that is, in reporting the transactions of the meetings of scientific associations. Fortunately the attempts are not often made; but, when they are, the results are quite different from what the editors probably desire. The intention of the editors is, we take it, really to inform the public, in an honest, straightforward way, what the papers presented at the meetings are about. Perhaps the gentlemen think that this is actually accomplished: nothing can be farther from the truth. Usually, instead of a clear statement, a column or two of the veriest nonsense is strung together by a young reporter entirely ignorant of the first principles of the simplest science. The matter passes into the office, and is accepted by an editor as ignorant of science as the reporter; and the result is, that science is belittled, and the public deceived — certainly not educated. When ignorance alone is exhibited in these reports, they may be regarded with equanimity by those who are informed; for the ignorance of the writer appears on the surface, and no one can or does hold the author of the paper responsible. But when, added to the ignorance, there is a tendency to ridicule, to turn matters of grave importance into petty jokes, — in general, to betray a flippant spirit in the treatment of the subjects discussed, — then it is time for science to enter a protest, not in the interests of scientific men (for newspaper reports, no matter how bad, do them little harm), but in the interests of science itself.

When a newspaper in a semi-civilized region makes sport of death; when an execution is emphasized by mirth-provoking head-lines; when the most sacred things are ridiculed, — the refined members of the community are shocked. So, too, when the earnest efforts of investigators are used by strangely incompetent young men for the purpose of exhibiting their sophomoric humor, those whose senses in matters of science are in the least refined feel outraged. They feel that the newspapers which lend themselves to such abuses are guilty of a sacrilege for which they should be held responsible. The harm done is both positive and negative, — it is positive in so far as entirely false notions in regard to the work of scientific men are given currency, and ignorance is encouraged; it is negative in so far as the opportunity for really correctly informing the public is lost.

All who hold science in reverence; who believe, that, through scientific investigation in every direction open to us, the truth will at last be reached; who believe that the spread of correct ideas concerning natural phenomena will eventually dispel that superstition which is now the great enemy of progress, — all such cannot but deplore any thing which in a tangible way is opposed to the development of scientific culture. We call upon the editors of our great daily newspapers to carefully consider the subject, and to endeavor to remedy what must be regarded as a grave difficulty. Better no reports at all than such as are usually furnished; but the work of reporting might easily be well done, and, if well done, would be of value.

THE PRESENT STATE OF SCIENCE IN BRAZIL.

THE last ten or fifteen years have witnessed a marked awakening in Brazil to the importance of scientific research, and the inauguration of what may fairly be termed a new movement, of which, so far as the writer is aware, no account has yet been given to the outside world; while Brazilians themselves are

perhaps, for the most part, unaware of the importance and promise of the scientific activity developed in their midst by a small group of earnest workers. Although Brazil has, ever since the abandonment of the narrow, restrictive, colonial policy of Portugal which proscribed foreigners, been the chosen field of research of many eminent foreign naturalists, the Brazilians have, with a few honorable exceptions, been content to receive at second hand their knowledge of the natural history of their own country, and have seldom undertaken, on their own account, to supplement and correct the work of foreign naturalists, much of which is necessarily incomplete and erroneous. Nor has the government, until recently, granted well-directed and sustained aid in favor of scientific investigations; although it has for many years maintained, at considerable expense, scientific departments in all the higher institutions of learning, and in establishments like the national observatory and museum, and has, in a few instances, organized surveys and exploring expeditions. Through bad organization or insufficient support, the scientific results of all these efforts have, however, been of small value. While this unsatisfactory state of affairs, so natural in a new country, has been the rule, it should not be overlooked that the government has, for a number of years, given an annual subsidy of about five thousand dollars towards the completion and publication of von Martius' great Flora braziliensis; and several foreign naturalists have, like Agassiz, received important official and private encouragement and aid in the prosecution of their researches.

Towards the close of the colonial period a promising scientific movement was begun, which received a severe check from the political troubles attending and following the emancipation of the country from Portuguese rule, — a check from which science in the empire is only just beginning to recover. At that time the national museum was established, having as a nucleus the splendid mineralogical collection of Werner, that, after a strange succession of mishaps, came to a final resting-place in Rio de Janeiro. An able mineralogist and geologist, Baron von Eschwege, was made inspector of mines, and, for about a dozen years, investigated, with admirable proficiency, the geology and mineralogy of the gold and diamond regions; while Pohl and Sellew carried on investigations in other parts, in part at least under government auspices. Two Brazilian mineralogists, Andrada and Camara, were drawn into politics; and in the former an able scientific man was transformed into the patriarch of Brazilian independence. At or about the same time, Friar Velloso prepared an important work on Brazilian botany, of which, unfortunately, only the plates were, until recently, published. The later work of Freire Allemão in the same field, being produced at a time of almost complete indifference to science, have for the most part been lost, or remain unpublished, as has also happened to that of Alves Serrão, Burlemaqui, and Capanema, in geology and mineralogy, and of the poet Gonçalves Dias in ethnology.

For a long period what passed for science in Brazil was characterized by an almost complete absence of investigation; and although there are many names with a local, or even national, reputation as teachers or writers on scientific subjects, it is difficult to find any solid contributions in the field of either the natural or physical sciences. Even to-day there are many reputations that have no real basis in original work of merit. The appearance, therefore, of a group, however small, of real investigators, marks the beginning of a new era; and, although this beginning is as yet a very modest one, its effect is already being felt, and will increase from year to year. This awakening to a knowledge of what science really is, and of the true methods of pursuing it, may be ascribed to various causes. The increased facilities of communications, and the constantly widening relations with foreign countries, the new life and energy developed by a great struggle like the Paraguayan war, the visit of Professor Agassiz in 1864, and the visits of the emperor to Europe and the United States, — have probably been the most important determining causes. Of these, the last is by no means the least. With a strongly developed scientific taste, and with such knowledge as could be obtained with the means at his command and in the non-scientific environment in which he was placed, the emperor profited to the utmost, in his travels, to associate with scientific men, to visit museums and schools, and to acquaint himself thoroughly with the means and methods of research; so that he returned with clearer conceptions of what was best to encourage and promote in his own country. Within the last ten or fifteen years the higher schools and scientific establishments have been reformed and given a better organization, new departments, and increased appropriations, which, although still very small for their needs, are princely in comparison with what they formerly received; an efficient mining-school has been established;

professors and specialists have been imported from abroad, though not to the extent that would have been expedient for some of the new departments and for work new in the country; a geological survey was organized, though, being somewhat in advance of its time, it was, from a spirit of short-sighted economy, suspended after two years of efficient work; the practice of attaching naturalists to engineering explorations has been adopted; and in many other ways scientific research is being promoted.

At present the national museum and observatory in Rio, and the school of mines at Ouro Preto, are the principal centres of scientific activity. The latter, being a comparatively new establishment, remote from the centralizing tendencies of the capital, organized on European models, and controlled by an able corps of French specialists, has escaped many of the vices of organization of the older institutions. The two former, although badly handicapped by lack of means and defective organization, have outstripped the other institutions that ought naturally to be important scientific centres, because in them the reform was more radical and complete, and, the working-corps being small and for the most part new, the chances of filling the places with competent specialists have been far greater than in the medical schools of Rio and Bahia, the polytechnic school and the Dom Pedro Segundo college at Rio. In these a greater number of the defects of the old organization are still retained, and some of the new features are of doubtful utility, while the whole organization is still too cumbersome and centralized for efficient special work in any department. The system of filling the professorships by competitive examination, as it has been conducted, too often gives the showy qualities of rhetoric and smartness the preference over solid merit as proved by original research; and the most competent often refuse to enter, or, if they do enter, are beaten in a competition in which a majority of the examining board has only very superficial knowledge of the subject of the chair to be filled.

The national observatory, now under the direction of Dr. L. Cruls, has of late years been completing its equipment, and has recently commenced the publication in French of a series of annals. Aside from its regular work, it organized four parties for the observation of the passage of Venus, two of which were outside of the limits of the empire. Astronomical work is also being carried on in a small private observatory by Dr. Pereira Reis, the former vice-director of the national observatory, and by some of his colleagues of the polytechnic school. The organization and equipment of this observatory by private individuals, assisted by voluntary contributions, is one of the most hopeful signs of the new scientific movement.

The national museum commenced in 1876 the publication of its Archivos, of which six volumes have already appeared, containing papers prepared in connection with the museum or with the extinct geological commission, the material of which is now incorporated with the museum. Among these papers, those of the late Professor Hartt on the archeology and ethnology of the Amazonas, of Drs. Lacerda and Peixoto on Indian crania, of Dr. Ladislau Netto and Ferreira Penna on Brazilian archeology, of Professor Derby on geology, of Dr. Lacerda on the physiological action of snake-poisons, and of Fritz Müller on insects and crustaceans, are worthy of special mention. A splendid monograph on the cretaceous invertebrate fossils, numbering over two hundred species, mostly new, collected by the geological commission, is now being prepared for the Archivos by Dr. C. A. White of the National museum of Washington, and will probably be followed by monographs on the equally rich carboniferous and Devonian faunas by Messrs. Derby and Rathbun, former members of the geological commission. The museum is at present devoting special attention to anthropological researches; to which the director, Dr. Ladislau Netto, is giving a large portion of his time, and lately held a very creditable exposition in this branch, by means of which considerable public interest was aroused, and large additions to the collections secured. The botanical work of the museum is under the direction of Dr. Nicolau Moreira, assisted by Mr. Schwache, an able German botanist. In the geological department Messrs. Derby and Freitas are chiefly occupied in the study, and preparation for publication, of the rich material accumulated by the geological commission, and, as far as circumstances will permit, in the prosecution of the geological study of the empire. The geological reconnoissance of the great São Francisco valley, and of the auriferous and diamantiferous belt of central Minas Geraes, by Professor Derby, is the most important of recent work done in this department. Under the direction of Dr. Couty of the polytechnic school, and Dr. Lacerda of the museum, a laboratory of experimental physiology was established some three years ago, annexed to the museum. In this, carefully conducted in-

vestigations on various subjects have been carried on, the results of which have been in part published in the French scientific journals. Of the work published in Portuguese, that of Dr. Lacerda, on the nature and physiological effects of snake and other poisons, and the successful application of permanganate of potash as an antidote to snake-poisons, is the most striking and important. The laboratory being open to investigators outside of the establishment, several have availed themselves of the opportunities thus afforded; and Messrs. Guimerães and Raposo have investigated the physiological effects of coffee, Paraguayan tea, and other alimentary substances; and Dr. Araujo Goes is now engaged in studying the microscopic organisms of pulmonary diseases.

The school of mines also has its annals, of which one volume has been published, containing important papers from the pen of the director, Professor Gorceix, on the mode of occurrence of the topaz, diamond, and other precious stones, and on the geology of the regions where they occur, as well as papers from the students of the school, which prove that it is training an able corps of investigators, from which much may be expected in the future. The second volume, now in preparation, will contain translations of the little-known papers of Lund on the bone-caverns of Lagoa Santa.

The past year has witnessed an almost complete reorganization of the medical school of Rio de Janeiro, with the establishment, on a liberal scale, of many new laboratories for instruction and research, from which much good work is naturally to be expected. Up to the present time the studies of Dr. Domingos Freire in organic chemistry, and on the microscopic organisms of yellow-fever, and the nature, cause, and treatment of that disease, are the most important that have appeared from that institution.

In the polytechnic school the era of investigation has been too recently introduced, and on too small a scale, to have yet produced any material results. Dr. Saldanha da Gama, in the botanical department, is studying the flora of the vicinity of Rio, and training his students in the methods of research; and important geological and mineralogical investigations are being carried on by Dr. Ennes da Souza, who has had the advantage of a thorough scientific training at Freiberg. The chemical department has just received as guests Professor Michler of the university of Zurich, now on a scientific visit to Brazil, and Dr. Sampaõ, a Brazilian graduate of the same university, who are conducting elaborate investigations on the chemistry of Brazilian vegetable products.

Brazil not having as yet reached that stage of scientific and material development in which scientific men can hope to gain a livelihood, and find means and time for investigation outside of the government schools and other establishments, little can be expected among private workers. Notwithstanding this fact, the development of what may be called the official science has been too slight to place it in advance of the non-official. Fritz Müller, a farmer in a German colony of southern Brazil, finds time for the zoölogical investigations that have given him a world-wide reputation; Glaziou, director of the public gardens of Rio, has contributed largely to the Flora braziliensis, and is probably unsurpassed in his knowledge of Brazilian botany; Rodrigues Peixoto, a practising physician, has been associated with Lacerda in important studies on Brazilian craniology; and Barbosa Rodrigues has worked extensively on the palms and orchids in botany, and in the fertile field of Amazonian ethnology.

Though the showing for Brazilian science is so small, and some of the work above mentioned may, on close scrutiny, prove to be somewhat crude and non-scientific in its methods and deductions, enough has been done to mark the dawning of a new era full of promise for the future, and characterized by the study of nature rather than the study of books. The small nucleus of investigators cannot fail to train disciples, to draw others around them, and to educate the government and people to the point of distinguishing true research from mere empty show and glitter. When once truly scientific methods come to be fairly naturalized in the country, the Brazilians will not be found lacking in the mental qualities that make able and original investigators. If scientific progress be slow, it will not be, as hitherto, from indifference, or ignorance of the true nature of science, but because the material development of the empire does not permit the facilities of research enjoyed in older and richer countries.

HISTORY OF THE APPLICATION OF THE ELECTRIC LIGHT TO LIGHTING THE COASTS OF FRANCE.[1]

IV.

In the English lighthouses, for which the de Meritens machine has also been adopted, another style of commutator is used, as shown

[1] Continued from No. 7.