

THURSDAY, NOVEMBER 22, 1888.

THE OPENING OF THE PASTEUR INSTITUTE.

"WE cannot refrain from expressing some regret that the encouragement of scientific research should be one of the things which they do better in France than among ourselves." With these words, trenchant enough if heeded by those in authority on whose ears they may fall, the *Times* concludes a leader on the inauguration of the Pasteur Institute by the President of the French Republic. Such a ceremony naturally suggests two distinct points for consideration: (1) the object of the institution thus inaugurated; (2) the interest attaching to the ceremony.

The Pasteur Institute is remarkable among all others in being the best form of monument ever erected, and at the same time in its being raised during the life-time of the distinguished man of science, in whose honour and for the furtherance of whose work it was designed. That the debt which the community owes to M. Pasteur will never be paid, nor even adequately acknowledged, needs no insistence; but we may be excused if we dwell upon this point a little, for in the multifarious and different battalions of the workers in the army of science there may well be some whose particular work has not quite brought home to them their obligation to him.

The most remarkable characteristic of M. Pasteur's work, the one which places it on so unique a pedestal, is the fertility of its results in every direction. To have elucidated at once the causation of most forms of fermentation, and the causation of most forms of acute febrile disease (this last leading to the infinitely precious invention by Sir Joseph Lister of antiseptic surgery), is on the chemico-biological side of natural science a feat of as great abstract value and of greater immediately practical worth to the community than any one, or even two, of the greatest epoch-making discoveries of physical science. If it were not for the lamentable consequences of the apathy with which the British public regard science and its contributions to their health and wealth, it would be sadly amusing to read, as anyone may do in even well-founded prints, the lay opinion that M. Pasteur is but a hydrophobia curer, and possibly a slightly more successful one than McGovern, the Irish quack. The flame of popular knowledge of current science always burns most unsteadily, and any sensational wind makes it flare for a short time, and then it sinks almost extinguished. It has thus been with the most recent work of M. Pasteur; and so we find at the inauguration of the Institute the wide subject of the chemico-biology of disease processes was subordinated to the representation of the existing condition of our knowledge of the treatment of rabies.

Although, considering the national importance of the general principles of M. Pasteur's work, this preponderance of attention given to one subject may be regretted, it nevertheless must be admitted that a specific instance is more easily "understood of the people," and may consequently more energetically drive home the wedges of scientific truth. To M. Grancher was most justly accorded the very agreeable task of expounding in a few

simple and unadorned sentences the results of the anti-rabietic treatment of M. Pasteur. Though rabies, or hydrophobia, has always occupied such a special position in the public mind, this has not prevented the application of the general principle of public ingratitude; and we are therefore in no wise surprised to find that the benefactor who arose, and, at his own risk and cost, attempted to remove such an evil, should have been received with calumny and misrepresentation. The consolation afforded by the unerring verdict of time rarely comes—as in the present case it fortunately has to M. Pasteur—before the benefit-conferring Prometheus is past receiving it.

M. Pasteur has always borne the monstrous attacks made upon him with such dignity and composure, that the summary by M. Grancher of the great works suggested by him must have been an intense gratification and recompense.

Our sympathy with his pleasure is unfortunately alloyed with regret that of recent years health has been denied him for the perfect enjoyment of his renown.

The announcement by M. Pasteur in 1885 (the year of the epidemic of rabies in London) that he had not only succeeded in rendering dogs refractory to rabies by means of prophylactic inoculations, but had also with the same material attempted, and apparently successfully, the curative treatment of two human beings, marked the commencement of a widespread application of his now fairly well-known methods.

From the first, M. Pasteur recognized the effect that such an announcement would have upon the public mind, and, in addition to forming a resolution only to treat assured cases of rabies (a resolution he had ultimately to abandon on the grounds of humanity), arranged the facts of his work in such a manner as to provide for complete statistical accuracy in his records.

By his prescience we are thus placed in possession of an overwhelming series of facts relating to persons bitten by rabid animals. He arranged those who came to him under these circumstances into three categories.

In the first (Class A) he placed persons bitten by animals indubitably proved to be rabid by the results of inoculation from the spinal cord into normal animals.

Secondly (Class B.), he grouped together those cases in which the state of the animal, though not tested by experiment, was nevertheless certified to have been rabies by a veterinary surgeon.

Finally, he constructed a third order (Class C.) in which were collected those cases in which, owing to escape, &c., of the dog or animal attacking, no precise information as to its condition could be obtained, but only a presumptive suspicion that it was rabid.

Before we review the figures derived from these three classes of patients, it is important to gauge the character of the statistics of the general mortality from the disease with which they have to be compared. It is only since special attention has been drawn to rabies through M. Pasteur's work that trustworthy statistics have been forthcoming. In former years estimates of various kinds were from time to time prepared, but while some authors took only cases of the most virulent kind, and consequently obtained exceedingly high death-rates among those bitten, others accumulated large numbers of instances the details of which were most imperfectly

ascertained, and the mortality percentages thus deduced consequently utterly untrustworthy. The severest test that could be conceived for genuine criticism of M. Pasteur's method is obviously the comparison of the death-rate in his Class A. with that among persons, not his patients, proved to have been bitten by rabid dogs by the fact of at least one of those attacked by the animal dying of the disease. Such a comparison is now fortunately possible. The probability of rabies following the bite of a rabid dog is now definitely ascertained to be from 15 to 16 per cent. of those attacked.

Now the death-rate in M. Pasteur's Class C. is no more than 1·36 per cent., even including every fatal case—that is, inclusive of those persons who develop the disease during the first fifteen days after the bite. The rigid comparison of these two death-rates may well afford M. Pasteur the satisfaction of feeling that he has saved a number (to be counted by hundreds rather than tens) of his fellow-creatures from the most agonizing of deaths, and an enormous number from the worst of apprehensions.

For general biological science the next most interesting statistics are those which seem to reveal the mode of action of the curative and prophylactic inoculations. M. Pasteur's explanations of the beneficial effects of the material inoculated was that the nerve-tissue contained not only the microbes, the causative factors of the disease, but also their metabolic products, and that these latter by accumulation inhibit the growth and spread of the organisms. If, therefore, these products were injected into the blood-stream in sufficient quantity, he believed that the animal so treated would be protected from the malady. In this country Dr. Wooldridge had already proved experimentally the occurrence of such a process in the case of anthrax or splenic fever. Now the accumulated experience of M. Pasteur's laboratory goes very far to establish this theory for rabies also. Thus in Russia, where rabies is frightfully prevalent by reason of its being endemic among wild (wolves notably) as well as among domestic animals, the figures obtained from the respective inoculation stations are most striking:—

	Odessa death-rate per cent.	Moscow death-rate per cent.	Warsaw death-rate per cent.
1886. "Traitement simple" } (i.e. small quantities injected)	3·39	8·40	3
1888. "Traitement intensif" } (i.e. large quantities injected)	0·64	1·60	0·1

It is abundantly evident from these figures that successful protection is due to the energy and frequency with which inoculations are practised, or, in other words, to the quantity of protective material injected. While we cannot too heartily congratulate M. Pasteur on his triumph in finding a cure for this miserable disease, we feel very glad that, since his work has established the true nature of rabies and its mode of propagation among animals and men, the French authorities have at last awakened to the fact that there is no disease which can be more successfully prevented by legislation. M. Grancher exhibited a chart showing the immediate effect of preventive legislation in

"Intensif" treatment for last sixteen months—no death.

reducing the prevalence of the malady in the Department of the Seine. For us, our own experience of the measures whereby the disease was temporarily extirpated from London (though now, of course, reappearing since the relaxation of the restrictions) is so strong that we hope this additional evidence will induce our Privy Council to apply such measures throughout the country; and having thus stamped out the disease in England, prevent by suitable contra-importation measures the re-introduction of the disease.

So much for the work of the Institute as immediately in operation. The special interest of the inauguration ceremony is noteworthy. We have already referred to it as being in part due to the personal monument it establishes to the genius of M. Pasteur, but it has a more particular interest for British national science. It lies in the fact that here we see an institution erected for the national purpose of scientific investigation into the causes of diseases and their mode of prevention. We see, moreover, the head of the Executive Government, in company with the members of his Cabinet, personally giving to the movement his cordial interest and support. It must make us all wonder when our Government will cease to regard the social and political importance of scientific investigations with other than an absolutely ineffective interest.

At present, for scientific investigations of this kind this country and its Government are positively dependent upon the charity of a private laboratory, that of the Brown Institution, the income of which, utterly inadequate, is very imperfectly helped by the defrayal on the part of the Government of simply the immediate expenses of the work done for them. And at the same time we wonder when our Government will remove the disgraceful legislative hindrances to British scientific work. Finally, we may ask, When shall we see the scientific millennium of an English Ministry taking an immediately personal interest in the welfare and support of such an institution? We can only conclude in the spirit of the words of the *Times* with which this article begins; and hope that, if it is generally appreciated how the lead has been taken from this country by France, at least an effort will be made by those who are responsible for the discredit thus forced on us to remove the blot by organizing a somewhat similar institution in England.

PRACTICAL BOTANY.

A Course of Practical Instruction in Botany. By Prof. F. O. Bower, D.Sc., F.L.S. Part I. Second Edition. (London: Macmillan and Co., 1888.)

THE first edition of Part I. of Profs. Bower and Vines's "Practical Botany" was published in 1885 (see *NATURE*, vol. xxxii. p. 73); and during the three years that have elapsed the book has become familiar in all botanical laboratories, and has proved an important aid to the work of both teachers and students. This first part deals with the Phanerogams and Pteridophytes. Part II., completing the work, appeared only last year (see *NATURE*, vol. xxxvii. p. 28), and thus the former part has reached a second edition while its companion volume is