membrancer. You have the Observatory at Edinburgh as part of the University of Edinburgh, and you have the Observatory at Greenwich under the Admiralty, besides several others. You have every possible variety of jurisdiction, and, consequently, it seems to me that you have a great waste of power; there is the School of Chemistry, and the School of Mines, and the Museum at Edinburgh, all under South Kensington Museum, and the Meteorological Department, which is partly under the Royal Society and partly under the Board of Trade. There is no possibility of getting any correlation between those different scientific bodies, and if you are to get proper unity of administration you must bring them all under one head, or to one focus. I should recommend placing them all under a scientific commission or council, and I should place that council probably under the Privy Council; but I should make it a body for administering all questions connected with all the scientific institutions, or all grants made by the Government for scientific purposes in the country, and I should give to this council the same status, with regard to its administration, or very much the same, that the Indian Council have. . . . . The parliamentary head of the department, if he differed from them in opinion as to their recommendations upon the scientific questions connected with those institutions, or any other that might be founded, should record his differences of opinion in a minute."

Dr. Siemens would "assemble the heads of departments at frequent intervals for the discussion of general questions, and would propose to add to their number such men as the president of the Royal Society, the president of the Institution of Civil Engineers, and at least one representative of the two great Universities. This Board would decide general questions appertaining to the advancement of science."

We could fill many more columns with evidence analogous to the above samples. Making due allowance for the different ways in which a new and complex question like this, compounded of scientific, political, and administrative elements, must present itself to a variety of minds trained to dissimilar pursuits and habits of thought, the almost general consensus as to the necessity of some such advising body as that proposed is most striking.

Still those who object to the creation of a Council on various grounds are not wanting, and we now glance briefly at the evidence of these witnesses.

Sir G. Airy thinks a paid Consultative Council could not do very much to assist the Government, and that the Council of the Royal Society would be the best body to which the Government could have recourse in any matters of that kind.

Prof. Owen prefers a Minister of Science, with a permanent Under-secretary and administrative staff, as in his opinion the representative of any particular branch of science on the Board would have too great an influence.

The Earl of Derby is very sceptical either as to the necessity, or as to the utility, or as to the successful working of such a Council. One objection he urges is that if matters for which the head of a department is responsible are to be referred to the Council, and if upon those matters the Council is to pronounce an authoritative opinion, the responsibility of Ministers to Parliament will be considerably lessened.

In reply to the suggestion that one function of the Council would probably be to advise the State as to the application of money for the higher teaching of science and for scientific research, and also to advise the Government with respect to any applications that may come before it for grants of money connected with science, whilst objecting to a Council, Lord Derby thinks that it is a matter which falls strictly within the province of the Minister of Education.

Lord Salisbury is opposed to a Council because he has never seen anything to lead him to believe that such a Council of Science would have anything to do; and he considers that the Government would always get better opinions on any scientific point that arises, by applying to the most distinguished scientific man in that particular branch at the time, than it would by having a set of permanent officers to give advice on such subjects.

There appears to have been before the Commission practically three solutions of the question. First, that no change should be made in the present condition of things. The Astronomer Royal is apparently the sole witness of eminence in science who seems to desire no reform in the scientific administration of the country. Secondly, that the Council of the Royal Society should be constituted the official advisers of the State—a view held generally by those who are adverse to the creation of a new Council; and third, that a Council be provided to assist the Minister charged with science and the Departments concerned with science.

The Commission arrive at the conclusion that the balance of argument and authority is in favour of the last-named arrangement, which accordingly they recommend in terms which, though general, leave no doubt that they contemplate the creation of a new official body so constituted as fairly to represent the various branches of science. We think that no unprejudiced and competent person can read the whole evidence without accepting this conclusion as undeniably sound, if not indeed absolutely unavoidable.

THE GOVERNMENT RESEARCHES IN PATHOLOGY AND MEDICINE

THE third volume of the "New Series of Reports of the Medical Officer of the Privy Council and Local Government Board," brings before us another instalment of the work paid for by the annual grant of 2,000*l.* "in aid of scientific investigations related to pathology and medicine." This grant has been actively opposed by a small minority in the House of Commons mainly upon the narrow and invidious ground that the medical profession was thereby obtaining knowledge and instruction which the medical profession ought to obtain at its own expense. "The medical profession lives upon the public; the medical profession makes use of its knowledge to extract money from the public; the grant will add to the knowledge which the medical profession uses with such object—therefore the grant is money drawn from the pockets of the public to aid in the further depletion of the pockets of the public."

Such appears to be the main inspiration of the

opposition. Whoever will be careful to read the last public report, and the short but most weighty statement with which Mr. Simon introduces it to his chiefs, will see plainly that this kind of opposition is founded in misapprehension or ignorance. The information sought is such as may help to inform the State how to offer most effectual resistance to the introduction of disease from without, and to the extension of disease within. It concerns resistance to typhoid fever, small pox, and many other diseases of well recognised contagious nature, and the possibility of controlling the extension of diseases less recognised as having like nature, as for instance what Mr. Simon calls "the tubercular infection." "It aims to be a systematic study of the intimate pathology of the morbid infections, acute and chronic."

Mr. Simon in his remarks points out that much of the study involved is most elaborate and purely scientific, never immediately convertible to pecuniary profit, but perhaps, on the contrary, involving heavy cost; not pretending to immediate popular application, but addressing itself primarily to the deeper scientific requirements of the medical profession, and therefore in an extreme degree technical. Studies of this sort cannot be cultivated to any adequate extent by private medical investigators, and the scientific investigations set going by the 2,000*l.* grant have a distinctive intention to supplement the ordinary resources of private medical observation in the direction already indicated. The work connects itself with the objects of preventive rather than with the objects of curative medicine, and in addition to investigations into the ætiology of infective diseases, it includes some very elaborate research concerning normal standards, histological and chemical, of the tissues involved in the morbid infective processes.

The latest published volume, entitled "Report made to the Lords of the Council on Scientific Investigations, made under their direction, in aid of Pathology and Medicine," contains the result of five researches:—(1 Dr. Sanderson's Further Report on the Intimate Pathology of Contagion; (2) Dr. Klein's Research into the Contagium of Variola Ovina; (3) Dr. Klein's Research into the Lymphatic System and its relation to Tubercle; (4) Dr. Creighton's Anatomical Research towards the Ætiology of Cancer; (5) Dr. Thudichum's Research into the Chemical Constitution of the Brain.

Dr. Sanderson's paper is a sequel to a former Report on the nature of infecting agents or contagia, in which Chauveau's opinion, expressed in the sentence "All contagia are probably particulate," was supported. The present paper treats of the infecting agents and morbid processes in diphtheria, erysipelas, splenic fever, and relapsing fever. In relation to all of these a mass of evidence collected from many observers is adduced to show that vegetable forms are connected with the contagions or with the morbid process. In splenic fever and relapsing fever organisms of a distinctive and specific form are declared to be present in the blood; bacterium-like rods accompanying splenic fever, minute organisms to which the name of *spirilla* has been given accompanying relapsing fever. In an "addendum" some observations of Dr. Letzerich, of Bramfels, Nassau, and of Dr. Oertel, of Munich, on the inoculation of animals with diphtheric poison are reported. From these it appears that in animals receiving the poison (derived from the throat of a child) by subcutaneous injection, the characteristic affection of the throat was developed after a few hours, and that the infiltration of tissues with the same sort of micrococci as are found infiltrating them in diphtheria always occurred.

Dr. Klein's first communication relates to the contagium of Variola Ovina, and describes certain small organised forms—bacteria, micrococci, and microsphæra gathered into colonies by long filaments—as found in the lymph from vesicles. The same forms are found in cavities formed in the rête Malpighii and subjacent corium, where the pock is developed after inoculation, extending afterwards into and occupying in vast numbers the lymphatics of the corium.

Dr. Klein's second communication treats of the Lymphatic System in relation to Tubercle. It commences with a minute and original description of the microscopical anatomy of the serous membranes, and their relation to the lymphatics, and compares with this the conditions in acute and chronic inflammation, noting in particular the processes leading to the formation of new blood-vessels and lymphatics both in healthy and diseased membranes. The second part of this communication relates to the lymphatics of the lungs in health, in certain chronic inflammations, and in tubercular infection. The appearances in the lungs of guinea-pigs after the production of artificial tuberculosis and in human lungs in tuberculosis are compared. Dr. Klein comes to the conclusion that the two processes are only to a limited extent similar (a conclusion opposed to the opinions of Sanderson and Wilson Fox). According to Dr. Klein, "in artificial tuberculosis of the lung of the guinea-pig the parts first attacked are the small branches of the pulmonary artery or pulmonary vein, whereas in acute miliary tuberculosis of man the capillary blood-vessels of the alveoli seem to be the tissue from which the action of the morbid agent starts.

Dr. Creighton's paper is a very thoughtful contribution to the present knowledge of cancer. It relates some unsuccessful attempts to propagate cancer by inoculation, and a number of careful observations as to the process of formation of secondary cancerous tumours. The attention is chiefly fixed upon the epithelium in relation to hyperplastic and heteroplastic (endoplastic) growth. Dr. Creighton infers from his observations that the efficient cause of secondary tumours in the liver is the substitution of the endoplastic for the normal (or excessive but still homo- though hyper-) plastic activity of the liver cells. The operation of deeper or extraneous causes is discussed, but left undecided. Hope is expressed that aids to a decision may be obtained from the results of a systematic examination of mammary tumour now proceeding.

Dr. Thudichum's research is a study of the normal chemical constitution of the brain, undertaken to prepare the way for a study of the brain in fevers, and other morbid states and processes. The paper is very long, occupying more than half of the 247 pages of the Report, and most elaborate. Dr. Thudichum believes that he has both added to and corrected former knowledge of the chemistry of the brain. In particular he describes with careful detail a number of newly observed

principles, both phosphorised and nitrogenised. Among the phosphorised, kephalin and myelin (both of which contain nitrogen, as well as phosphorus) are new, and are associated with lecithin. They are described as typical colloids, of no true solubility, of almost indefinite power of soaking up water so as to form an imperfect solution, of feeble chemical activity, of a remarkable readiness to combine with acids salts and alkalies, and to part with them on the addition of excess of water. Kephalin and myelin are stable, lecithin so unstable as to elude proper analysis. Similarly the nitrogenised bodies, cerebrine (Müller's), kerasine, and phrenosine, are colloids, but of less perfectly marked type, and less interesting natural history.

In his summary Dr. Thudichum, speaking of the phosphorised bodies, remarks that "we have therefore here a diversity of affinities such as is not possessed by any other class of chemical compounds in nature at present known; and the exercise of these affinities being greatly influenced by the mass of reagent and the mass of water which may be present, the interchange of affinities may produce a perfectly incalculable number of states of the phosphorised and consequently of brain matter. This power of answering to any qualitative and quantitative influence by reciprocal quality or quantity we may term the state of *labile equilibrium;* it foreshadows on the chemical side the remarkable properties which nerve matter exhibits in regard of its vital functions."

The volume now under consideration has been preceded by two volumes, containing a first and second report by Dr. Klein, on the Lymphatic System and its relation to Tubercle, a report by Dr. Sanderson on the Infective Products of Inflammation, and by Dr. Thudichum on Chemical Changes in cases of Typhus. Reports are now in course of preparation by Dr. Baxter on Disinfectants, by Dr. Sanderson on the Febrile Process and on Infective Inflammations, by Dr. Thudichum on the Chemical Constitution of the Brain, by Dr. Creighton on Anatomical Studies with reference to Cancer, by Dr. Klein on the Contagium of Enteric Fever. The whole represents four years' work, for which 8,000*l.* has been voted. The value and importance of all this work in relation to the welfare of the community, as a contribution in aid of preventive medicine, cannot be doubted by any careful reader of the record. Nor, after even a superficial reading of the record can there be doubt but that the work is of a kind which can only be set going by such means as public grants, since it involves a special training and a special devotion inconsistent with the earning of livelihood by other direct or incidental means. The grant is on the evidence justified.

But there are other aspects of the work which claim a serious regard. The department of the Government concerned in protecting the country from the invasions of contagious disease, whether represented by Minister of Health or principal medical officer, needs in all things to be fully informed of the latest discoveries in pathology, hygiene, and therapeutics. Of such minister or officer the body of scientific men whose work is here recorded, together with others who are engaged in sanitary investigations and inspections under the central authority—men like Drs. Seaton and Buchanan and Mr. J. N. Radcliffe—constitute a body of advisers or council representing the most advanced knowledge bearing upon the public health. They constitute a council to which the minister or officer may refer for latest knowledge when legislation is concerned, or for practical advice when action has to be taken. They are, in fact, at this moment practically such a council. In the Science Commission Report on the Advancement of Science, the formation of a similar council as adviser of a Minister of Science is advocated. We would suggest that we have in what we have stated an excellent illustration of the principle proposed, with a wider application, in the Science Commission Report.

THE INFLUENCE OF THE PRESSURE OF THE ATMOSPHERE ON HUMAN LIFE

Influence de la pression de l'air sur la vie de l'homme. Par D. Jourdanet. 2 vols. (Paris: Masson, 1874.)

AFTER having practised medicine for six years on the borders of the Gulf of Mexico, and rendered himself familiar with the diseases and conditions of life of the inhabitants of low levels, M. Jourdanet removed to the elevated plateau of Anahuac—more than 2,000 metres above the sea level. Here, as might have been anticipated, he found the pathological conditions different, but to his surprise he discovered that the differences were not simply such as result from temperature, or are paralleled in places of lower level and higher latitude, but presented peculiarities which he conceived to be dependent on the elevation of the situation alone. A residence of twenty years in the locality enabled him to confirm this idea and to prove that, while the blood of the inhabitants presented no poverty of corpuscles, the corpuscles themselves were deficient in oxygen, on account, as he believed, of the too feeble pressure of the atmosphere in these high regions. This led him to undertake the study of the whole question of the influence of the atmospheric pressure on health, and to call to his aid M. Paul Bert, Professor of Physiology at the Sorbonne, by means of whose experiments he believes himself to have arrived at some definite results. These, with every other possible point of interest connected with the subject, he now presents us with, in two large and beautifully illustrated volumes; leaving, however, the details of the physiological experiments to be published in a forthcoming work by M. Bert himself.

The question so fully discussed by M. Jourdanet is certainly of very great interest, and, in spite of previous observations and opinions on the therapeutic action of compressed air and on the possible limits of life in regard to height and other similar points, it is also of some novelty as treated by him.

According to M. Jourdanet the pressure of the atmosphere has not always been as small as it is now; and assuming, what is probably true, that a greater pressure would involve greater heat, he would account in this way for the warm periods known to have existed in Tertiary times. This leads him to make an hypothesis as regards the cause of the glacial epoch, the occurrence of which would be contrary to the above theory; but it is not an hypothesis that could recommend itself to geologists. The glacial epoch arose, he imagines, in this way: by some sudden convulsions the crust of the earth was torn open, and prodigious quantities of gas and vapour driven