

THURSDAY, MAY 11, 1899.

THE NATIONAL PHYSICAL LABORATORY.

THE following Scheme for the government of the National Physical Laboratory has been drawn up by the Royal Society with the approval of Her Majesty's Treasury, and steps are being taken to give effect to the Scheme at as early a date as practicable. The Government has promised to ask Parliament for a grant of 12,000*l.* for buildings, and an annual grant of 4000*l.*, and will also facilitate the erection of the buildings in the Deer Park at Kew. The resources of the Kew Committee of the Royal Society and the buildings used by them will also be handed over to the new Institution.

The grant will not be available until voted by Parliament, and the first grant will be 5000*l.* for buildings and 2000*l.* in respect of the first half-year. The Treasury have, however, approved of the immediate nomination of the new governing body, and have authorised any preparations for the work of the Laboratory, which can be undertaken without expenditure, previous to the sanctioning of the anticipated grants by Parliament.

The President and Council of the Royal Society have accordingly appointed the Executive Committee, in accordance with the provisions of the Scheme, with a view to preliminary arrangements being set on foot as soon as possible; and will shortly proceed to complete the constitution of the General Board. The representatives nominated by the technical Institutions named in the Scheme to serve on the General Board are as follows:—

Mr. W. H. Preece, F.R.S.	Institution of Civil En-
Sir J. Wolfe-Barry, F.R.S.	gineers.
Sir Wm. White, F.R.S.	Institution of Mechanical
Sir Edw. Carbutt, Bart.	Engineers.
Mr. Alex. Siemens	Institution of Electrical
Prof. Ayrton, F.R.S.	Engineers.
Sir Wm. Roberts-Austen, F.R.S.	Iron and Steel Institute.
Sir Fredk. Abel, F.R.S.	Society of Chemical In-
Mr. Geo. Beilby	dustry.
Mr. Walter F. Reid	Institution of Naval Archi-
Sir Nathaniel Barnaby	teets.
Mr. J. T. Milton	

The President and Council of the Royal Society have appointed as Vice-Chairman of the General Board and of the Executive Committee:

Lord Rayleigh, F.R.S.

The following are the other members of the Executive Committee:

Lord Lister, President of the Royal Society.	} <i>ex officio.</i>
Mr. A. B. Kempe, Treasurer of the Royal Society.	
Prof. A. W. Rücker, as Secretary of the Royal Society.	
Sir Courtenay Boyle, K.C.B., Permanent Secretary of the Board of Trade.	
Capt. W. de W. Abney, F.R.S.	} from among the
Capt. E. W. Creak, F.R.S.	
Prof. G. Carey Foster, F.R.S.	
Mr. F. Galton, F.R.S.	
Prof. J. Perry, F.R.S.	
Gen. Sir R. Strachey, F.R.S.	} Members of the
Sir John Wolfe-Barry, F.R.S.	
Sir Edward Carbutt, Bart.	
Mr. Alex. Siemens	
Sir William Roberts-Austen, F.R.S.	
Mr. G. Beilby	
Sir Nathaniel Barnaby	} from among those
	} Members of the
	} General Board
	} nominated by the
	} technical Societies
	} named in the
	} Scheme; and

Prof. R. B. Clifton, F.R.S.	} Nominated by the
Prof. O. Lodge, F.R.S.	
Sir Andrew Noble, F.R.S.	
Prof. A. Schuster, F.R.S.	
Prof. J. J. Thomson, F.R.S.	
Dr. Thorpe, F.R.S.	

The Scheme of Organisation of the Laboratory is as follows:—

1. The name of the Institution shall be the National Physical Laboratory. The Kew Observatory shall be incorporated therewith.

2. The ultimate control of the Institution shall be vested in the President and Council of the Royal Society, who, in the exercise thereof, may from time to time issue such directions as they may think fit to the General Board and Executive Committee hereinafter described. The President of the Royal Society shall be the Chairman of the Governing Body as hereinafter defined. The income and all other property of the Institution shall be vested in the Royal Society for the purposes of the Institution.

3. For the present, and until otherwise ordered by the President and Council of the Royal Society, with the approval of H.M. Treasury, there shall be a Governing Body for the Institution, consisting of a General Board and an Executive Committee, the constitution and duties of which shall be as hereinafter defined. Provided always that the Permanent Secretary of H.M. Board of Trade shall be *ex officio* a member of the Governing Body, and that the choice of members of the Governing Body, or of any Committee thereof, shall not be confined to Fellows of the Royal Society.

4. The General Board shall consist of the President, Treasurer, and Secretaries of the Royal Society, the Vice-Chairman of the Board (appointed as defined below by the President and Council of the Royal Society), the Permanent Secretary of the Board of Trade, and of thirty-six ordinary members.

Twenty-four of the ordinary members shall be appointed by the President and Council of the Royal Society; of the remaining twelve ordinary members, two shall be nominated for appointment by the Council of each of the following Institutions, as being fitted to represent commercial interests in connection with the Laboratory:—

- The Institution of Civil Engineers.
- The Institution of Mechanical Engineers.
- The Institution of Electrical Engineers.
- The Iron and Steel Institute.
- The Institution of Naval Architects.
- The Society of Chemical Industry.

In the selection of ordinary members of the General Board care shall be taken that Scotland and Ireland are represented.

Any person not being already a member of the General Board who shall become a member of the Executive Committee, shall be a member of that Board during his tenure of office on the Executive Committee, but shall be regarded as an additional, and not as an ordinary member of the Board.

5. The Executive Committee shall consist of the President, Treasurer, and one of the Secretaries of the Royal Society; the Vice-Chairman of the Executive Committee (appointed as defined below); the Permanent Secretary of the Board of Trade; six persons appointed by the President and Council of the Royal Society from among those who are members of the Kew Observatory Committee at the time when the Kew Observatory is incorporated in the National Physical Laboratory (two of these six persons shall retire at the end of every two years, and vacancies occurring amongst them by retirement or otherwise shall not be filled up); and of twelve ordinary members.

The ordinary members shall be nominated by the

President and Council of the Royal Society, but one-half shall be chosen from among those members of the General Board who have been nominated as fitted to represent commercial interests on that Board.

Those members of the Executive Committee who are Fellows of the Royal Society, shall be appointed by the President and Council to be the Gassiot Committee of the Royal Society.

6. The Vice-Chairman of the General Board shall be appointed by the President and Council of the Royal Society, and shall also be Vice-Chairman of the Executive Committee. He shall hold office for six years, and shall be eligible for reappointment, but shall not hold office for more than twelve years.

7. At least one-sixth of the ordinary members of the General Board and of the Executive Committee shall retire annually.

In the case of the General Board, the retiring ordinary members shall be those who have not attended a meeting of the Board for two years, together with so many other members of the Board, selected by seniority, as may be necessary to bring the number of retiring members up to one-sixth of the whole number of ordinary members of the Board.

In the case of the Executive Committee, the retiring ordinary members shall be those who have not attended one-half of the meetings of the Committee during the previous year, together with so many other members of the Board, selected by seniority, as may be necessary to bring the number of retiring members up to one-sixth of the whole number of ordinary members of the Board.

No retiring member of the General Board or of the Executive Committee shall be eligible for reappointment until at least one year has elapsed from the date of his retirement.

The President and Council shall have power to remove from the General Board and from the Executive Committee any member of either whom they may judge to be disqualified.

Vacancies on the General Board or on the Executive Committee due to death, resignation, or removal by the President and Council of the Royal Society, shall be filled by the President and Council of the Royal Society, provided always that—

- (1) Any person so appointed shall, for the purposes of the regulations for retirement from the Board or Committee, be regarded at the time of his appointment as having served for the same period as the member to whose place he succeeds.
- (2) If the vacancy on the General Board be caused by one of the persons nominated as fitted to represent commercial interests ceasing to be a member of the Board, the President and Council of the Royal Society shall choose his successor from among a list of names recommended by the Councils of the Institutions named in Section 4.
- (3) If a vacancy on the Executive Committee be caused by one of the persons nominated as fitted to represent commercial interests ceasing to be a member of the Committee, his successor shall either be selected from among those members of the General Board who were nominated as fitted to represent commercial interests, or shall be nominated by the President and Council of the Royal Society after consultation with the Councils of the Institutions named in Section 4.

The President and Council of the Royal Society shall determine the order of the seniority of the members of the first General Board and of the first Executive Committee for the purposes of the regulations for retirement.

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The Executive Committee.

8. The Executive Committee shall have the immediate management of the National Physical Laboratory; shall appoint and dismiss the officials, except the Director; and shall determine the nature of the work to be undertaken from time to time.

The General Board.

9. A meeting of the General Board shall be held in October, at which the Executive Committee shall present a report on the work and finances of the National Physical Laboratory during the year ending on the preceding September 30. Copies of this report shall be circulated among the Members of the General Board at least one week before the meeting, and after the meeting shall be forwarded to the President and Council of the Royal Society, together with any further report, resolutions, or recommendations which may be added by the General Board.

The Executive Committee shall also lay before the General Board at its meeting in October a statement as to the work which it is proposed to undertake in the Laboratory during the ensuing year. This statement shall be circulated among members of the Board at least a week before the meeting; and the General Board may make such recommendations relative to the statement, or to the future work of the National Physical Laboratory, as they may think fit.

These recommendations shall be laid before the Executive Committee for their consideration.

Sub-Committees.

10. The Executive Committee may from time to time appoint Sub-Committees, of which the members shall not necessarily be members of the Executive Committee or of the General Board, either to superintend or to assist in certain specified investigations, or to superintend some department of the National Physical Laboratory.

The Director.

11. The Director of the National Physical Laboratory shall be appointed by the President and Council of the Royal Society after consultation with the Executive Committee, on such terms as the President and Council may determine, and shall be removable by the President and Council. He shall be responsible to, and shall take instructions from, the Executive Committee, but, subject to such instructions, he shall have the sole direction and control of the officials of the National Physical Laboratory and of the work done within it.

The Executive Committee may delegate its power of appointing and dismissing the officials of the Institution to the Director in such cases as it may think fit.

The Director shall neither be allowed nor be called upon to undertake work not connected with the National Physical Laboratory, except with the consent of the Executive Committee.

Finance.

The Royal Society shall open a banking account, to be called "The National Physical Laboratory Account of the Royal Society," into which all sums received by the Executive Committee for the purposes of the Institution shall be paid. The Treasurer of the Royal Society shall also pay into this account all sums received by him for the said purposes, after deducting therefrom such amounts as he shall be directed by the President and Council, with the approval of the Treasury, to retain for the purpose of defraying any expenses which the Royal Society may incur in the exercise of its control of the Institution.

The Executive Committee shall be empowered to draw on this account for the purposes of the Institution by

cheques signed by such members of the Executive Committee as may be authorised by the Committee to do so.

Legal Proceedings.

Any legal proceedings with regard to the affairs of the Institution, which it may become necessary to institute or defend, shall be instituted or defended by the Solicitors of the Royal Society, in the name and on behalf of the Royal Society upon the instructions of the Executive Committee, but no such proceedings shall be instituted or defended without the order of the President and Council of the Royal Society.

The Kew Observatory Committee of the Royal Society.

"The Kew Observatory Committee of the Royal Society," incorporated under the Companies Act, 1867, shall be wound up; and the property thereof shall be held by the Royal Society for the purposes of the Institution.

CHEMICAL TECHNOLOGY.

Outlines of Industrial Chemistry. A Text-book for Students. By Frank Hall Thorp, Ph.D., Instructor in Industrial Chemistry in the Massachusetts Institute of Technology. Pp. xx + 541. (New York: The Macmillan Co. London: Macmillan and Co., Ltd., 1898.)

IN writing a book such as the present, the author's main difficulty must be in deciding what to omit. The number of industries in which chemistry plays a more or less important part is so large, and their nature so varied, that it would appear to be almost impossible to give even a moderately satisfactory account of them within the limits of one volume. By omitting metallurgy altogether, and condensing the preparation of the artificial organic dye-stuffs into a little over eight pages, the author succeeds in finding space for the essentials of the majority of the remaining chemical industries. The omission of metallurgy is justified by the facts that this subject is usually taught independently, and that several good short text-books dealing with it already exist. The chemistry of the artificial organic colouring matters is generally included in courses of lectures on organic chemistry, and, presumably for similar reasons, no mention is made of the majority of the pharmaceutical and photographic chemicals.

An introductory section contains a general account of the apparatus employed in performing such common operations as evaporation, filtration, distillation, calcining, and so on, on the large scale. The diagrammatic sketches employed in this section, and throughout the book, are very clear and are calculated to be of much more service to a student than elaborate illustrations of the outside of the apparatus or even complicated working drawings would be. The two cuts on pp. 12 and 13, representing filter-presses, might with advantage have been replaced by diagrams.

After a brief account of the main facts about fuels and water, the different chemical industries are considered, about equal space being devoted to those dealing with inorganic and those dealing with organic substances. The accounts of the origin and properties of the raw materials, and of the different operations and transformations through which they pass on their way to the finished products, are clear and concise; in most cases the author has succeeded admirably in subordinating

mere detail whilst bringing out clearly the essential factors on which the success of the process depends.

The treatment of some of the more recent developments of technical chemistry is not quite so satisfactory as that accorded to the older industries; the account of the electrolytic processes for the preparation of alkalis and chlorine being perhaps the least satisfactory chapter in the book. The author of a work on industrial chemistry is, of course, hampered to some extent by the natural and inevitable reticence of the inventors of new processes; but, even allowing for this, the chapter might have been improved by a wider acquaintance with the recent literature of the subject. This, in passing, is true, though to a less extent, of the chapter dealing with the cyanide industry in which so much progress has been made of late years.

In speaking of the Deacon chlorine process, on p. 99, the author remarks that since the reaction between hydrochloric acid and oxygen evolves heat, the temperature of the tower in which the reaction occurs should "theoretically" be maintained without further heating, but that this is not the case. In reality, of course, the whole thing depends on the relation between the amount of heat evolved by the chemical change and that lost by radiation, convection, and conduction. He goes on to say:—

"Theoretically, too, all the chlorine of the hydrochloric acid should be recovered, but practically the reaction is far from complete."

Since it is well known that the reaction



is reversible, an equilibrium must tend to be established; this equilibrium will not be displaced by the presence of a catalytic agent (which merely accelerates the velocity with which the equilibrium is approached), so that the practical result is only in disaccord with the incorrect theory.

These are, however, but minor blemishes in a book which attains a very high average of excellence. We are not acquainted with any other book in English which covers the same ground, and there is no doubt that it will prove to be of great service to all persons interested in technical chemistry, and more especially to the students and teachers to whom it most directly appeals. T. E.

VOLCANOES.

Volcanoes: their Structure and Significance. By T. G. Bonney, D.Sc., LL.D., F.R.S., Professor of Geology at University College, London. Pp. 337. With 12 Plates, a Map, and 21 Illustrations in the Text. "The Progressive Science Series." (London: John Murray. New York: G. P. Putnam's Sons, 1899.)

IN this work the author has succeeded in giving, within convenient limits, a clear and very readable account of the present state of vulcanological science. The work is not burdened with scientific details nor made unattractive by a too technical terminology; but it nevertheless contains a trustworthy discussion of the most recent researches of geologists, and their latest views upon questions connected with these very interesting natural phenomena.

The first chapter, entitled "The life-history of vol-