taining a *Brevet d'Invention* are as follows :—The applicant for a patent must first apply to No. 24, *Rue de Mont Thabor*. This is a subordinate bureau of the Ministère des Finances, not very readily found or publicly indicated. He passes through a gateway between the *Café des Finances* and a stable for *remises*. He ascends to the second stage up narrow stairs, dark and odorous. Here is the bureau for the first stage of proceeding. He pays 5 francs, and obtains the necessary forms to be filled up ; fills them up and pays 100 francs.

13. These forms being filled up, he takes them with the receipt to the *Hôtel de Ville*, and there he deposits his specification.

14. This specification is sent to a third bureau, which is on the opposite side of the Seine, No. 78, *Rue de Varenne*, the Ministère de l'Agriculture et du Commerce, and is also up two pairs of narrow dark stairs. Here the specifications are kept during 15 years, whilst the patent lasts ; after that period they are transferred with any models accidentally accompanying them to the *Conservatoire des Arts et Métiers*. The room for searches is about 60 feet long and 16 feet wide. The specifications are arranged in *carton* boxes on shelves. It is rather crowded. Anyone enters and searches in the printed catalogues and calls for the *brevet* without let or hindrance ; but he is not permitted to make notes even in pencil. Copies must be ordered of the office at a given tariff, and if a copy of a drawing is required, he must bring his own draughtsman.

15. The catalogue of the specifications is printed, and may be bought at V. Bouchard Huzard, Rue d'Eperon, No. 5.

16. It has been already pointed out that the law does not require that any models should be made, but some are sent. The officers kindly showed us what they possessed. We were conducted up back stairs into a little room about 10 feet wide by 20 feet long. The floor was covered with models unarranged, and very dusty. On a shelf were some models in tin, also very dusty. A model of a shoe was here, a candlestick there, &c. The officer said that they were very rarely looked at, and the accuracy of the statement was fully borne out by the condition of the room. He said that all the models in this small chamber were the products of some 20 years.

17. These facts show that the *Conservatoire des Arts et Métiers* did not arise and is not at all dependent on any connection with models accidentally delivered with the *Brevets d'Invention*, which are not recognised by the French law. The *Conservatoire* is a great educational institution, teaching the general public through its exhibitions, and a special public through its lectures. It seems to us to afford an example which our own country might imitate with advantage generally as to scope and also in many of its details.—We have, &c.

(Signed) HENRY COLE,
FRANCIS FOWKE, Capt. R.E.

A map accompanies this Report which shows the buildings then occupied by the Conservatoire and those which it was proposed to build in addition. If the Commissioners of the 1851 Exhibition, to whose laudable scheme we recently referred, have not already consulted this map and the Report, we think they might do so with great advantage. There are many points in common between the scheme which they are considering and the plan which was then being carried out by the French Government, and which resulted in an institution that has been in working order for years, with, it is universally acknowledged, the best results to science and to France.

In the same Appendix M. Tresca furnishes answers to a number of questions with reference to the actual use made of the models of patents in the Patent Museum of Paris. The information thus afforded we would recommend to the notice of the Treasury Commission which has for some time been cogitating as to what course to pursue with regard to our own Patent Museum. The analogy between the two cases is very complete, and it suggests that the best solution lies in a course similar to that which has been followed in France. From M. Tresca's answers we learn that in the Catalogue of Patents there were 7,300 entries of models, only 10 of which are accompanied by specifications. While 1,400 specifications had been consulted during 1864, not a single model had been examined or asked for, thus showing that the models were a practically useless part of the Patent Museum. M. Tresca states that the place of a model can be supplied by a drawing, leading to more complete, exact, and certain results, and thus avoiding useless expense. Their loss, therefore, would really be a gain to the Conservatoire ; they cause, M. Tresca states, embarrassment by their compulsory preservation, the objects rarely representing the final idea of the inventor. They for the most part get destroyed by time without having been consulted by any one. Might not a somewhat similar report be made of our own Collection of "Patents"?

The same blue-book contains some valuable information with regard to the lectures which were then given in the Paris Conservatoire, which is worth consulting. Later and more complete information in this department may, however, be found in the appendix to the Report of the Duke of Devonshire's Commission. From what we have said, it will be seen that the idea of a Government Science Museum is by no means of recent growth, but that, on the contrary, it has taken many years to come to a practical issue ; and that, moreover, we have a ready-made example which has stood the test of years, and is now doing work of the highest practical value in the Paris Conservatoire des Arts et Métiers.

COHN ON THE BIOLOGY OF PLANTS

Beiträge zur Biologie der Pflanzen. Herausgegeben von Dr. Ferdinand Cohn. (Breslau, 1875.) Drittes Heft.

THE third part of Cohn's "Beiträge," now before us, completes the first volume, and let us express the hope that we may have another volume before very long. Curiously, each of the three parts has been separately paged, an arrangement which renders it necessary to note the part as well as the page when the index is consulted. If we may judge from the size and price, each part has increased in importance, so that the third part has more papers and is nearly double the size of the first. In all the parts there have been papers of great interest and value, and those in the present part are in no way behind their predecessors. Dr. Cohn himself contributes three papers to the present part, Dr. J. Schroeter two, while Drs. L. Just, A. B. Frank, Richard Sadebeck, and Eduard Eidam, each one. The first paper is by Dr. Schroeter on the Development of certain Rust-Fungi. On *Carex hirta*, one of the Uredineæ was observed which Dr. Schroeter believes to be *Puccinia caricis* of De Candolle ; and as he had reason to suspect that *Æcidium urticæ* of Schum was only a stage in the life history of *P. caricis*, experiments were made to ascertain definitely whether *P. caricis* was heterœcious, and if so, whether *Æcidium*

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urticæ was one of the stages. Details of the experiments are given, and Schrœter concludes that *Æcidium urticæ* is a stage of *Puccinia caricis*. In a note to his paper, Dr. Schrœter mentions that Dr. Magnus, of Berlin, has made similar experiments with the same result, an important confirmation of the remarkable habit these curious plants have of changing from one host to another, and at the same time changing the form of their spores, a condition described by De Bary long ago in the rust of wheat. A second form noticed by our author is a species of rust common on many grasses. It has many names, and Dr. Schrœter calls it *Uromyces dactylidis*, Ottli, (*Uromyces graminis*, Cooke). One stage is spent in our common grasses, such as *Dactylis glomerata*, *Poa nemoralis*, *P. trivialis*, *P. annua*, *P. pratensis*, &c. The other stage occurs on *Ranunculus bulbosus*, *R. repens*, and *R. polyanthemos*, and is known as *Æcidium Ranunculacearum*, D.C. The Æcidia occurring in other Ranunculaceæ (*Clematis*, *Thalictrum*, &c.) seem to belong to other species. Dr. L. Just's paper is a physiological one, showing the effect of the epidermis of the apple in preventing loss of water by transpiration. The third paper, by Dr. J. Schrœter, on the effect of disinfectants in lower organisms, shows markedly the value of carbolic acid in destroying germs. In the fourth paper Dr. A. B. Frank shows how light influences the relative time of development of the flowers in a catkin, those flowers opening first which receive the most light. Next follow two papers by Dr. Ferdinand Cohn, one on the "Function of the Bladders of Aldrovanda and Utricularia," the other on the "Development of the genus Volvox." English readers are already acquainted with the more important facts recorded in the first paper, as they have already been made use of by Mr. Darwin in his work on "Insectivorous Plants." The second paper is of especial interest in relation to the re-distribution of the Thallophytes, by Prof. Sachs, in the fourth edition of his justly celebrated "Lehrbuch." The structure of volvox is carefully described, and its modes of reproduction both sexual and non-sexual. The non-sexual reproductive cells Cohn calls Parthenogonidia. Non-sexual reproduction seems to take place during the whole year, and the alternation of generations is completed by the occurrence of sexual reproduction in the spring. The volvox-colony, or cænobium, is either monœcious or diœcious, the female cells, or Gynogonidia are either produced along with the male cells, or Androgonidia, in the same colony, or they are not. Cohn proposes to divide the Linnæan Volvox globator into two sub-species, namely, (*a*) *Volvox monoicus*, and (*b*) *Volvox dioicus*, the former having both andro- and gynogonidia, the latter either one or other. The structure of Volvox is very like that of Pandorina, but the reproduction is like that of Sphaeroplea, and it belongs, not to the Zygosporeæ, which have conjugating zoospores, but to the Oosporeæ. Cohn, however, does not consider the Zygosporeæ and Oosporeæ to be separate classes of the Thallophyta, but only to be subdivisions of one class, to which he gives the name of Gamosporeæ. The next division Cohn calls the Gamocarpeæ, a division quite equivalent to Sachs' Carposporeæ. In the Gamocarpeæ there are two methods of fertilisation. One by means of the Pollinodium, analogous to the conjugation in the Gamosporeæ, the other by Spermatia, resembling the Spermatozoids. In the higher plants a somewhat similar arrangement exists; the Muscineæ and Vascular Cryptogams having Spermatozoids, while the flowering plants have pollen and pollen-tubes, showing a certain analogy to the pollinodium of some of the Carposporeæ.

Dr. Richard Sadebeck contributes a paper on the remarkable parasite living in the cells of the prothallium of Equisetum, and called *Pythium equiseti*. It belongs to the Oosporeæ, and its structure and life-history is here well described.

The part concludes with two papers, "Researches on Bacteria," Parts II. and III. The first is by Dr. Cohn, and is a continuation of his paper with the same title in the second part of the "Beiträge," while the other is by Dr. Eduard Eidam. In the latter paper Dr. Eidam gives details of a series of very interesting researches on the action of different degrees of temperature and of drying on Bacterian Termo. The Bacteria were cultivated in Prof. Cohn's normal nutrient fluid, and the solution kept at definite temperatures for definite periods of time. The activity of Bacteria does not begin until the temperature rises above + 5° C. + 5½°, being the temperature at which they begin to multiply, although very slowly. Between 30° and 35° C. the multiplication is most rapid, but at 40° the activity again diminishes, and the Bacteria in the nutrient fluid are killed by exposure for fourteen hours to a temperature of 45° C., or for three hours at a temperature of 50° C. When dried the Bacteria can retain their vitality for a long time at high as well as at low temperatures. All these experiments are of especial interest at the present time and seem to have been conducted with great care. Prof. Cohn's paper deals chiefly with descriptions of new or imperfectly known genera and species, and concludes with an attempt at grouping the different genera of Bacteriaceæ according to their natural affinities. The close relation of Bacteria to the Phycochromaceæ is pointed out, and it is shown to be impossible to erect the Bacteriaceæ into a family separate from the Phycochromaceæ. Naegelis' name of Schizomycetes is objected to on the ground that Bacteria are not fungi, and the term Schizophyta proposed for the group instead. This group is nearly equivalent to and would take the place of Sachs' first class of Thallophyta, namely, the Protophyta. The Schizophyta includes two tribes: (1) Glœogenæ, in which the cells are either free or united by gelatinous substance; and (2) Nematogenæ, which are filamentous. To the first tribe belong such genera as Chroococcus, Micrococcus, Bacterium, Aphanocapsa, Glœocapsa, Clathrocystis, Sarcina, Polycystis, &c.; while to tribe 2 belong Beggiatoa, Oscillaria, Vibrio, Spirulina, Anabæna, Nostoc, Rivularia, Cladothrix, Scytonema, &c. The paper is an exceedingly interesting one, and has most important bearings on the classification of the Thallophytes.

W. R. McNAB

FERNET'S PHYSICS

Cours de Physique. Par É. Fernet. (Paris: G. Masson, Editeur, 1876.)

FROM the great success which attended the publication of Prof. Ganot's "Éléments de Physique," due in a great measure to the excellence of its illustrations, and followed as it was a few years later by the splendidly got up "Traité" of M. Deschanel, which has been so ably

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