In remembering the simple forms the late pupils did $94\frac{6}{10}\%$ as well as the early.

It seems clear that the mental work of the school day does not produce any marked decrease in the ability to do further work. The data here given are somewhat influenced by certain factors, though not by practice. These factors will be fully discussed in a later report.

The multiplication, spelling and figure tests when given to about 300 children in another city showed the following results:

The multiplication test was given to 156 children early and to 154 later. When evaluated for 153 children the results show the latter to have done $86\frac{2}{3}\%$ as much work, to have made $14\frac{7}{10}\%$ more mistakes. Taking together the work of all the children tested (594, 297 early, 297 late), we find that the children who did the work late did $2\frac{9}{10}\%$ *more* work, and made exactly the same number of mistakes.

The spelling test was given to 135 early and 128 late. When evaluated for 127 children the results show the latter to have worked through $92\frac{7}{10}\%$ as many lines, to have marked $\frac{9}{10}$ of 1 % more words, and to have marked wrongly 87 % as many words. Taking together the work of all the children tested, we find that those who did the work late worked through $94\frac{9}{10}\%$ as many lines, marked $1\frac{5}{10}\%$ more words and marked wrongly $93\frac{7}{10}\%$ as many.

The figure test was given to 156 children early and to 152 late. After reducing the results of the 156 to a basis of 152 we find that those who had the tests late did 17 % *better.*

Taking together the work of all the children tested, we find that those who had the test late did almost 2 % better than those who had it early.

Besides these three tests, which are of the same sort as some of those given to the first lot of children, there was given to this second lot a test with letters similar to the figure test. This test was given to 140 children early and to an equal number late. Those doing the work late did 97 % as well as those who had it early.

The factors mentioned as influencing the work of the first set of children were largely counterbalanced by factors at work in the second; one, however, should be mentioned. A certain circumstance probably lessened the work of one class (of 30) of the first lot of children during an early spelling test. So the early work in this test should probably be reckoned about 2 % higher. On the whole these additional data render more probable our previous conclusion that "the mental work of the school day does not produce any decrease in the ability to do mental work." A glance at the following table, which summarizes the more important data, shows this better perhaps than the detailed accounts already given.

Test.	No. of Scholars Tested.	Ratio of Late to Early Work.
Multiplication.	297	$102\frac{9}{10}\%$
Spelling.	273	$101\frac{5}{10}\%$
Figures.	295	102 %
Nonsense syllables.	147	98 %
Form.	145	$94\frac{6}{10}\%$
Letters.	140	99 %

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THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

PHYSICS.

The plan proposed is to issue a book catalogue once in five years, arranged according to both subjects and authors, and to issue also, from week to week, two sets of card catalogues—one according to subjects and the other according to authors. Estimates are given of the proposed cost of this; and various alternatives are proposed, such as the issuing of a book catalogue by itself, or a book catalogue and an author card catalogue. It is estimated that each arti-

cle will require four entries, on an average one according to the author, the others according to the subjects treated of in the paper.

It is proposed also to print, at the head of each of the cards or slips, distinctive symbols to indicate the science and particular sub-division of the science to which the paper refers.

There can be no doubt but that, to satisfy the needs of workers in laboratories, the plan of having a card catalogue of subjects is by far the most satisfactory. A book catalogue would be practically useless except to a student looking up references for historical reasons, and should, therefore, be kept in a general library, and not in a laboratory library. For the use of workers in laboratories the subject card catalogue would be of the greatest importance, as everyone knows who has ever kept one. It is of great use to the director of the laboratory in the saving of time and brain matter, because he no longer needs to remember all articles which have appeared, and to the student or investigator in keeping him informed of all that is going on in his particular line of work. From the standpoint, then, of Physics there can be no doubt but that it would be desirable for the International Committee to print all three catalogues, the book catalogue and the two card catalogues; and of these the card catalogues should be kept, it seems best, in the laboratory itself, or at least in such a situation as to be ready for use by all the students.

No suggestions are asked by the Committee concerning the division of the sciences or the classification proposed; and, in fact, this matter is of secondary importance. The plan is to have the assistants and the clerks in the Central Office in London make a division of the titles according to subjects and to label the cards and slips in some definite way; so that anyone, although ignorant of the subject-matter, can arrange the cards easily and quickly when they are received.

Each card in Physics is to be marked with the letter 'D,' and each subject card is to have, further, a number, such as '5410,' which signifies the particular subdivision to which the subject has reference. In this particular case the 5 would indicate the primary division, 'Light;' the 4 the subdivision, 'Polarization;' the 10 the special subject, 'Methods of Producing Polarized Radiation.'

According to this system Physics is divided into seven 'primary divisions,' so-called, namely: Bibliography and Dynamics; Heat; Mechanical and Thermal Effects of Contact and Mixture; Vibrations, Waves and Sound; Theories of the Constitution of the Ether and of Matter; Light, including Invisible Radiation; Electro-magnetism.

'Bibliography and Dynamics' is subdivided into seven sections: Bibliography of Physics; Dynamics in General; Dynamics of a Particle and Rigid Dynamics; Elasticity; Hardness, Friction and Viscosity; Dynamics of Fluids; Measurements of Dynamical Quantities.

'Heat' is divided into seven sections: Temperature and Thermometry; Calorimetry; Determination of the Mechanical Equivalent of Heat; Fundamental Laws of Thermodynamics; Thermal Conduction and Convection; Changes of Volume and of State (Experiment and Theory); Radiation.

'Mechanical and Thermal Effects of Contact or Mixture' is divided into five sections: Friction; Capillarity; Diffusion; Transpiration and Mechanical Permeability; Imbibition and Surface Condensation of Gases; Solution and Osmose.

'Vibrations, Waves and Sound' is divided into five sections: Theory and Observation of Harmonic Vibrations; Theory of Wave Motion; Sound; The Sensation of Sound; The Physical Basis of Music.

'Light, including Invisible Radiation,' is divided into six sections: Geometrical Optics and Photometry; Velocity, Wave-length, Energy, etc., of Radiation; Interference and Diffraction; Reflection and Refraction; Polarization; The Emission of Radiation, Phosphorescence, etc.

'Electro-magnetism' is divided into eight sections: Electric and Magnetic Units; Electrostatics; Magnetism; The Electric Current; Electrolysis; Electrodynamics; Electric Discharge; Terrestrial Magnetism; The Compass, Earth Currents.

These sections are divided further into 270 sub-divisions. The cards are to go to the subscribers fully labelled, the marking being done by expert assistants in London. On being received they can be filed away in suitable cases by a clerk, no expert knowledge being required. With a suitable key as to symbols any desired reference can be found quickly, and the work being done in any subject can be ascertained easily. Any system of classification, therefore, which is extensive, definite, and free from ambiguity, will be satisfactory.

In the main, the systems proposed by the Committee of the Royal Society are most satisfactory; and the labor expended in perfecting them in the different sciences, although enormous, will be fully repaid.

Unfortunately, the classification in Physics does not entirely satisfy the requirements demanded. The primary divisions are not altogether logical, nor is the classification of certain subjects; but this is comparatively immaterial.

In some cases it would undoubtedy be well still further to sub-divide a subject. For instance, the sub-divison devoted to the 'discharge in rarefied gases,' or the one devoted to the 'measurements of wave-lengths by optical and photographic methods.' In other cases this process has been carried too far. For instance, there is no particular reason why a special sub-division should be given to the 'vapor pressure near curved surfaces.'

Again, certain subjects seem to be entirely omitted, such as 'spectrum analysis;' the 'effect of different external causes on wave-lengths,' such as the Zeeman effect and the pressure effect; the 'numerical relations between the lines of any one spectrum and between the spectra of different elements;' 'Döppler's principle;' the 'laws of radiation and absorption;' 'forced vibrations and resonance;' the 'laws of steady currents as distinct from alternating currents;' 'heat effects of currents;' 'photography;' etc.

There are sections which are almost identical, such as the 'vibration of strings and rods' under 'Sound' and the 'dynamics of flexible strings' under 'Elasticity.' It is hardly an accepted fact that the Hall effect is due to changes in specific resistance, and, therefore, one would not necessarily, place it in that section. Again, in speaking of dynamics, the word center of inertia or center of mass is preferable to center of gravity. The name 'Electro-magnetism' is not a particularly happy one for the last primary division.

The only points of importance in the classification which need be criticised, however, are, I think, the omissions, the other matters being of very little importance, owing to the fact that the classification has a key, and the fact that anyone can, therefore, easily find the reference which he desires. It would increase, however, the value of the catalogue if the scheme of classification could be somewhat remodeled, and I venture to express the hope that some action of this kind may be taken before the recommendations of the committee are accepted by the countries concerned in the proposal.

There has been no plan proposed in recent years which seems to be of so great importance to the students of Physics

throughout the world as this, and it is earnestly to be desired that enough countries and enough universities and libraries will subscribe to the enterprise to make it possible for the Central Committee to publish the book and the card catalogues.

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CHEMISTRY.

IF the object of arranging titles of books in a bibliography in certain groups or classes is to enable readers and investigators to find more readily an article on a given subject, then the *anonymous* Committee that drew up the schedule of classification for Chemistry in the Report of the Royal Society's International Catalogue Committee has made an almost total failure.

Two methods were open to the Committee appointed to devise a classification scheme for Chemistry, either to adopt an arbitrary system, in which symbols uniformly indicate definite subjects, or to adopt the dictionary plan, in which specific words are arranged alphabetically. The latter plan has, in our opinion, great and incontestable advantages over the former, but as the Committee chose to adopt the first named method the second cannot be here considered.

The provisional plan which was submitted to the delegates at the Conference of the International Catalogue Committee, held in London, October, 1898, forms Section F, of the general scheme printed in a small volume, very difficult for others than delegates to obtain. The grand divisions, with their registration symbols, are as follows:

(No number) Chemical Bibliography.
0100 Chemistry (Specific) of the Elements.
0900 Laboratory Procedure.
1000 Organic (Carbon) Chemistry (Specific).
1010 Hydrocarbons.
1100 Alcohols and Ethers.
1200 Acids.
1300 Aldehydes and Ketones.
1400 Carbohydrates ; Glucosides ; Resins.
1500 Amino- and Azo-Compounds.
1600 Mixed Cycloids.
1700 Organo-Metallic and allied Compounds.
1800 Alkaloids.
1900 Proteids.
2000 Coloured Compounds.
2500 Operations in Organic Chemistry.
3000 Analytical Chemistry.
3500 Theoretical and Physical Chemistry.
4000 Physiological Chemistry.

These grand divisions are sub-divided so as to provide a class and a symbol for every substance known to the chemist or awaiting discovery; at least such is the intention. Chemical Bibliography is divided into six groups, to wit:

0000 Philosophy.
0010 History.
0020 Biography.
0030 Dictionaries, collected works, monographs, and text-books.
0040 Pedagogy.
0050 Addresses, lectures, essays and theses.

Curiously, no symbol is provided for bibliographies of chemistry, a topic that must have been prominent in the minds of the persons on the Committee.

The second grand division '**0100** Chemistry of the Elements' is intended to embrace "all specifically chemical subject-matter, and such other entries as may be desirable, relating to the elements generally, excepting carbon." In this category the elements are arranged alphabetically and to each a symbol is given, thus:

0110 (Al) Aluminium.
0120 (Sb) Antimony.
0130 (A) Argon.
* * * * *
0200 (Cd) Cadmium.
0210 (Cs) Cæsium.
* * * * *
0250 (Cl) Chlorine.
0260 (Cr) Chromium.
* * * * *
0800 (Va) Vanadium.
0810 (Yt) Ytterbium.
0820 (Y) Yttrium.
0830 (Zn) Zinc.
0840 (Zr) Zirconium.

Students, and even older chemists, who find difficulty in recalling the atomic weights of common elements will scarcely welcome the proposition to give to each element another factor, though in the case of antimony this objection disappears.

This alphabetical arrangement of the elements prevents carrying out one of the prime objects of classification, namely, the grouping of related matters; thus

0270 = Cobalt, **0500** = Nickel,
0690 = Sulphur, **0710** = Tellurium.

The natural group Ba, Ca and Sr, have respectively the unrelated numbers **0150**, **0220** and **0680**. Surely the elements might have been arranged systematically, so that related bodies would have contiguous symbols.

Annexed to the table of elements are instructions for sub-dividing entries and the following paragraph: "Specific entries relating to the halogens collectively shall be arranged in Division **0250** under *Halogens*." This mixing of a word-heading with numerical symbols is a weak feature to be again noticed.

The instructions for entering titles in sub-divisions of **0100** include the following paragraph: "Entries relating to compounds, which in the Slip Catalogue bear the number and symbol of the dominant element, together with the symbol of the secondary constituent, or dominant second constituent, shall be printed in the subdivision of their second constituent." If we understand aright this rather obscure sentence, it provides for writing on slips according to one rule and for printing them in book-form according to another rule; sodium chloride would appear, therefore, under the symbol for sodium in the written slips and under chlorine in the printed volume!

A second paragraph provides that "references to hydroxides, acids and salts shall be entered under the oxide, and corresponding sulphur compounds under the sulphide."

A third paragraph reads as follows: "(*d*) In each sub-division the entries shall be arranged in such order that those relating, α, to the history or origin of the substance come first, and following these, in the order mentioned, those relating, β, to its preparation or manufacture; γ, to its structure, or of a theoretical nature; δ, to its interactions or use; ε, to its compounds—these five several sections being denoted by the letters α, β, γ, δ, ε."

Passing without comment this non-parsable English (which occurs elsewhere in the report), the scheme introduces another arbitrary feature, Greek letters for specific subjects, which is an admission that the numerical plan is found insufficient; though it need not be, provided decimals were used, a plan which does not seem to be contemplated by the Committee. The suggestion is even made that "it would be possible to carry the analysis still farther by means of symbols, such as ψ, $\varkappa$, and so forth, to indicate physical properties, crystalline form, etc." The writers of this review venture to suggest that when the Greek alphabet is exhausted the Hebrew will come in handy.

This mixture of numerical symbols with word-headings is again resorted to in division '**0930** Operations in inorganic chemistry,' where it is suggested that "entries shall be made under significant headings, such as dissolution (*sic*) and solvents, crystallization, distillation, * * * oxidation, electrolysis, furnace operations, etc., arranged alphabetically."

To organic chemistry the symbol **1000** is assigned, under which all entries shall be arranged that relate to the subject generally; substitution derivatives of the compounds included in each of the numbered divisions—especially haloid and allied derivatives—shall, as far as possible, be en-

tered under the compounds from which they are derived.

The next paragraph provides that "entries under the name of a substance may, if necessary, be sub-divided in the same way as that proposed for inorganic substances."

Hydrocarbons receive the numerical symbol **1010**, and the scheme for indicating their substitution derivatives leads to amazing propositions; the general group is divided thus:

1010 Hydrocarbons.
1020 Paraffins.
1030 Unsaturated Open-Chain Hydrocarbons.
1040 Benzenoid Hydrocarbons.
1050 Reduced Benzenoid Hydrocarbons (Terpenes, etc.).
1060 Unclassified Hydrocarbons.

"Each of these divisions shall be sub-divided (excepting **1010** and **1020**) into isologous groups, in each of which compounds shall be entered in homologous order." Then follow two new arbitrary signs for distinguishing derivatives; these are full-faced numerals, **2**, **4**, etc., used to indicate homologous series C_nH_{2n-2}, C_nH_{2n-4}, and the full-faced letter **C**, with exponents attached to indicate the number of carbon atoms in a given compound.

Applying this scheme to nitropropane ($CH_3.CH_2.CH_2.(NO_2)$) it will receive the registration symbol **1020.C$_3$.NO$_2$**; allene (C_2:C:CH_2) will be indicated by the symbol **1030.2.C$_3$**, and bromotuluene ($C_6H_5.CH_2.Br$) will be indicated by **1040.6.C$_7$.Br**.

This plan of assigning to definite chemical bodies arbitrary symbols resembling in structure well-established formulæ is most objectionable; if carried out it would prove vexatious to chemists and of no practical value to librarians.

To alcohols and ethers the symbol **1100** is assigned; to acids, **1200**; each of these groups is sub-divided exactly as are the hydrocarbons, but the symbols of the sub-divisions do not harmonize. Since paraffins = **1020**, 'ols' should have been **1120**, and acids **1220** (instead of **1110** and **1210**).

In the paragraph on acids provision is made for indicating the number of oxygen atoms, the character of the acid and the basicity by numbers, to which ol, al, on, id or cy shall be appended, according to the origin of the acid. "Thus lactic acid would be marked **1210.C$_3$O$_3$** (**1.ol**), and protocatechuic acid, **1230.8.C$_7$O$_4$** (**1.2.ol**)." Here, again, we have registration symbols resembling in a general way chemical formulæ, yet they do not show the constitution nor even suggest the name of the substance.

Number **1440** is given to carbohydrates other than mono-, di- and trisaccharides and **1450** to glucosides and **1460** to resins, and it is provided that compounds belonging to these divisions shall be entered alphabetically; this is again a departure from the numerical plan. Another rule provides that "under alkaloids (**1800**) a list shall be given of vegeto-alkaloids, together with the Latin names of the plants from which they have been obtained, arranged in the alphabetical order of the plant names." Chemists not versed in botany would find this arrangement a puzzling one. Again, "alkaloids derived from plants (**1810**) and from animals (**1820**) shall be arranged alphabetically."

Division **2000** is styled 'Coloured compounds' [!], a singular misnomer for compounds used in dyeing; yet another division, **2010**, is called 'Coloured substances, not dyestuffs,' and division **2020** is named 'dyestuffs.' Provision is made for sub-dividing these categories thus: "**2010** into Hydrocarbons (coloured), Alcohols (coloured), Ketones (coloured), etc.; **2020** into Azo dyes * * * dye-stuffs of vegetable origin, unclassified dyes," arranged alphabetically in each sub-division.

The rules concerning the entries of the sub-divisions of **3000**, Analytical Chem-

istry, also lack uniformity, clearness and exactness; "division **3200** shall include all entries relating to the determination of individual elements in their compounds and in mixtures, excluding determinations of atomic weights" which belong to division **3500** (theoretical and physical chemistry). "Division **3300** shall include all entries relating to the determination of individual compounds, *e. g.*, alkaloids, carbohydrates * * * but excluding gases. If necessary gravimetric, volumetric, electrolytic, physical, etc., methods may be distinguished by letters, such as *g*, *v*, etc." "Division **3400** (Applied Analysis) shall include all entries relating to the analysis of composite materials, such as drugs, foods, soils, waters and technical products generally, arranged under appropriate significant headings."

The remaining divisions, **3500**, Theoretical and Physical Chemistry, and **4000**, Physiological Chemistry, must be passed; the specimens given are sufficiently numerous.

A study of this remarkable scheme of classification shows that the Committee failed to recognize the fact that classification and notation are two distinct things, and that a notation need have no relation to the character of the class to which the notation is given. To differentiate the houses in a city, street and number are given; '120 Grand Avenue' suffices to distinguish a given house, and it is not necessary to construct a symbol indicating the number of stories, the number of windows and the color of the paint in order to recognize the address.

Accompanying the schedule of classification is a specimem page giving illustrations of the way in which these rules should be applied; the examples bring out forcibly the absurdities of the conglomerate method proposed. The paper on Argon, by Lord Rayleigh and W. Ramsay, receives the Kabbalistic formula '**0100**. $\beta.\varphi$,' but, if we understand rightly the Committee's rules, the numerals should be **0130**, which stands for argon.

An article by J. J. Sudborough and L. L. Lloyd, on 'Stereoisomerism as affecting formation of etheral salts from unsaturated acids,' is assigned simply the number **3500**; when, however, the same paper is entered under a different title, namely: 'Etherification of stereoisomeric unsaturated acids a criterion of structure,' it has the number **1200** γ; when, on the other hand, this paper is catalogued as: 'Cinnamic and allied acids as a criterion of structure, Etherification of,' the catalogue slip must bear the symbol **1230.10.**$C_9O_2\delta$.

To a chemist the formula of cinnamic acid $C_6H_5.CH{:}CH_2.CO_2H$ has a definite meaning, and we protest against a system that introduces symbols, analogous in appearance, yet wholly misleading as respects the composition.

An examination of the schedule of classification of Chemistry proposed by the International Catalogue Committee shows that it consists of a medley of several methods. The system includes:

1. Numbers, full-face and inferiors, used for several distinct purposes.
2. Roman capitals, to denote component elements.
3. Roman lower-case, to denote kind of chemical process.
4. Italic letters in parenthesis, to denote basicity of acids.
5. Greek lower-case letters.
6. Word-headings arranged alphabetically.
7. Special provisions; exceptions to rules.

In 1772, at Ulm, was printed a thin octavo, having the title 'Medicinisch-chymisch und alchemistisches Oraculum,' which contains a key to over two thousand symbols and kabbalistic figures found in alchemical manuscripts and books; the book is curious and instructive, as well as really serviceable to antiquarian chemists. The number

of synonyms for a given substance is large; alum has twenty-six; aqua fortis, twenty-two; mercury, thirty-eight; a pound weight, eight, and cream of tartar is credited with thirty-two; the symbols have an uncouth appearance, but are hardly more fanciful than those proposed by the Committee on the International Catalogue. Should their schedule of classification prevail, a new edition of the 'Alchemical Oracle' would soon become a necessity.

H. CARRINGTON BOLTON,
WILLIAM P. CUTTER.

METEOROLOGY.

THE schedules of classification in meteorology proposed by the International Catalogue Committee of the Royal Society seem to be fairly well adapted to secure the objects sought by the International Conference on the bibliography of science. I do not understand that the Conference or the Committee has in mind any attempt at a philosophical classification of human knowledge as embodied in the publications of scientific societies. On the contrary, their object is merely to collect together in London all possible titles of scientific works, and to so arrange these that the clerks of the Royal Society may easily copy out all the titles on any given subject that may be called for by any student or investigator. For instance, under the head of 'Earth Temperature,' No. 2,100, there may be 10,000 titles and cards; these will be subdivided into a number of divisions, probably according to special aspects and according to the countries or stations. Each of these sub-divisions may have a number between 2,100 and 2,199, or, if more sub-divisions are needed, they will be between 21,000 and 21,999. Of course, the ease with which a clerk picks out the cards that belong to a given subject desired by the student depends, first, upon the minuteness of this sub-classification, and, secondly, upon the accuracy with which the content of a memoir is expressed by its own title. This latter is the *bête noir* of all classification by titles, and there is no remedy for it except that the bibliographer examine the original memoir itself, page by page. In this respect the Royal Society must depend upon the thoroughness of those who send titles to it. The Society is simply the central office, or agent, for all the other societies and men in the scientific world. Every card that is sent to it should have inscribed on it the one or more subdivisions into which it falls. If these subdivisions do not appear on the preliminary schedules of classification that have been sent out for criticism and suggestion, then they will be inserted as fast as needed.

It seems to me that the method adopted by the Conference and the Royal Society will work just as well as any other that could be suggested, and will be a great boon to science if kept up during the next century. Of course, it will require at least ten years of experience for us to begin to appreciate either its defects or advantages. Fortunately, so far as regards meteorology, the Weather Bureau has the great international bibliography, started in 1881 under my personal supervision and already partially published. The classification adopted therein by Mr. C. J. Sawyer, after consultation with all the recognized experts of Europe and America, embraces many details not specifically mentioned in the schedule of the Royal Society, and is found very convenient when once the student has become slightly familiar with it. It endeavored to attain greater elasticity by adopting a mixture of capital and small letters, Roman and Arabic numerals, in order to designate the various divisions and sub-divisions. Thus we have IB1b to designate the Aristotelian works on meteorology in general, whereas the Royal Society classification would, undoubtedly, designate

these as 0002, or, possibly, 00021. There is very little to choose between the two methods except as to the ease in writing, speaking and printing.

As to the classification or arrangement of subjects, my personal preference would be strongly in favor of a simple dictionary catalogue.

CLEVELAND ABBE.

THE STOKES JUBILEE.

ON June 1 and 2, 1899, the University of Cambridge celebrated the fiftieth anniversary of the appointment of Sir George Gabriel Stokes to the Lucasian professorship of mathematics in that institution. During the half century of his connection with Cambridge, Professor Stokes has distinguished himself by a remarkable series of investigations in the fields of hydromechanics, physical geodesy, elasticity, the undulatory theory of light, and pure mathematics. His activity has continued down to the present date, one of his most recent papers dealing with the mechanical properties of the X-rays.

The celebration of so rare an event in academic life, and the eagerness of educational and scientific institutions to render homage to so eminent a man, naturally brought together a large body of specialists in the mathematico-physical sciences. About 400 delegates and other guests were present. Nearly all of these were entertained either in the colleges or in the homes of members of the professorial staff. Thus was it made easy for the stranger within the gates of this renowned University to see much of its inner life and to enjoy in the fullest degree its charming hospitality.

The ceremonies began on the afternoon of June 1st, with the Rede Lecture, delivered in the Senate House, by Professor Cornu, on 'The wave theory of light; its influence on modern physics.' This was delivered with admirable clearness in French. In the evening following a conversazione was held in Fitzwilliam Museum, and busts of Sir George Stokes were presented to the University and to Pembroke College (that of Stokes) by Lord Kelvin.

On the morning of June 2d the delegates and guests were received in the Senate House by the Vice-Chancellor and the delegates presented the addresses sent by the various academic and scientific institutions. There were about seventy such addresses, so that it was essential to dispense with the formal reading of them in most cases. Professor Stokes responded briefly and with great modesty to these addresses, saying that they made him feel that in his long life he ought to have accomplished much more; but, he added, humorously: If I had done more I probably should not have lived to celebrate this jubilee.

On the afternoon of June 2d the address of the University of Cambridge and a gold medal were presented to Sir George Stokes; and immediately thereafter the degree of Doctor in Science, *honoris causa*, was conferred on the following distinguished men of science: Marie Alfred Cornu, professor of experimental physics in the École Polytechnique, Paris; Jean Gaston Darboux, dean of the faculty of sciences in the University of Paris; Albert Abraham Michelson, professor of experimental physics in the University of Chicago; Magnus Gustav Mittag-Leffler, professor of pure mathematics, Stockholm; Georg Herman Quincke, professor of experimental physics in the University of Heidelberg; and Woldemar Voigt, professor of mathematical physics in the University of Göttingen.

SCIENTIFIC BOOKS.

A Text-Book of Physics—Sound. By J. H. POYNTING and J. J. THOMSON. London, Charles Griffin & Co. 1899. Pp. 163.

This is the first one of five volumes in