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# NOTICE

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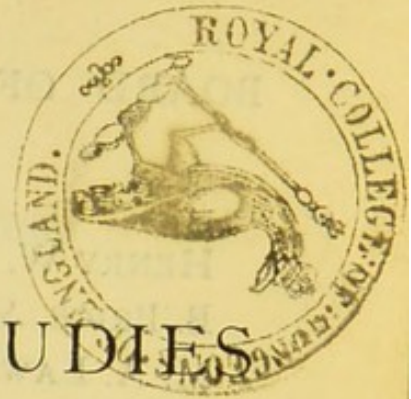
## NATURAL SCIENCE SCHOOL

OF THE

## UNIVERSITY OF OXFORD.

*Issued in pursuance of Statute Tit. V. (VI.) Sect. 1.*

OXFORD, 1872.



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## School of Natural Science.

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THE BOARD OF STUDIES for the Natural Science School hereby give notice that the range of subjects included in the Examinations, shall be as follows:—

### PRELIMINARY HONOUR EXAMINATION.\*

#### I. MECHANICS AND PHYSICS.

Mechanics, to the extent represented by Newth's 'First Book of Natural Philosophy,' and the first four Books of 'Ganot's Physics.'

Acoustics, Heat, Light, Magnetism, and Electricity, as represented by 'Ganot's Physics.'

\* The Board direct the attention of Candidates in the Natural Science School to clauses 3 and 4 of the Statute printed in the Appendix.

## 2. CHEMISTRY.

The general principles of Chemistry, and the properties of the better known elements and compounds (excepting such as are included under Organic Chemistry), as treated of in any one of the following manuals:—

- Williamson's Chemistry for Students ;
- Roscoe's Lessons in Elementary Chemistry ;
- Wilson's Inorganic Chemistry ;
- Fownes' Manual of Chemistry ;
- or more fully in
- Miller's Elements of Chemistry, Vol. II.

The practical examination will comprise the analysis of single substances, and such elementary exercises in chemical manipulation as are included in Harcourt and Madan's Exercises in Practical Chemistry, Part I.

## FINAL HONOUR EXAMINATION.

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THE Final Honour Examination comprises three General Subjects, viz.—

- I. Physics,
- II. Chemistry,
- III. Biology ;

and the following Special Subjects, which may be taken in as supplementary to one or more of the General Subjects :—

- A. Crystallography and Mineralogy,—the former as included under the General Subjects of Physics and Chemistry, the latter as included under Chemistry.
- B. Geology and Palæontology,—the former as included under the three General Subjects, the latter as included under Biology.
- C. Zoology, } as subjects included under Biology.
- D. Botany, }

The several sections which follow deal with the manner in which each separate subject, whether general or special, is to be studied by a Candidate for honours.

The appended lists of books are intended to serve as guides, suggestive of the best courses of study, and offering some choice of text-books. Alternative treatises are in several cases included in the lists in the same paragraph.

In many instances portions only of the works recommended will need to be studied as treating in a special manner of the subjects for which the book may be recommended.

The Board desire it to be understood that a knowledge of the subjects, based on practical work, as well as knowledge gathered from books, will always be required at the examinations in this School.

## I. GENERAL SUBJECTS.

### I. PHYSICS.

A Candidate who offers himself in the Final Honour Examination for examination in Physics as his general subject shall be required to show an accurate general knowledge of Physics, and he shall be allowed to present himself in addition for a more detailed examination in one or more of the following branches of Physics:—

Acoustics,  
Heat,  
Light,  
Electricity and Magnetism.

It is necessary that a student of Physics should have at least an elementary knowledge of Geometry, Algebra, and Mechanics.

Jamin's *Cours de Physique*, last edition, in 3 vols., may be mentioned as a good text-book on general Physics.

Students are however advised to consult their Tutors or the Professor of Experimental Philosophy with respect to the books to be read, inasmuch as the most desirable course of study must depend on the Mathematical knowledge of each individual.

## II. CHEMISTRY.

Candidates in the Final Honour Examination who offer themselves for examination in Chemistry will be expected to show an acquaintance with the following subjects :—

- I. Chemical Physics ;
- II. Inorganic Chemistry ;
- III. Organic Chemistry ;
- IV. General and Theoretical Chemistry.

There will also be a Practical Examination which will comprise—

- V. The Qualitative analysis of inorganic substances ;
- VI. The Quantitative analysis of inorganic substances.

The use of books will be allowed to Candidates in the Examination in Quantitative analysis.



## III. BIOLOGY.

1. Candidates who offer themselves in the Final Honour Examination for examination in Biology will be expected to show an acquaintance, firstly, with General and Comparative Anatomy and Histology<sup>1</sup>; secondly, with Human and Comparative Physiology, inclusive of Physiological Chemistry; and thirdly, with the General Philosophy of the subject.

2. In these subjects the Candidates will be examined both by paper work and practically; and will be required to give evidence of being competent not merely to verify and describe specimens already prepared for naked-eye or microscopic demonstration as the case may be, but also to prepare such or similar specimens themselves.

3. Candidates may, in addition to the amount of work indicated in the preceding paragraphs, bring up any of the 'Special Subjects' contained in the list appended below. A Candidate who offers himself for examination in a Special Subject will be expected to show, firstly, a detailed practical acquaintance with specimens illustrating that subject, for which purpose the Catalogues in the University Museum can be made available; and secondly, exact knowledge of some one or more monographs treating of it. Excellence, however, in a Special Subject will not compensate for failure in any essential part of the general examination.

Every Candidate must state, at the time of entering his name for examination, what Special Subject, if any, he takes in.

A student who offers himself for examination in a Special Subject is referred to the following provisional List:—

a. *Comparative Osteology.*

b. *The Comparative Anatomy and Physiology of the Organs of Digestion.*

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<sup>1</sup> Under these terms vegetable structures are included.

- c. *The Comparative Anatomy and Physiology of the Organs of Circulation and Respiration.*
- d. *The Comparative Anatomy and Physiology of the Nervous System.*
- e. *The Comparative Anatomy and Physiology of the Reproductive Systems.*
- f. *Ethnology.*

4. The following works are provisionally recommended by the Board of Studies for use in the study of the above-mentioned Departments of Biology.

(a) *List of Books recommended for use in the preparation for the General Examination in Biology:—*

*General Anatomy and Histology—*

- Sharpey in Quain's Anatomy, 7th ed. Lond., 1867.
- The Micrographic Dictionary, by Griffiths and Henfrey, now in course of re-publication.
- The Histological Catalogue of the College of Surgeons, by Professor Quekett.
- Kölliker's Handbuch der Gewebelehre, ed. 1867. Leipzig.
- Stricker's Handbook of Human and Comparative Histology, now in course of translation for the New Sydenham Society.

*Comparative Anatomy—*

- Huxley's Introduction to the Classification of Animals, Lond., 1869.
- Huxley's Anatomy of Vertebrated Animals, Lond., 1871.
- Gegenbaur's Grundzüge der Vergl. Anatomie, Leipzig, 1869.
- Milne-Edwards' Leçons sur la Physiologie, 1857-1870. Paris.
- Owen's Anatomy of Vertebrates, 3 vols, 8vo, 1866-1868. London.
- The Osteological and Physiological Catalogues of the College of Surgeons, by Professor Owen.
- The Anatomical and Physiological Catalogues of the Oxford Museum.
- Flower's Osteology of Mammalia. Lond., 1871.
- Cuvier's Ossemens Fossiles, 2<sup>me</sup> éd. 1821-1824. Paris.

Rolleston's Forms of Animal Life. Oxford, 1870.

Bronn's Klassen und Ordnungen des Thierreichs, 1860-1871. Leipzig und Heidelberg.

*Human Physiology—*

Carpenter's Human Physiology, 7th ed. Lond., 1869.

Funke's Lehrbuch der Physiologie, now in course of re-publication. Leipzig.

Hermann's Handbuch der Biologie, 1870. Berlin.

Dalton's Human Physiology. Philad., 1859.

Draper's Human Physiology. Lond., 1856.

Ranke's Grundzüge der Physiologie, 1868. Leipzig.

Wundt's Lehrbuch der Physiologie, 1865. Erlangen.

Ludwig's Lehrbuch der Physiologie, 1858-1861. Leipzig und Heidelberg.

Budge's Lehrbuch der speciellen Physiologie des Menschen, 1862. Leipzig.

*Comparative Physiology—*

Carpenter's Comparative Physiology, 4th ed. Lond., 1854.

Marshall's Outlines of Physiology. 2 vols., Lond., 1867.

Milne-Edwards' Leçons sur la Physiologie. 9 vols., Paris, 1857-1870.

Bergmann und Leuckart, Anatomisch-physiologische Uebersicht des Thierreichs, 1855. Stuttgart.

*General Philosophy of Biology—*

a. Darwin's Origin of Species, 5th ed. Lond., 1869.

Van der Hoeven's Philosophia Zoologica, 1864. Leyden.

Lyell's Principles of Geology, ed. 1870, chap. xxxiv-xxxvii.

Mivart's Genesis of Species. Lond., 1871.

Spencer's Principles of Biology, 1864-1867; Principles of Psychology, ed. 1868-1871.

b. Agassiz's Essay on Classification. Lond., 1859, chap. iii.	} For a Historical Survey of the Progress of Biology.
Whewell's History of the Inductive Sciences, 3rd ed. 3 vols., Lond., 1857.	

c. Van der Hoeven's Handbook of Zoology. Lond., 1857.	} For Zoology.
Nicholson's Manual of Zoology, 2nd ed. Edinb., 1871.	

Van der Hoeven's *Philosophia Zoologica*,  
lib. iv. Lugd. Bat., 1864.  
Lyell's *Principles of Geology*, chap. xxxviii-  
xli., 11th ed. Lond., 1872.

} For Geogra-  
phical Distri-  
bution.

d. Waitz's *Anthropology*.

Brace's *Races of the Old World*, 2nd ed.  
Lond., 1869.

} For Ethno-  
logy and An-  
thropology.

(b) *List of Books recommended in connexion with 'Special Subjects':—*

*Comparative Osteology—*

Cuvier's *Ossemens Fossiles*, any one of the five volumes.

Flower's *Osteology of Mammalia*.

Professor Huxley's *Anatomy of Vertebrated Animals*.

*The Comparative Anatomy and Physiology of the Organs of Digestion—*

The *Physiological Catalogue of the Royal College of Surgeons*, Vol. I.

Milne-Edwards' *Leçons*, Vol. VI.

Articles 'Stomach and Intestine' and 'Pancreas' in  
Todd's '*Cyclopædia of Anatomy and Physiology*.'

Schiff's *Leçons sur la Physiologie de la Digestion*, 2 vols.  
Berl., 1868.

*The Comparative Anatomy and Physiology of the Organs of Circulation and Respiration—*

Milne-Edwards' *Leçons sur la Physiologie*, Vol. III.

Marey's *Physiologie Médicale de la Circulation du Sang*. Paris, 1863.

Bert's *Leçons sur la Physiologie Comparée de la Respiration*. Paris, 1870.

*The Comparative Anatomy and Physiology of the Nervous System—*

Leuret et Gratiolet's *Anatomie Comparée du Système Nerveux*, Tom. II, par M. Pierre Gratiolet. Paris, 1857.

Vulpian's *Leçons sur le Système Nerveux*. Paris, 1866.

Brown-Séguard's *Lectures*. Philad., 1865.

*The Comparative Anatomy and Physiology of the Reproductive Systems—*

Physiological Catalogue of the Royal College of Surgeons,  
Vols. IV and V.

Kölliker's *Entwicklungsgeschichte*. Leipzig, 1861.

Milne-Edwards' *Leçons*, Vol. IX.

*Ethnology—*

Brace's *Races of the Old World*, 2nd ed. Lond., 1869.

5. Candidates who offer themselves for examination in Geology, Zoology, or Botany, will be required to exhibit practical acquaintance with those subjects to at least the same extent as Candidates who offer themselves for examination in any one of the Special Subjects above mentioned are required to do with reference to those subjects. But they will not be required to go through the same amount of practical work in the Departments of Biology not specially connected with Geology, Zoology, or Botany, as Candidates who do not bring up any one of these three subjects.

## II. LIST OF SPECIAL SUBJECTS.

### A. MINERALOGY AND CRYSTALLOGRAPHY.

Candidates for Honours in the Natural Science School who desire to take in Mineralogy as a Supplementary Science  
 (a) should exhibit a practical as well as theoretical knowledge of Crystallography, and of Crystallographic Physics.

The Candidate should also be acquainted with the Crystal-  
 (b) lographic characters of such substances as serve to illustrate the principles and applications of Crystallography.

Mineralogy may be further pursued by the Student :

Firstly, as a discriminative and classificatory Science, in-  
 (c) volving an acquaintance with the logical principles of classification.

Secondly, in respect to its subject-matter, namely, by the actual study of the more important minerals and other  
 (d) crystallized substances ; more especially of such as illustrate the principles of Classification as well as of Crystallography,  
 (e) and of such as are important either from their contributing to form the rock masses of the globe, or from a mining point of view, or as being of value for their employment in the useful arts.

Thirdly, in respect of the practical methods of discriminating minerals, not merely by investigating their Crystallo-  
 (f) graphic forms with the aid of the goniometer, but by determining their physical characteristics, specific gravity, degree of hardness, colour, optical and pyro-electric properties, &c. ; and also by examination with the blowpipe and other simple chemical tests.

And finally, the mineralogical Student should be acquainted  
 (g) with the hypotheses regarding the causes that have operated in effecting the deposition, the transformations, or the successions of Minerals in veins and rocks.

*Treatises recommended.*

- (a) Miller (W. H.), *A Tract on Crystallography*. Cambridge, 1863.  
 Lang (V. von), *Lehrbuch der Krystallographie*. Vienna, 1866.  
 Karsten (H.), *Lehrbuch der Krystallographie*. Leipzig, 1861.  
 Schrauf (A.), *Lehrbuch der physikalischen Mineralogie*. Vienna, 1866.  
 Grailich (J.), *Miller's Lehrbuch der Krystallographie*, a German translation of Professor Miller's original work, containing chapters on Crystallographic Physics. Vienna, 1856.  
 Grailich (J.), *Krystallographisch - optische Untersuchungen*. Vienna und Olmütz, 1858.
- (b) Rammelsberg (C. F.), *Krystallographische Chemie*. Berlin, 1855, and Suppl. 1857.
- (c) Mill (John Stuart), *A system of Logic, the chapters on Classification*. 7th ed. London, 1868.  
 Whewell (W.), *History of the Inductive Sciences, chapters on Mineralogy*. 3rd ed. London, 1857.  
 Rose (G.), *Das krystallo - chemische Mineralsystem*. Leipzig, 1852.  
 Rammelsberg (C. F.), *Berzelius' neues chemisches Mineralsystem*. Nürnberg, 1847.
- (d) Brooke and Miller's *Mineralogy*. London, 1852.  
 Rammelsberg (C. F.), *Handbuch der Mineralchemie*. Leipzig, 1860.  
 Quenstedt (F. A.), *Handbuch der Mineralogie*. 2nd ed. Tübingen, 1863.  
 Dufrenoy (A.), *Traité de Minéralogie*. 2<sup>me</sup> éd. Paris, 1856-60.

Descloizeaux (A.), Manuel de Minéralogie. Paris, 1862.  
 Dana (J. D.), System of Mineralogy. 5th ed. London,  
 1868.  
 Kenngott (A.), Die Minerale der Schweiz. Leipzig, 1866.

(e) Cotta (B. von), Rocks classified and described, translated  
 by H. Lawrence. London, 1866.  
 Zirkel (F.), Lehrbuch der Petrographie. Bonn, 1866.  
 Senft (F.), Lehrbuch der Mineralien und Felsartenkunde.  
 Jena, 1869.

(f) First volume of Dana's System of Mineralogy. 4th ed.  
 London, 1855.  
 Blanford and Scheerer on the Blowpipe. London, 1856.  
 Rammelsberg (C. F.), Lehrbuch der Krystallkunde.  
 Leipzig, 1852.  
 Naumann (C. F.), Elemente der Mineralogie. 8th ed.  
 Leipzig, 1871.

(g) Bischoff (Gustav), Lehrbuch der chemischen und physi-  
 kalischen Geologie. 2nd ed. Bonn, 1863, &c.  
 ——— English translation by the Cavendish Society.  
 Blum (R.), Die Pseudomorphosen des Mineralreichs.  
 Stuttgart, 1843, &c. &c.  
 Cotta (B. von), Gangstudien. Freiberg, 1847, &c. &c.



## B. GEOLOGY.

Candidates who propose to offer themselves for examination in Geology would do well to keep in mind, that the aim of this branch of Science is nothing less than to discover and demonstrate the ancient history of the Earth. For this purpose it is required not only to obtain correct knowledge of the composition, structure, and arrangement of Rocks, and the nature and distribution of Organic Remains, but further to apply to the phænomena which have been observed just reasonings founded on analogies in existing nature, and principles established by Physics, Chemistry, and Biology. Only in proportion as this can be truly accomplished can the foundations of Geological Theory be securely laid.

The portions of Geological study which are now suggested to Candidates, in illustration of what has been said, relate to the internal structure and movements of rock masses; their chemical composition and mineral aggregation; the organic remains which they enclose; and the inferences from observed phænomena as to the causes which operated to produce them.

*Composition, Structure, and Arrangement of Rocks.*

(a) Rocks generally: the grounds of their division into and classification as Rocks of Igneous or Aqueous origin; Rocks of stratified or unstratified arrangement; and as Rocks of Palæozoic, Mesozoic, or Cainozoic age.

(b) Stratified Rocks: their chemical and mineral constitution, source of materials, conditions of deposition in the sea, in lakes, or on the course of rivers.

(c) Unstratified Rocks: considered as to their classification, composition, and structure, the conditions of their occurrence, and geological age.

(d) Metamorphic Rocks: Rocks regarded as altered from their first condition by heat and chemical reactions below the surface of the earth.

(e) Divisional Structures in Rocks, known as 'joints,' 'cleavage,' and 'foliation'; how produced, and in what geological periods.

(*f*) Mineral Veins: metallic and mineral contents; occurrence in relation to the nature, position and antiquity of Rocks, movements of disturbance in the crust of the earth, and geological time.

*Movements in the Crust of the Globe. Heat of the Interior.*

(*g*) Earthquakes and ancient subterranean movements; characteristic phænomena and probable causes.

(*h*) Volcanos; their characteristic physical and chemical phænomena, geographical distribution, and geological age.

*Physical Geography. Climate.*

(*i*) The leading features of Physical Geography;—by what natural processes, with what measures of force, and during what periods of time, the characteristic phænomena have been occasioned.

(*k*) The Temperature of the Earth, at attainable depths, in relation to ancient and modern climate.

*Palæontology.*

(*l*) The Flora and Fauna of the Land in a limited geological period, as for example the period of the Stonesfield oolite.

(*m*) The Fauna of the Sea in a limited geological period, as for example the Cambro-Silurian period.

(*n*) Or the Lower Cretaceous period.

(*o*) The Carboniferous Flora of Britain; origin of the coal, and of the accompanying strata; dislocations; dykes; quantity of coal; depth of working; rate of consumption; probable duration.

(*p*) Monographs of groups of Organic Remains, specially such as belong to families of plants and animals which are characteristic of geological periods, or have become comparatively rare in existing nature; for example—

The Zamiaceæ, Lepidodendra, Sigillariæ, among Plants;

The Crinoïdea, Trilobitida, Brachiopoda, Cephalopoda, among Invertebrate Animals;

Megalosaurus, Plesiosaurus, Teleosaurus, Rhamphorhynchus, among Reptiles ;

Ungulata and Marsupialia, among Mammalia.

The Books and Memoirs named in the following list are suggested as sufficient to guide the student toward a right general view of the several subjects enumerated. For more complete references, and information as to researches still in progress, the student is advised to consult the Professor.

(a) *Rocks generally.*

Bischof, Chemical and Physical Geology. 2 vols., Lond. 1854-5.

Cotta, Gesteinslehre, 1862—translated by Lawrence.

Vogelsang, Mikroskopische Gesteinsstudien, 1867.

(b) *Stratified Rocks.*

De la Beche, Geological Observer, 2nd ed. Lond., 1853, Jukes' and other Manuals of Geology.

Lyell, Principles of Geology, 11th ed. 2 vols., 1872.

(c) *Unstratified Rocks.*

Jukes' Manual of Geology, 3rd ed. Edinb., 1872.

Naumann, Lehrbuch der Geognosie, 1850; Leonhardt und Bronn, N. Jahrb. 1847.

Senft, Classification and Description of Rocks, 1857—abstract in Geol. Soc. Journ. xiv. 1.

(d) *Metamorphic Rocks.*

Bischof, Chemical and Physical Geology. 2 vols., Lond., 1854-5.

Cotta, Geologie der Gegenwart. Leipzig, 1866.

Daubr e, Exp eriences Synth etiques sur le M etamorphisme. Paris, 1860.

Delesse,  tudes sur le M etamorphisme. Paris, 1858.

Sterry Hunt, Reports of Canadian Geological Survey, &c.

Von Buch, Ann. des Sci. Nat. t. xvii.

(e) *Divisional Structures.*

A Report to the British Association, by Professor Phillips, 1856, On Cleavage and Foliation in Rocks; containing references to special researches of Sedgwick, Sharpe, and Sorby. See also Memoirs by Haughton, Hopkins (1847), and Tyndall.

*(f) Mineral Veins.*

- Cotta, Gangstudien, 1847.  
 Fournet, Études sur les Dépôts Métallifères, 1835.  
 Henwood, On Metalliferous Deposits. Penzance, 1871.  
 Taylor, On Mineral Veins—a Report to the British Association, 1833.  
 Werner, On Veins. Lond., 1791.

*(g) Earthquakes.*

- Hopkins, On Theories of Elevation—in Trans. Cambr. Phil. Soc., 1837; and in a Report to the British Association, 1847.  
 Mallet, Catalogue of Earthquakes—in Reports to the British Association begun in 1847—Neapolitan Earthquake, 1862.

*(h) Volcanos.*

- Abich, Vulcanische Bildung, 1841.  
 Daubeny, On Volcanos, 2nd ed. Lond., 1848.  
 Fouqué, Rapports sur les Phénomènes chimiques des Volcans, 1866.  
 Phillips, On Vesuvius. Oxford, 1869.  
 Scrope, Geology of Central France. Lond., 1848.  
 Von Buch, Die Canarischen Inseln. Berlin, 1825.  
 Dufrénoy et De Beaumont, Sur les Cratères de Soulèvement—Ann. des Mines, 1833.

*(i) Physical Geography.*

- Agassiz, Forbes, Tyndall, Moseley, on Glaciers.  
 Ansted, Herschel, Somerville, on Physical Geography.  
 Beaumont, E. de, Phil. Mag. et Ann. 1831.  
 Darwin, Geological Observations, 2nd ed. Lond., 1851.  
 Hopkins, Address to Geol. Soc. 1853.  
 Lyell, Principles of Geology, 11th ed. 2 vols. Lond., 1872.  
 Ramsay, Memoirs of Geol. Survey, 1866.  
 Playfair, Illustrations of the Huttonian Theory. Edinb., 1802.  
 Studer et Désor, Sur les Alpes—Bibl. Univ. de Genève, 1842.

*(k) Temperature of the Earth.*

- Cordier, Essai sur la Temperature de l'Intérieur de la Terre—Ann. du Mus., 1827.  
 Fox, On the Temperature of Mines—Geol. Soc. of Cornwall, Vols. II and III.

- Henwood, On Subterranean Temperature, 1871.  
 Phillips, 1836, Everett, 1871, 1872—in Reports of the  
 British Association.  
 Quetelet, On Diurnal and Annual Variations of Earth-  
 temperature—Mem. Acad. of Brussels, 1837.  
 Thomson and Tait, Treatise on Nat. Phil., Vol. I., p. 711.  
 Oxford, 1867.

(l) *Stonesfield Oolite, Flora and Fauna.*

- Morris and Lycett, On Great Oolite Fossils (Mem. Pal.  
 Soc.).  
 Oppel, Ueber einige Cephalopoden der Juraformation  
 Württembergs. Würtemb., 1856.  
 Phillips, in Geology of Oxford and the Valley of the  
 Thames. Oxford, 1871.  
 Quenstedt, Der Jura. Tubing., 1858.

(m) *Cambro-Silurian Fauna.*

- Barrande, Syst. Silurien du centre de la Bohême. Prague,  
 1852-70.  
 Bigsby, Thesaurus Siluricus. Lond., 1868.  
 Hall, Geology of New York. Albany, 1852.  
 Murchison, Siluria, 4th edit. Lond., 1867.  
 Sedgwick, Palæozoic Fossils in Cambridge Museum.  
 Cambr., 1855.

(n) *Lower Cretaceous Period.*

- Austen, Morris, and Sharpe, in Journal of Geol. Soc.  
 Davidson, On Brachiopoda—Mem. of Pal. Soc.  
 D'Orbigny, Paléontologie Française. Paris, 1840-67.  
 Fitton, On Beds below the Chalk, Trans. Geol. Soc., 1836.  
 Wright, On Echinodermata—Mem. of Pal. Soc.

(o) *Carboniferous Flora.*

- Binney in Pal. Soc. Memoirs.  
 Brongniart, Végétaux Fossiles. Paris, 1828.  
 Carruthers, Communications to the Geological Society.  
 Göppert, Systema Filicum Fossilium, 1838.  
 Hooker in Memoirs of Geol. Survey.  
 Hull, On the Coal-fields of Great Britain. Lond. 1861.  
 Lindley and Hutton, Fossil Flora. Lond., 1829-37.  
 Sternberg, Flora der Vorwelt. Leipzig, 1820.

(p) *Monographs of Organic Remains.*

- Books and Memoirs on these and other groups of Fossils  
 are too numerous to specify. Candidates may be  
 advised to apply to the Professor of Geology for  
 references adapted to the several cases.

## C. ZOOLOGY.

Candidates offering Zoology will be required to show a thorough acquaintance with the following subjects:—

1. The general principles of classification, applied to the animal kingdom, together with a comparison of the more important systems hitherto proposed for this purpose.

2. The structure and habits of animals, with especial reference to their external organs.

3. The types of extinct animals, in order to show their position and relationship with existing groups.

And for more special subjects—

*a.* The classification, geographical distribution, affinities, economy, transformations, and development of the animals comprised in some one or more of the families, genera, or individual species of animals; with practical illustrations, by dissection and delineation, of their structure.

*b.* The minute details of structure of special individual organs may also be practically shown and illustrated by dissection; e. g.—

The organs of flight throughout the Insecta.

The mouth organs in the Crustacea.

The embryonic and metamorphic changes occurring in one or more of the species of any family, especially amongst the Invertebrata.

*c.* The student may also offer himself for examination upon the Fauna of any district in the British islands; e. g.—

The animals of the Isis and Cherwell.

The indigenous invertebrated Fauna of the neighbourhood of Oxford.

The literature of Zoology is so extensive, and the number of special monographs on nearly every branch of the subject is so great, that it will in all cases be advisable for the student to apply to his Tutor or to the Professor of Zoology for references to the best works and memoirs necessary for working out the particular subject which he may desire to study. The following list is appended for the assistance of Zoological Students.

1. *General Modes of Study.*

Linnæus, *Philosophia Botanica*. Vindob., 1770.

Fabricius, *Philosophia Entomologica*. Hamb. 1778. (The chapters on the general subjects of Classification, Nomenclature, and Terminology applicable to the Animal Kingdom). Also the chapters on the same subjects in the works of Illiger, *Versuch systematischen Terminologie*. Helmstadt, 1800; Van der Hoeven, *Philosophia Zoologica*. Lugd. Batav. 1864; Kirby and Spence, *Introduction to Entomology*, vol. iv.; and Burmeister, *Handbuch der Entomologie*, translated by Shuckard.

Agassiz, *Methods of Study in Natural History*, Boston, 1860; and *Essay on Classification*, London, 1859.

2. *General Zoology.*

Linnæus, *Systema Naturæ*, 13th ed. Vindob. 1767.

Cuvier, *Le Règne Animal*, especially the Crochard edition, 20 vols., with Plates of all the genera.

Van der Hoeven, *Handbook of Zoology*, translated by Clark, 2 vols. 1856; or Nicholson, *a Manual of Zoology*. 8vo, London, 1870.

The series of French works known as 'Nouvelles Suites à Buffon.'

Van Voorst's *Series of British Zoology*, by Bell, Yarrell, Forbes, Johnston, and others.

Kirby, *Bridgewater Treatise*. 2 vols., London, 1835.

Burmeister, *Zoologischer Hand-Atlas*. Fol., Berlin, 1835.

Victor Carus, *Icones Zootomicæ*. Fol., Leipz. 1857.

3. *Fossil Zoology.*

Gervais, *Zoologie et Paléontologie générales*. Paris, 4to, 1869.

Gervais, *Zoologie et Paléontologie française*. 4to, Paris, 1859.

Pictet, *Traité de Paléontologie, et Atlas*, 2<sup>me</sup> édition. 4 vols, Paris, 1853-57.

Owen, various memoirs on Fossil Animals, Birds, and Reptiles, in *Transactions of Royal and Zoological Societies*.

Agassiz, *Recherches sur les Poissons Fossiles*. 8vo and fol., Neuchatel, 1833—

Salter, in Mem. Geol. Survey Decad. 2, 7 and 11, 1849-64.  
 Barrande, Syst. Silurien de Bohême, Vol. I. Prague, 1852.  
 Burmeister On Trilobites (Ray Society).

*a. Vertebrata.*

Schreber und Wagner, Die Säugethiere in Abbildungen nach der Natur. 4to, Erlang. 1774-1846.

Waterhouse, Nat. Hist. of Marsupialia and Rodentia. 2 vols., London, 1846-48.

Dahlbom, Studia Zoologica familias regni animalis naturales tractantia. Lund, 1856.

Owen, Anatomy of Vertebrates, Preface, and chapters 1, 2, 13, 14, 25, 26, and 40.

British Museum Catalogues of various families of Mammalia, also of Snakes and Lizards.

A. Murray, The Geographical Distribution of Animals. London, 1866.

G. R. Gray, The Genera of Birds, 3 vols. 4to; and Catalogues of Birds published by the Trustees of the British Museum.

Montagu, Ornithological Dictionary. London, 1866.

Jerdon, Birds of India. 3 vols., Calcutta, 1862-64.

Günther, British Museum Catalogues of Fishes, vols. i-viii, and of the Batrachia Salientia.

Couch, Fishes of the British Islands. London, 1862-65.

Müller, On Ganoid Fishes, in Trans. Acad. Sci., Berlin, 1844. English Trans. in Taylor's Scientific Memoirs, vol. iv, p. 499, 543.

*Invertebrata.*

Savigny, Mémoires sur les Animaux sans Vertébrés. 2 Parts, Paris, 1816.

Straus-Durckheim, Considérations générales sur l'Anatomie comparée des Animaux Articulés. 4to, Paris, 1823.

Dana, The Crustacea of the United States Exploring Expedition, with folio Atlas of Plates. Philadelphia, 1852.

Baird, British Entomostraca (Ray Society). 8vo, London, 1850.

Darwin, Monograph on Cirripedia (Ray Society), 2 vols., 8vo, 1851 and 1854, and on Fossil Cirripedia, 2 vols., 4to, 1851 and 1854 (Palæontogr. Soc.).



- Packard, Guide to the Study of Insects, 2nd edition. Salem, 1870 (including recent and fossil groups).
- Westwood, Introduction to Mod. Classif. of Insects. London, 1839-40.
- Kirby, Monographia Apum Angliæ. 2 vols., Ipswich, 1802.
- Blackwall, British Spiders (Ray Society). Fol., Lond., 1861.
- Woodward, Manual of Mollusca. London, 1866.
- Forbes and Hanley, History of British Mollusca. 4 vols., London, 1853.
- Lovell Reeve, Conchologia Systematica. 4to, London, 1841.
- Mrs. Gray, Figures of Molluscous Animals. 5 vols. 8vo, London, 1857.
- Semper, Reisen im Archipel der Philippinen—(1) Holothurien, (2) Landmollusken, (3) Phyllobranchidæ, 1871, (4) Æolidien, 1870. Leipzig, 1868-71.
- Alder and Hancock, Monograph of Nudibranchiate Mollusca (Ray Society). Lond., 1845.
- Lacaze Duthiers, Histoire Naturelle du Corail. 8vo, Paris, 1864.
- Forbes, On Naked-eyed Medusæ. 4to, London, 1848.
- Cobbold, On Entozoa. London, 1864, and Suppl. 1869.
- Greene, Manuals of Cœlenterata, Lond., 1861, and Protozoa, Lond., 1863.

*b and c.*

- Sir Charles Bell, Bridgewater Treatise on the Hand. Lond., 1833.
- Strickland and Melville, The Dodo and its Kindred. Lond., 1848.
- Van der Hoeven, Recherches sur l'Hist. nat. des Limules. Fol., Leyden, 1838.
- Owen, Memoir on Limulus, Trans. Linn. Soc., 1872.
- Lyonnet, Traité anatomique de la Chenille, &c., 4to, La Haye, 1762 ; also his posthumous memoirs published by De Haan, including the Pupa and Imago of Cossus. 4to, Paris, 1832.
- Chabrier, Sur le vol des Insectes. 4to, Paris, 1823.
- Schiödte, On Structure of Mouth of Crustacea in Kroyer's Naturhistorisk Tidsskrift, Ser. iii. vol. iv, translated in Annals of Nat. History, January 1868.

## D. BOTANY.

Candidates offering Botany will be required to show a thorough acquaintance with the following subjects :—

1. Structural and Physiological Botany, together with dissections, and descriptions of preparations, illustrating the minute structure and organs of plants.

2. The Principles of Systematic Botany, with a knowledge of the leading characters of the more important Natural Orders.

3. Of Geographical and Geological Botany, so much as is contained, for example, in Henfrey's 'Elementary Course' (2nd ed.), or in Balfour's 'Manual of Botany.'

4. The technical description of specimens of plants.

The following Books are provisionally recommended :—

Henfrey, Elementary Course of Botany, 2nd ed., by Dr. Masters. London.

Balfour, Manual of Botany, last ed. Edinburgh.

Asa Gray, The Botanical Text-Book, last ed. New York.

Bentley, Manual of Botany, 2nd ed. London, 1870.

P. Duchartre, Éléments de Botanique. Paris, 1867.

Emm. Le Maout et J. Decaisne, Traité Général de Botanique. Paris. In course of translation.

Berkeley, Cryptogamic Botany. London, 1857.

Julius Sachs, Lehrbuch der Botanik. Leipzig, 1870.

Lindley, Vegetable Kingdom. London, 1853.

Lindley, Descriptive Botany. London.

Signed by order of the Board of Studies in the  
Natural Science School.

HENRY W. ACLAND,  
*Chairman.*

MAY 4, 1870.

## APPENDIX.

STATT. Tit. V. (VI.) Sect. I.

§ 6. *Of the Honour School of Natural Science.*

1. The subjects of examination in the Honour School of Natural Science shall be Physics, Chemistry, and Biology.

2. The Examination shall be divided into two parts: the one to be termed the Preliminary Honour Examination; the other to be termed the Final Honour Examination.

3. The Preliminary Honour Examination shall be compulsory upon all Candidates in the School, and shall be restricted to the more elementary parts of (1) Mechanics and Physics, (2) Chemistry, together with a practical examination of a simple character in the latter subject at least.

4. A Candidate shall be allowed to present himself for the Preliminary Honour Examination either on the occasion of his Final Honour Examination, or at any previous Examination in the Natural Science School subsequent to the time at which he passes his First Public Examination; and he shall be allowed to present himself for the Preliminary Examination in Mechanics and Physics at a different Examination from that in which he presents himself for the Preliminary Examination in Chemistry.

5. In the Final Honour Examination, a Candidate may offer himself for examination in one or more of the three general subjects of Physics, Chemistry, and Biology. The Final Honour Examination shall in each subject be partly practical.

6. The place assigned to a Candidate in the list of Classes shall depend upon the joint result, in the judgement of the Examiners, of his examination in all the subjects in which he offers himself for examination on the occasion of his Final Honour Examination, whether they be included in the Preliminary or Final divisions of the Examination.

7. The Final Honour Examination shall begin not later than seven days after the termination of the Preliminary Honour Examination; and, during the interval between the two parts of the Examination, a list of those who have passed the Preliminary Examination shall be issued by the Examiners, the subject or subjects in which each Candidate has passed being stated.

8. In the Final Honour Examination, a Candidate may, in addition to his general subject or subjects, offer himself for examination in special subjects included under any of the three general subjects of Physics, Chemistry, and Biology. These special subjects shall be selected by the Candidate from a list to be issued by the Board of Studies.

9. The Board of Studies for this School shall be—

The Regius Professor of Medicine,  
 The Sedleian Professor of Natural Philosophy,  
 The Professor of Botany,  
 The Professor of Experimental Philosophy,  
 The Professor of Mineralogy,  
 The Professor of Geology,  
 The Waynflete Professor of Chemistry,  
 The Linacre Professor of Physiology,  
 The Professor of Zoology,

together with the Examiners in the School for the time being, and all persons who have served as Examiners in the School within the two years preceding.

10. The Board of Studies shall issue a notice explanatory of the range of the subjects included in the Preliminary Honour Examination, and also a similar notice with respect to the Final Honour Examination; and shall have power, subject to the provisions of this statute, to revise such notices from time to time.

The Board shall also issue a list of the special subjects above mentioned, and have power to revise the same from time to time.

The Board shall also have power to frame, from time to time, regulations as to the conduct of the Examinations.