University Calendar.

MICHAELMAS, 1857.

UNIVERSITY OFFICERS.

Rector.

Very Rev. J. H. Newman, D.D.

Vice-Rector.

Vacant.

Professors, etc.

FACULTY OF THEOLOGY.

Allocation, *not fixed.*

Dean—Rev. Professor O'Reilly.

1. *Dogmatic Theology*—Rev. Father O'Reilly, D.D., S.J.
2. *Canon Law*—Very Rev. Laurence Forde, D.D.

FACULTY OF MEDICINE.

Allocation, £1,000.

Dean—Professor MacDermott.

1. *Theory and Practice of Surgery*—Andrew Ellis, F.R.C.S.I.
2. *Anatomy and Physiology*—Thomas Hayden, F.R.C.S.I., and Robert Cryan, L.R.C.S.I., and K. and Q.C.P.I.

3. *Practice of Medicine and Pathology*—Robert D. Lyons, M.B.T.C.D., L.R.C.S., M.R.I.A.
4. *Medical Chemistry*—W. K. Sullivan, D. Ph.
5. *Materia Medica*—Robert MacDermott, B.A., B.M., Trin. Coll. Dub., M. R.I.A.
6. *Medical Jurisprudence*—S. M. MacSwiney, M.D.; L. Dub. Coll. Phys.; M.R.C.S.E.
7. *Demonstrators of Anatomy*—Henry Tyrrell, L.R.C.S.I., and Francis Quinlan, L.R.C.S.I.

FACULTY OF PHILOSOPHY AND LETTERS.

Allocation, £2,000.

Dean—Professor Butler.

1. *Greek and Latin Literature*—Robert Ornsby, M.A.
2. *Greek and Latin Languages*—James Stewart, M.A.
3. *Irish Archæology*—Eugene Curry, M.R.I.A.
4. *Poetry*—D. F. M'Carthy.
5. *English Literature*—Thomas Arnold, M.A.
6. *Italian and Spanish Languages*—Signor Marani.
7. *French and German Languages*—M. l' Abbé Schürr.
8. *Ancient History and Geography*—Peter le Page Renouf.
9. *Modern History and Geography*—J. B. Robertson.
10. *Philosophy of History*—T. W. Allies, M.A.
11. *Political and Social Science*—Aubrey de Vere.
12. *Political Economy*—John O'Hagan, B.A.
13. *Geometry and Elementary Mathematics*—Edward Butler, M.A.
14. *Logic*—D. B. Dunne, D.D., D. Ph.
15. *Fine Arts*—J. H. Pollen, M.A.
16. *Catechist in Creed and Scripture*—Rev. W. G. Penny, M.A.

FACULTY OF SCIENCE.

Allocation, £1,000.

Dean—Professor Lyons.

1. *Mathematical Science*—Edward Butler, M.A.

2. *Natural Philosophy*—Henry Hennessy, M.R.I.A.
3. *Physiology*—Robert D. Lyons, M.B.T.C.D., L.R.C.S., M.R.I.A.
4. *Physical Chemistry*—W. K. Sullivan, D. Ph.
5. *Engineering*—Terence Flanagan, M.I.C.E.
6. *Architecture*—J. J. MacCarthy, M.R.I.A..

Secretary.

Thomas Scratton, B.A.

Examiners.

1. Rev. Father O'Reilly, D.D., S.J., Professor Dogmatic Theology.
2. Morgan W. Crofton, Esq., M.A., late Professor of Nat. Phil., Queen's College, Galway.
3. Robert MacDermott, M.B., Professor Materia Medica.
4. W. H. Scott, M.A., late Fellow of Brasenose College, Oxford.
5. Rev. Father Kelly, S.J.

Chaplains.

Rev. James Quinn, D.D.
Rev. Matthew Quinn, D.D.
Rev. Robert Dunne.
Rev. Hugh Macmanus, D.D.
Rev. James Doyle, D.D., Sacristan.

Preachers for the Session of 1856–57.

Residents.

1. The Rector.
2. The Professor of Dogmatic Theology.
3. The Professor of Canon Law.
4. The Dean of St. Patrick's House.
5. The Dean of St. Laurence's House.
6. The Dean of the University Church.

Deans and Tutors of Houses.

St. Patrick's House—Dean, Very Rev. M. Flannery, V.G.; Tutor, Vacant.

St. Mary's House (Rector's)—Dean, Rev. W. G. Penny, M.A.; Tutor, W. H. Scott, M.A.

St. Laurence's House—Dean, Rev. James Quinn, D.D.

Carmelite House—Dean, Very Rev. Father Bennett, O.C.C., Provincial.

CATHOLIC UNIVERSITY.

MEDICAL, ETC., BURSES.

The following Courses are prescribed respectively for Students holding Medical or Scientific Burses, and Students who contemplate entering the School of Civil Engineers.

COURSE OF STUDY FOR STUDENTS HOLDING MEDICAL BURSES.

FIRST YEAR.

Mathematics	Three Terms
Latin and Greek Languages	,,
English History, Language, and Literature	,,
Modern Languages	,,
Ancient History	,,

SECOND YEAR.

Logic	
Modern Languages	Three Terms
Latin	Two Terms
Modern History	Three Terms
Chemistry	,,

COURSE OF STUDY FOR STUDENTS PREPARING TO ENTER THE SCHOOL OF CIVIL ENGINEERS.

FIRST YEAR.

Mathematics	Three Terms
Latin and Greek	„
History and Geography	„
Modern Languages	„
Drawing	„

SECOND YEAR.

The same as for the first year, with the addition of Natural Philosophy.

PREPARATORY CLASSES.

By permission of the University Authorities, and with a view to the convenience of such members of the Catholic University as may be desirous of qualifying themselves for the Examinations prescribed for appointments in the various departments of the Public Service open to general competition, Courses of study for two years each have been arranged according to the following tables. It must be understood, that these Courses will admit of special modifications to suit the various requirements of individual students.

COURSE OF STUDY FOR THE CIVIL SERVICES.

FIRST YEAR.

Mathematics	Three Terms
English History, Language, and Literature	,,
Latin and Greek Languages	Two Terms
French	Three Terms

SECOND YEAR.

Mathematics	Three Terms
French	,,
Italian or German	,,
Modern History	,,
Latin and Greek	One Term
Logic; Moral and Political Science	

COURSE OF STUDY PREPARATORY TO EXAMINATION FOR APPOINTMENTS IN THE ROYAL ARTILLERY AND ENGINEERS.

FIRST YEAR.

Mathematics	Three Terms
Latin and Greek Languages	,,
Modern Languages	,,
History and Geography	,,
Drawing	

SECOND YEAR

The higher Mathematical and Physical Sciences	Three Terms
English History, Language, and Literature	,,
Latin and Greek Languages	,,
Modern Languages	,,
Logic; Moral and Political Science	
Drawing	
Chemistry, Mineralogy, and Geology	,,

FACULTY OF SCIENCE.

SCHEME OF STUDIES AND EXAMINATIONS FOR THE LICENCE IN SCIENCE.

Qualifications for Entering the Faculty.—No student can enter the Faculty of Science, except as an Auditor, unless he has taken a Scholar's degree in the Faculty of Philosophy and Letters. As it is optional with the candidates for that degree to present mathematics or not, and as a certain amount of knowledge of elementary mathematics is absolutely necessary to enable a student to profit by the lectures delivered by the Professors of the Faculty of Science, the student will have to show, previous to his admission to the Faculty, that he possesses a sufficient knowledge of the following subjects, unless he has already presented them at his Scholarship examination and passed creditably, viz.:—

Euclid's Elements of Geometry;
Algebra to Quadratic Equations, inclusively;
Plane Trigonometry;
Elements of Coördinate Geometry.

Qualifications for the Licence in Science.—Whether we look upon mathematics as an instrument of research, or as the science of space and number, it is obviously the basis of all accurate scientific knowledge, and should consequently constitute one of the most important elements of study in a faculty of science. If we recollect also how intimately woven up with one another are the various natural phenomena, and how

difficult, indeed oftentimes impossible, it is to decide to what branch of science a particular class of phenomena should be rightly assigned, it must be evident that, in order to thoroughly comprehend any one department of physical science, in its widest acceptation, we must be more or less acquainted with the elements of all the others. Thus a knowledge of chemistry would be very useful to the physicist, and would in many cases make his researches more fruitful of results than if he was ignorant of it; while it is impossible to study chemistry with profit without a thorough acquaintance with physics, or physiology without chemistry. With a view, therefore, of avoiding such an error as that of allowing students to devote themselves to the special study of any one branch of science, without a proper preparation, the Licence in Science will only be granted to those who shall show by examination proficiency in all the branches of science taught in the Faculty, viz:—

Pure Mathematics.
Mathematical Statics and Dynamics, and Kosmical Physics.
Experimental Sciences.
Natural Science.

In imposing this condition, it is sought to guard against another danger, namely, that the exclusive study of any branch of knowledge is apt to cramp the mind, and communicate to it a one-sidedness which would warp the judgment. The acquirement of a certain amount of knowledge of all the more important branches of science, preparatory to entering upon the special study of any one of them, will obviate this evil, while it will give the student a greater precision of ideas and grasp of mind. These observations apply with equal force to all students, whatever be their objects in entering the Faculty—whether for the pursuit of knowledge for

its own sake, or to qualify themselves for the duty of imparting instruction to others, or for professional or industrial purposes.

Course of Study.—The studies necessary for obtaining a Licence in Science will occupy two years. The following outline of the various courses to be delivered in the Faculty during that period, and in which the subjects of each year's course are indicated, will serve to convey an idea of the system of instruction to be pursued by the Faculty:—

Outline of the various Courses of Lectures to be delivered in the Faculty of Science.

I. MATHEMATICS.

FIRST YEAR.

Spherical Trigonometry—Theory of Equations.
Coördinate Geometry.
Elements of Differential and Integral Calculus.

SECOND YEAR.

Differential and Integral Calculus.
Calculus of Variations.—Calculus of Finite Differences.
Higher Geometry.
Higher Algebra.

II. PHYSICS.

FIRST YEAR.

1. GENERAL AND EXPERIMENTAL PHYSICS.

PRELIMINARIES.

Matter considered in its most simple properties.

FORCE.

Force, its definition and measurement. Composition and

resolution of parallel forces. Converging forces. Couples. Centre of Gravity. Simple machines.

MOTION.

Relations between time, space, and velocity. Laws of falling bodies. Motion in curves. Quantity of motion. Rotation. Definition and measurement of useful work in machinery.

EQUILIBRIUM AND MOTION OF FLUIDS.

Equilibrium of fluids. Level surfaces. Principle of Archimedes. Floating bodies. Equilibrium of elastic fluids. Physical constitution of the atmosphere.

Motion of fluids. Laws of fluid motion in tubes and channels. Waves.

HEAT.

Dilatation of solids, liquids, and gases. The thermometer. Conduction of heat. Radiation. Latent heat. Specific heat. Fusion and solidification. Evaporation and condensation. Tension of vapours. Dynamical theory of heat.

SOUND.

Propagation of sound in solids, liquids, and gases. Waves in elastic bodies. Nodal points, lines, and surfaces. Reflexion and refraction of sound. Physical theory of music.

LIGHT.

Laws of the propagation and intensity of light. Reflexion and refraction. Indices of refraction. Prisms and lenses. Dispersion of light. Diffraction telescope and microscope. General theory of vision. Double refraction. Polarization by reflexion and refraction. Circular polarization. Epipolic dispersion. Connection of these phenomena with the molecular conditions of different bodies.

ELECTRICITY.

Electrical attractions and repulsions. Conduction. Distribution of electricity. Induction. General theory of statical electricity.

Magnetic attractions. Poles. Magnetic curves. Action of the Earth on magnetic needles.

Electricity considered in a dynamical state. Voltaic batteries. Influence of a current on the magnetic needle. Action of a magnet on electric currents. Attractions and repulsions of currents. General theory of dynamical electricity. Connection of electricity and magnetism. Electrodynamic induction. Diamagnetism. Sources of electricity. Connection of heat, light, and electricity.

MOLECULAR ACTIONS.

Capillary attraction. Endosmose and exosmose. Crystallographic forms. Elasticity. Mutual dependence and connection of the physical properties of matter.

SECOND YEAR.

2. MATHEMATICAL STATICS AND DYNAMICS.

STATICS.

Equilibrium of a point on a given surface. General equations for the equilibrium of a solid body.

Theory of moments.

Attractions of spheroids.

DYNAMICS.

Equations for the motion of a point. Projectile motion in a circle.

Motion of two mutually attracting bodies.

Motion of a point on a given surface.

The pendulum.

Equations for the motion of a solid body.

Rotation.

Moments of inertia, and their relations to the principal axes of solid bodies.

General principles of dynamics.

EQUILIBRIUM OF FLUIDS.

General equations. Level surfaces. Application to elastic fluids.

FLUID MOTION.

Equations of motion in incompressible fluids, with applications. Motions of elastic fluids.

SECOND YEAR.

3. KOSMICAL PHYSICS.

Spherical appearance of the heavens. Grouping of the stars. Star systems. Apparent motion of the stars. Motions of the sun and planets. Methods for deducing the true from the apparent motions. Parallax. Refraction. Aberration. Precession and nutation. Physical aspect of the sun, moon, and planets. Comets. Double stars. Coloured stars. Nebulæ.

Terrestrial latitudes and longitudes.

Determination of the figure and dimensions of the earth from geodesical measurements. Use of the pendulum and barometer in studying the structure and figure of the earth. Universal gravitation. Statics of our planetary system. The figures of the planets and their satellites. Dynamics of the heavenly bodies. Motions of the planets and satellites. Motions of the comets. Motions of double stars. Proper motions of the stars. Rotation of the heavenly bodies around

their centres of gravity. Connexion between the statical and dynamical conditions of the earth and its internal structure. Proofs of the original fluidity of the earth. Proof of the fluid condition of the interior of the earth at the present day. Reaction of the interior fluid mass on the exterior solid crust. Elevation of mountains, islands, and continents. Volcanos and earthquakes. Variations in the distribution of land and water at the earth's surface. Tides and currents. Terrestrial climate. Isothermal lines, and the causes which influence their configuration. Motions of the atmosphere. Winds and storms. Hygrometric condition of the atmosphere. Rain and dew. General view of the laws and phenomena of terrestrial magnetism. Connexion between these phenomena and the internal structure of the globe. Influence of the sun and moon on magnetic phenomena.

III. CHEMISTRY.

FIRST YEAR.

1. GENERAL THEORETICAL CHEMISTRY.

Generalities. Chemical equivalents; nomenclature and notation.

History, preparation, physical and chemical properties of each of the metalloids. Most important of the compounds formed by the metalloids with one another.

Laws of combination by weight and volume, deduced from the study of the combinations of the metalloids. Establishment of the equivalents of the metalloids from their combinations.

Physical and chemical properties of the metals. Combinations of the metals with one another. Alloys.

Action of oxygen, sulphur, chlorine, etc., upon metals. Physical and chemical properties of oxides, sulphides, chlorides, etc.

Salts.

Generalities on organic substances. Proximate and elementary analysis of organic bodies.

Ternary proximate principles of plants:—Cellulose, starch, inuline, dextrine, gums, pectin and other gelatinous principles of plants, sugars, mannite, glucosides.

Alcoholic fermentation—alcohol and ether. Simple and compound ethers; alcohols. Volatile acids derived by oxidation from alcohols. Aldehydes, acetones, etc., and the acids related to them.

Non-volatile organic acids which yield pyrogenous acids by the action of heat. Pyrogenous acids derived from non volatile organic acids.

Organic alkalies or alkaloids.

Essential oils, camphors, resins, etc.

Carbides of hydrogen.

Neutral fat bodies.

Animal bodies.

SECOND YEAR.

2. PHYSIOLOGICAL CHEMISTRY.

Comparative chemical composition of different natural families of plants. Relation between the form and composition of plants.

Comparative chemical composition of the different tissues and fluids of animals.

SECOND YEAR.

3. CHEMICAL PHYSICS.

Elementary principles of crystallography.

Chemical relations of heat: Influence of chemical composition upon the dilatation of bodies. Maximum density of

saline solutions. Relation between the fusing and boiling points of bodies, and their composition. Elastic force and density of gases and vapours. Relation between the specific heat of bodies and their chemical equivalents. Heat developed by chemical combination. Thermo-chemical laws. Calorimetry. Different methods employed to determine the specific heat and the heat of combination of bodies. Theories of combustion. Chemical relations of radiant heat.

Chemical relations of light: chemical and molecular changes induced in bodies by the action of light. Influence exerted by bodies upon the refrangibility of light. Rotatory or circular polarization of liquids and gases. Correlation between crystallographic form and optical properties.

Electro chemistry: Chemical properties of electricity. Chemical action of electrical discharges. Laws of electro-chemical decomposition. Different kinds of voltaic batteries. Electro-chemical theories. Classification of bodies founded upon their electrical relations.

Chemical statics and dynamics.

Molecular constitution of bodies.

Stœchiometry.

IV. MINERALOGY.

SECOND YEAR.

Generalities. Morphology of minerals. Structure of minerals—crystalline, spheroidal, and amorphous states of aggregation.

Physical characters of minerals:—Cleavage and fracture; hardness; tenacity; specific gravity; magnetism; electrical properties; optical properties; lustre; colour; pellucidity; phosphorence.

Chemical properties of minerals. Chemical constitution

of minerals. Equivalents of minerals—formulæ. Influence of chemical constitution upon form, etc.:—Dimorphism; isomorphism; allotropism; isomorphic replacement; polymeric isomorphism. Determination of minerals.

Classification and physiography of minerals.

V. GEOLOGY.

SECOND YEAR.

(GEOGNOSY, *or the chemical and mechanical structure of the Earth's crust, and the changes which it undergoes from the action of chemical and mechanical agencies*).

1. LITHOLOGY. Minerals which form rocks. Division of rocks into: mechanically formed rocks, organically formed rocks, metamorphic or altered rocks, and crystallized rocks.

Water as a geological agent:—Mechanical action of water in the solid and liquid state. Chemical action of water in the liquid and gaseous state.

The atmosphere as a geological agent.

Geological agency of Heat.

Pseudomorphism. Paragenesis of minerals. Comparative physiography of the minerals of different geological districts.

2. PETROLOGY. Stratification; lamination; joints; spheroidal and columnar structure; cleavage, etc.

Modes of occurrence of igneous rocks.

Phenomena connected with the elevation and depression of rock masses:—Faults, fissures, dykes, veins, etc. Unconformability of rocks. Mineral veins.

Changes produced by the action of water upon rock masses.

Metamorphic action of heat.

Classification of rocks.

VI. PHYSIOLOGY.

FIRST YEAR.

Relations of the animal and vegetable kingdoms.

Outlines of the history of the animal kingdom, recent and remote.

Animals as distinguished from plants.

Organization and life of animals.

General view of animal kingdom.

Structure of animals.

Skeletoid and A-skeletoid animals.

Archetype skeleton. Osseous system of animals.

SECOND YEAR.

Of the fluids of the animal system.

Of the circulating fluid and the laws of the circulation.

Of the digestive system, and of digestion, assimilation, nutrition, growth, and metamorphosis of tissues.

Of the respiratory system, and of respiration.

Of the nervous system, of the brain, spinal cord, etc.

Histomorphism or Elementary Form and Structure of tissue.

Of Histo-genesis and Histolysis.

Special Histo-morphism or Histology of the Blood and fluids generally, and of the solid tissues.

Outlines of Economic Physiology—Animal and Vegetable.

Examinations.—At the end of two years spent in these studies, an examination will be held, at which the student must satisfy the examiners that he has attained sufficient proficiency to qualify him for his licence. But, as the student's proficiency may entitle him not only to his licence, but also to honours, the examination will be so conducted as to afford him an opportunity of establishing his claim to the latter. It will, therefore, have a double scope, to ascertain whether

he has reached (1) the standard of *necessary* proficiency; or (2) that of *meritorious* proficiency.

Examinations for necessary proficiency.—In order to determine whether the student is profiting by his studies, and especially if he is in the way to obtain his licence, it is proposed that an examination similar to the Inceptorship examination in the Faculty of Philosophy and Letters, be held at the end of the first year, in the following subjects, which constitute accordingly the first year's course, as already indicated.

1. Elementary Mathematics.
2. General Experimental Physics.
3. General Theoretical Chemistry.
4. Elementary Physiology.

If the student passes creditably in these subjects, he may enter upon the second year's course, the subjects of which are:—

1. The higher Mathematics.
2. Mathematical Statics and Dynamics.
3. Kosmical Physics.
4. Chemical Physics.
5. General Physiology and Physiological Chemistry.
6. Mineralogy and Geology.

The subjects for *necessary* proficiency at the final examination for the license in Science will consist of

1. Mathematical Statics and Dynamics.
2. Kosmical Physics.
3. Chemical Physics.
4. General Physiology and Physiological Chemistry.
5. Mineralogy and Geology.

Examination for Honours.—After the candidate has creditably passed his examination in the five subjects just men-

tioned, and obtained his licence, he may become a candidate for honours. Two at least of the subjects taught in the faculty must be presented for the honour examination, and the candidate is at liberty to select any two he pleases. With the view of guiding the student, and encouraging the special study of sciences which have an intimate relationship, the following scheme, in which the cognate sciences are grouped together, is suggested for selection:—

1. { Higher Mathematics.
   Mathematical Statics and Dynamics, and Kosmical Physics.

Or 2. { Kosmical Physics, Mathematical Dynamics and Statics.
   Experimental Physics.

Or 3. { Experimental Physics.
   Theoretical Chemistry and Chemical Physics.

Or 4. { Theoretical Chemistry (chiefly *inorganic*).
   Mineralogy and Geology.

Or 5. { Theoretical Chemistry (chiefly organic).
   Physiology.

There is of course no objection to a student presenting more than two subjects, or all if he chooses.

Exhibitions.—With the view of still further promoting a higher cultivation of science, burses will be established in connection with the different subjects taught in the Faculty, which will be open to competition to those licentiates in science who have obtained honours in any of the subjects in the preceding lists. These burses may be held for three years, that is, until the student is in a position to proceed to his fellowship examination, subject, however, to the condition that the holder of the burse must act as assistant to the professor of that science in connection with which he holds his burse.

Higher degrees.—If the student desires to obtain the

higher collegiate degree of Fellowship in Science, he may, after he has obtained his license, and thus prepared himself for the special study of one or more branches of science, enter upon the study of those which he intends to present for his fellowship examination, which, unlike that of licentiate, will be granted for superior knowledge in special subjects, such as the higher mathematics, physics, chemistry, or physiology.

Practical Instruction.—It being now universally admitted that the higher instruction in science can only be given where the most ample means are afforded, not only of illustrating the lectures of the professors, but of enabling all the students to become practically conversant with the methods of investigation adopted in each science, the Faculty of Science will be provided with an Observatory, Laboratories, Zoological, Botanical, and Mineralogical Cabinets. The Physical Cabinet has been already furnished with some of the principal apparatus required for the illustration of experimental Physics. The Chemical Laboratory, now completed, and which will be ready for the reception of students in the next session, is not inferior to the best laboratories of other Universities, and will, it is to be hoped, afford students every facility for the cultivation of that important and practically useful science, Chemistry. The other laboratories will be fitted up in a corresponding manner. Cabinets of Natural History and Mineralogy can only be formed by the slow growth of time; but already some progress has been made to provide the *necessary* part of the mineral collections, and steps will be taken towards the early establishment of the others.