The Ministry of Finance hereby approves the foregoing Regulations.

Sealed with the Official Seal of the Ministry of Finance for Northern Ireland this 27th day of August, nineteen hundred and fifty-nine.

(L.S.) *K. R. Shimeld,*
Assistant Secretary.

EXPLANATORY NOTE

(This note is not part of the Regulations, but is intended to indicate their general purport.)

The existing Regulations provide for a married woman teacher being absent for a period of not less than 18 weeks during the period preceding and succeeding child-birth. This amendment provides for the reduction of this period in exceptional circumstances, e.g., where the child does not live and it is desirable in the interests of the teacher that she should return to duty as soon as possible.

1959. No. 149

As this Order has been classified as local it is not printed at length in this volume. A summary is given in the List of Statutory Rules of a Local Character under the heading GAS.

1959. No. 150 **[C]**

PHARMACY AND POISONS

The Pharmaceutical Society of Northern Ireland

REGULATIONS, DATED 1ST SEPTEMBER, 1959, MADE BY THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF NORTHERN IRELAND, WITH THE APPROVAL OF THE MINISTER OF HOME AFFAIRS, UNDER SECTION THREE OF THE PHARMACY AND POISONS ACT (NORTHERN IRELAND), 1925.

The Council of the Pharmaceutical Society of Northern Ireland, in exercise of the powers conferred on it by Section Three of the Pharmacy and Poisons Act (Northern Ireland), 1925(a), and of every other power enabling it in that behalf, hereby makes the following regulations:—

Citation and Interpretation

1.—(1) These regulations may be cited as the Pharmaceutical Society of Northern Ireland (General) (No. 2) Regulations, 1959, and shall come into operation on 1st October, 1959.

(a) 15 & 16 Geo. 5, c. 8 (N.I.).

(2) In these regulations:—

"The Act" shall mean the Pharmacy and Poisons Act (Northern Ireland), 1925.

"The Act of 1945" shall mean the Medicines, Pharmacy and Poisons Act (Northern Ireland), 1945(a).

"The Council" shall mean the Council of the Society.

"The President" shall mean the President of the Society.

"The Secretary" shall mean the Secretary of the Society.

"The Society" shall mean the Pharmaceutical Society of Northern Ireland.

"The Statutory Committee" shall mean the Statutory Committee of the Pharmaceutical Society of Northern Ireland.

"The Treasurer" shall mean the Honorary Treasurer of the Society.

"The Vice-President" shall mean the Vice-President of the Society.

Revocation

2. The Pharmaceutical Society of Northern Ireland (General) Regulations, 1956(b), and The Pharmaceutical Society of Northern Ireland (General) Regulations, 1959(c), are hereby revoked provided however that the Pharmaceutical Society of Northern Ireland (General) Regulations, 1946(d), and the appendices thereto and the Pharmaceutical Society of Northern Ireland (General) Regulations, 1954(e), as kept in force by Regulation Two and The Pharmaceutical Society of Northern Ireland (General) Regulations, 1956, shall remain in force and apply to candidates registered as apprentices before the 1st day of January, 1956, who, having passed the Final Part I Qualifying Examination before the 1st day of July, 1960, present themselves for, and pass, the Final Part II Qualifying Examination before the 30th day of June, 1962.

Finance

3. All sums of money received by the Treasurer in any year by way of penalties under the provisions of subsection (5) of section thirty-five of the Act of 1945 shall form part of the general funds of the Society.

4. The fees payable for registration under section seven of the Act as a Pharmaceutical Chemist, Chemist and Druggist or Registered Druggist shall be two guineas and as a Student four guineas.

5. Where the name of any registered person has been struck off a Register by the direction of the Statutory Committee, the fee payable, if any, for the restoration of such name to the register shall be two guineas.

6. The Retention Fee under section eight of the Act of 1945 payable annually by a Member of the Society in respect of the retention of his name on the Register shall be two guineas; by an Associate of the Society, two guineas, and by a Student of the Society, five shillings. The Retention Fee shall be due and payable on the first day of September in each year. Provided that any Member who became a Life Member prior to the 24th May, 1945, shall not be required to pay a Retention Fee.

(a) 1945. c. 9.
(b) S.R. & O. (N.I.) 1956, No. 115.
(c) S.R. & O. (N.I.) 1959, No. 48.
(d) S.R. & O. (N.I.) 1946, No. 37.
(e) S.R. & O. (N.I.) 1954, No. 62.

7. The penalty under subsection (4) of section eight of the Act of 1945 (for default in payment of the Retention Fee) shall be:

(*a*) in respect of a Member or Associate, the sum of One Guinea; and

(*b*) in respect of a Student, five shillings.

8. The fee to be paid in respect of the issue of a Certificate of Registration, under the proviso to subsection (1) of section nine of the Act of 1945, by a person who has satisfied the Secretary that the original Certificate has been lost or destroyed shall be ten shillings.

Students

9.—(1) A candidate applying to be registered as a student of the Society shall furnish the Council with documentary evidence of having passed in the following subjects of one of the recognized examinations:

English Language, a Mathematical subject, Physics, Chemistry, and any other subject, provided, however, that,

(*a*) the five subjects must have been passed on one and the same occasion, or

(*b*) if the five subjects have not been taken at the one occasion then at least one of the subjects must have been passed at advanced (or higher) level, or marks equivalent to the credit standard in the Grammar School Senior Certificate Examination of the Ministry of Education for Northern Ireland must have been obtained in at least two of the subjects taken at ordinary (or lower) level.

(2) For the purpose of this Regulation the following examinations are recognized by the Council:

The Grammar School Senior Certificate Examination of the Ministry of Education for Northern Ireland.

The Leaving Certificate Examination of the Scottish Education Department.

The General Certificate of Education Examination of the following examining bodies:—

University of Bristol.
University of Durham.
University of London.
Cambridge Local Examinations Syndicate.
Oxford and Cambridge Schools Examination Board.
Oxford Local Examinations Delegacy.
The Associated Examining Board for the General Certificate of Education.
Joint Matriculation Board of the Northern Universities.
Southern Universities Joint Board for School Examinations.
Welsh Joint Education Committee.

10. Upon acceptance of a candidate the Council shall require him to forward to the Secretary:

(*a*) a fee of four guineas as prescribed in regulation 4;

(*b*) a copy of his certificate of date of birth;

and on receipt of same a certificate that he has been registered as a student will be sent to him.

Regulations for the Part I Qualifying Examination

11. The examination shall be held yearly commencing in or about the third week in June and, if deemed necessary, upon such further occasions as the Council may decide of which sufficient notice shall be given to students.

12. The subjects of the examination shall be Biology, Chemistry and Physics. The examination shall be conducted in accordance with the syllabuses set out in Appendix A to these Regulations.

13. A candidate will not be permitted to enter for the examination unless he:

(*a*) is registered as a student

(*b*) attends, subsequent to his registration as a student, at an Institution approved by the Council for giving instruction for the examination, an approved course of instruction of a session of three terms in Biology, Chemistry and Physics and submits a certificate on the official form that he has carried out the work of the course to the satisfaction of the Principal or other duly authorised person.

14. The fee to be paid for entry to the examination shall be:—

(*a*) for the first time of entry ... ... Six Guineas

(*b*) for any subsequent entry ... ... Four Guineas

and shall be paid when applying to enter for the examination.

15. A student who fails to satisfy the Board of Examiners owing to weakness in one subject only of the examination may present himself for examination in that subject only if permitted by the Board of Examiners so to do. A student who satisfies the Board of Examiners in the subjects of the examination and otherwise complies with the provisions of these Regulations shall have passed the examination.

16. A student who has passed the Part I Qualifying Examination shall enter into Articles of Pupilage with an employer for the period of apprenticeship and the Articles of Pupilage shall contain the provisions of the Draft Articles of Pupilage set out in Appendix C hereof or provisions to the like effect.

17. The Council, on the advice of the Board of Examiners, are hereby empowered to require a student who has failed to pass Part I of the Qualifying Examination on the first or any subsequent occasion to undertake an approved course of study in one or more subjects before being permitted to enter for the examination on any future occasion. If a student shall have failed on three occasions to pass Part I of the Qualifying Examination he shall not normally be entitled to enter for the said examination on any future occasion, provided always that the Council, if the Board of Examiners so recommend, may allow such student to enter for the said examination on one more occasion only.

Regulations for the Part II Qualifying Examination

18. The examination shall be based on a course of study extending over two years and shall be divided into two parts, Part A and Part B.

An examination in each part shall be held yearly commencing in or about the third week in June and, if deemed necessary, upon such further occasions as the Council may decide of which sufficient notice shall be given to candidates.

19. The subjects of the examination shall be:—

Part A: PHARMACEUTICAL CHEMISTRY I, PHARMACEUTICS I, PHARMACOGNOSY, and PHYSIOLOGY.

Part B: PHARMACEUTICAL CHEMISTRY II, PHARMACEUTICS II, and PHARMACOLOGY.

Each part of the examination shall be conducted in accordance with the syllabuses set out in Appendix B of these Regulations.

20. The fee to be paid for entry to either Part A or Part B of the examination shall be three guineas for each subject.

21. A student shall not be permitted to enter for either part of the examination unless he:—

(*a*) has passed the Part I Qualifying Examination.

(*b*) submits a declaration made and signed by a pharmaceutical chemist who in the opinion of the Secretary is able to verify from personal knowledge the facts set out in the declaration that he has completed at least 18 months of his two years course of practical training in accordance with the Regulations appended to the draft Articles of Pupilage in Appendix C of these Regulations. The declaration shall state the address of the place at which the course was undergone and shall be valid only if the course was undergone by the candidate subsequent to his passing the Part I Qualifying Examination and while serving under Articles of Pupilage in accordance with Regulation 16 and except for a reason satisfactory to the Council only if the course was subsequent to the Articles of Pupilage having been endorsed by the Secretary and a copy having been lodged with him.

(*c*) submits a certificate on the official form signed by the Principal or other duly authorised person of an Institution approved by the Council for the purpose of giving instruction for the examination, that the student has regularly attended at the Institution an approved course of study leading to Part A or Part B of the examination as the case may be and that he has carried out the work of the course to the satisfaction of the Principal or other duly authorised person.

22.—(1) A student shall present himself for examination in all the subjects of that part of the examination for which he enters provided that a student who has satisfied the Board of Examiners in not less than two subjects of Part A of the examination at a previous entry shall not be required to present himself again for examination in those subjects.

(2) A student who fails to satisfy the Board of Examiners in one only of the subjects of Part A of the examination shall re-attend the course of instruction in that subject if the Council, on the advice of the Board of Examiners, so direct and may, when again presenting himself for examination in that subject, also present himself for examination in Part B of the examination.

(3) A student who fails to satisfy the Board of Examiners in two only of the subjects of Part A of the examination shall be required to re-attend the course of instruction in those subjects before again presenting himself for examination and may, at the same time, attend the lectures in pharmacology and be examined in that subject together with the two remaining subjects of Part A.

(4) A student who fails to satisfy the Board of Examiners in three or more of the subjects of Part A of the examination shall be required to re-attend the course of instruction in all the subjects of Part A of the examination before again presenting himself for examination.

(5) A student who fails to satisfy the Board of Examiners in one or more of the subjects of Part B of the examination shall be required to re-attend the course of instruction in the subject or subjects before again presenting himself for examination.

23. A student who satisfies the Board of Examiners in all the subjects of Part A and Part B of the examination and otherwise complies with the provisions of the Pharmacy and Poisons Acts (Northern Ireland), 1925 to 1955, shall be granted a certificate entitling him to be registered as a pharmaceutical chemist.

24. A person who submits to the Council documentary evidence that he has passed the final examination for the degree of pharmaceutics of the Queen's University, Belfast, obtained under conditions approved by the Council shall be deemed to have satisfied the Board of Examiners in such of the subjects or parts of the subjects of the examination as the Council may from time to time determine and may be permitted to present himself for examination in any remaining subjects or subject or part of a subject only and upon satisfying the Board of Examiners shall be granted a certificate of qualification to be registered as a Pharmaceutical Chemist under the Pharmacy and Poisons Acts (Northern Ireland), 1925 to 1955, provided that no such certificate shall be issued to a student until he has produced to the Secretary, if he has not already done so, a copy of his certificate of date of birth showing that his age is not less than 21 years and a declaration that he has undergone a course of practical training referred to in Regulation 20.

For the acceptance of evidence under this regulation a fee of six guineas shall be paid and such fee shall be deemed to include the fee payable for entry to the examination in any remaining subjects or subject or part of a subject for the first time.

General

25. Application to enter for the Part I Qualifying Examination or for either Part A or Part B of the Part II Qualifying Examination shall be made to the Secretary on or before the first day of the month preceding that in which the examination is to be held, accompanied by the prescribed fee. Students will receive due notice of the dates and times on which they will be required to present themselves for examination.

26. A student who has entered for one or more of the examinations referred to in the preceding regulation but fails to present himself and submits, within a reasonable time, proof satisfactory to the Council that his absence was due to illness or other unavoidable cause shall have the fee refunded.

27. When any Examiner appointed by the Council is unable to conduct the examination at the proper time, the President, or in his absence, the Vice-President, shall have power to appoint a substitute who shall for that examination only discharge the duties of the Examiner originally appointed, provided that such appointment shall be subject to the approval of the Minister of Home Affairs.

Sealed with the Common Seal of the Pharmaceutical Society of Northern Ireland this first day of September, nineteen hundred and fifty-nine, in the presence of

(L.S.) J. CALDWELL, Vice-President.
W. GORMAN, Secretary.

I, the Right Honourable W. W. B. Topping, Minister of Home Affairs for Northern Ireland, in pursuance of the powers vested in me by sub-section (2) of Section Three of the Pharmacy and Poisons Act (Northern Ireland), 1925, and after consultation with the Minister of Education for Northern Ireland, hereby approve of the foregoing Regulations.

Dated this 8th day of September, nineteen hundred and fifty-nine.

W. W. B. TOPPING.

APPENDIX A

Syllabuses for the Part I Qualifying Examination

BIOLOGY

(Examination in this subject comprises two written sessions each of three hours' duration covering Botany and Zoology respectively and two practical sessions each of three hours' duration covering Botany and Zoology respectively. The Examiners are not precluded from asking candidates oral questions during the practical sessions.)

BOTANY

The distinction between living and non-living matter and the general differences between plants and animals. The morphology of Dicotyledons and Monocotyledons, with special reference to food storage and vegetative reproduction.

Cell-structure; nuclear and cell division in broad outline. The anatomy and histology of roots, stems and leaves of the Angiosperms and of *Pinus*. Meristems and secondary growth, including the origin and characters of periderm.

Flower structure. The principles of the classification of plants as illustrated by the families *Ranunculaceae, Cruciferae, Rosaceae, Leguminosae, Umbelliferae, Labiatae, Solanaceae, Scrophulariaceae, Primulaceae, Compositae, Liliaceae* and *Amaryllidaceae*. Pollination; fertilisation, its significance and consequences. The general characters of fruits and seeds.

The elements of plant physiology: the relation of the plant to the soil; the nitrogen cycle; absorption of water and mineral salts; transpiration and conduction of water; photosynthesis; translocation of storage of foods; enzymes and enzyme action; respiration and fermentation; energy relations; germination; growth and response, the latter illustrated by geotropism and phototropism. Saprophytism and parasitism.

A knowledge of the chief divisions of the Plant Kingdom as exemplified by the following:—

Structure and life-history of *Chlamydomonas* and *Spirogyra*. General habit and life-history of *Fucus*, but excluding details of vegetative structure. Structure, nutrition, reproduction, and economic importance of the bacteria, and of *Mucor, Cystopus, Saccharomyces, Penicillium, Aspergillus* and *Psalliota*. Life-cycle of a liverwort, a moss, a fern (*Dryopteris*) and *Selaginella* (excluding details of internal structure). Life-cycle of *Pinus*.

The elementary facts of heredity (simple Mendelian segregation and independent assortment).

Practical Examination

The candidate must be prepared:—

(*a*) To dissect, and to describe with labelled drawings, any plant or part of a plant, subject to the limitations prescribed in the syllabus above.

(*b*) To make microscopical preparations, using simple staining methods only, and to prepare accurate drawings from these preparations. Special importance is attached to accurate drawing and identifications of tissues under a high power.

(*c*) To describe with labelled drawings and to identify preparations provided.

(*d*) To conduct, or comment on, experiments illustrating the elements of plant physiology.

The candidate will be required to bring to the Practical Examination his original laboratory notebooks, duly signed by the teacher, for the inspection of the Examiners. These notebooks must be taken away at the close of the examination. The use of books is not permitted in the practical examination.

ZOOLOGY

The structure of the animal cell. Cell division. The differences between plants and animals.

The general structure, physiology, and life-history of the following:—

Amoeba, Euglena—non-cellular (unicellular) organisations, *Hydra, Aurelia. Earthworm, Cockroach,* and *Bee* as principal invertebrate types. An elementary knowledge of a *Bivalve Mollusc* and *Starfish.* The *Dogfish, Frog* and *Guinea Pig* as principal vertebrate types with an elementary knowledge of the *Lizard* and *Bird* (Pigeon).

The elementary morphology and physiology of these animals to be considered comparatively. *A knowledge of vertebrate musculature and details of the skeleton of Dogfish, Lizard and Pigeon will not be required.*

An elementary knowledge of the general characters, histology and function of tissues and organs as illustrated by epithelia, blood, lymph, nervous, muscular, areolar cartilage and bone tissues. The intestine of the frog, the liver and kidney of the mammal, the skin of the frog and mammal. The spinal cord, pancreas, lung, ovary and testis of mammal.

(*a*) Animal parasitism as illustrated by the life-histories and habits of *Trypanosomes, Malarial Parasite, Entamoeba, Liverfluke, Tapeworm, Ascaris and related species, Warble Fly, House Fly, Bed Bug, Lice, Flea* and *Tick.*

(*b*) Plant parasitism as illustrated by the life-histories and habits of *Eelworms, Aphids,* and *Craneflies.*
Mention should be made as to the possible treatments and control of these parasitic forms.

The general phenomena of sexual and asexual reproduction as shown in the life-histories of the animals named above. The history and characters of germ cells. An outline of the development of the frog up to the formation of the three primary germ layers and a general account of metamorphosis.

The elementary facts of heredity—simple Mendelian segregation and independent assortment. Organic evolution and the nature of the evidence supporting it.

Practical Examination

The practical work will be based on the above syllabus and include:—

(*a*) The making of dissections.

(*b*) The identification and description of microscopical preparations of *Amoeba, Euglena, Hydra, Aurelia, Earthworm, Tapeworm, Ascaris, Liverfluke.* Mouth parts and tracheae of Cockroach. Mouth parts and ovipositor of *Hen, Warble Fly, House Fly, Bed Bug, Lice, Flea, Aphid, Tick* and

Eelworm. Also blood, cartilage, bone, muscle, spinal cord, intestine of frog, the liver, kidney, pancreas, lung, ovary and testis of mammal. The skin of *Frog* and mammal.

(*c*) The general external features and internal anatomy as shown in special dissections of the following types:—

Earthworm: general dissection—and in more detail, the alimentary canal and nervous system.

Cockroach: mouth parts only.

Dogfish: alimentary canal; heart, afferent and efferent branchial vessels; brain and cranial nerves; urogenital system; examination of thick cross-sections of pharynx and tail.

Frog: alimentary canal; heart and principal vessels of the arterial and venous systems, central nervous system and spinal and sympathetic nerves; urogenital system.

Guinea Pig: alimentary canal; lungs and principal vessels of the arterial and venous systems; urogenital system.

Guinea Pig's heart.

(*d*) The salient features of the mammal skeleton (excluding skull).

(*e*) The salient features of the dog skull.

(*f*) The preparation of simple permanent stained mounts.

(*g*) The examination of whole mounts and representative sections through the frog from the early stages of development to the time of the first appearance of the external gills. An examination of any mammalian embryo in the uterus to illustrate the arrangement of the embryonic membranes prior to birth.

The candidate will be required to bring to the Practical Examination his original laboratory notebooks, duly signed by the teacher, for inspection should the Examiners so desire. These notebooks must be taken away by the candidate at the close of the examination. The use of books is not permitted in the practical Examination.

CHEMISTRY

(Examination in this subject comprises one written session and one practical session each of three hours' duration. The Examiners are not precluded from asking candidates oral questions during the practical session.)

General and Inorganic Chemistry

Determination and uses of equivalent, atomic and molecular weights; symbols, formulae and equations; nomenclature. An elementary treatment of atomic structure and electronic theory of valency; periodic classification of elements.

Chief methods of preparation and reactions of the following non-metallic elements and compounds: hydrogen, oxygen, ozone, water, hydrogen peroxide, fluorine, chlorine, bromine, iodine, and related hydrides and oxy-acids; nitrogen, oxides of nitrogen, nitrous acid, nitric acid, ammonia and ammonium salts; sulphur and its oxides, sulphurous and sulphuric acids, thiosulphates, hydrogen sulphide; phosphorus and its oxides and oxy-acids, phosphine and the chlorides of phosphorus; carbon and its oxides, carbonic acid and salts, cyanides; silica, silicates; boric acid, borates.

The source, extraction, properties and uses of the following metals, with the preparation, properties and uses of the compounds indicated:

Sodium, potassium, magnesium, barium, strontium, calcium, zinc, copper, lead, silver, and their chlorides, sulphates, nitrates, carbonates, oxides and hydroxides, sulphides. Cadmium; cadmium sulphide and chloride. Mercury; mercuric and mercurous oxides, chlorides, nitrates and sulphides. Aluminium; oxides

and hydroxides, sulphates and alums. Chromium; oxides, chromates and dichromates. Iron; ferrous and ferric oxides and hydroxides, chlorides, sulphates, sulphides. Cobalt: oxides, carbonate, sulphide. Nickel; hydroxide, sulphide. Manganese; oxides, sulphates, carbonates, chlorides, manganates and permanganates. Antimony and arsenic; oxides, hydrides, sulphides. Bismuth; carbonate, chloride, sulphide, nitrate. Tin; stannous and stannic oxides, chlorides, sulphides. Gold.

Physical Chemistry

Laws of Boyle, Charles, Avogadro, Gay-Lussac, Graham; Dalton's law of partial pressures; kinetic theory of gases; ideal gas equation; van der Waals' equation; determination of molecular weights of gases and vapours; solubility of gases, Henry's law; Raoult's law; osmotic pressure; determination of molecular weight of solutes.

Chemical equilibrium and the law of mass action. Le Chatelier's principle; exothermic and endothermic reactions, Hess's Law; rate of reactions and the effect of temperature; catalysis.

An elementary treatment of electrolysis and electrolytic dissociations; the electrochemical series; conductivity; strength of acids and bases; buffers; dissociation constants; pH notation; indicators; hydrolysis of salts; solubility product.

Colloids: an introduction to the nature and properties of some common colloidal systems.

Organic Chemistry

Detection and estimation of carbon, hydrogen, nitrogen, sulphur and halogens in organic compounds; empirical, molecular and constitutional formulae.

Methane, ethane and the homologous series of paraffins; structural isomerism. Unsaturated hydrocarbons; simple olefines, butadiene and acetylene. The general reactions associated with the common functional groups in aliphatic compounds including alkyl halides, alcohols; ethers; aldehydes; ketones; carboxylic acids and derivatives; primary, secondary and teritiary amines; nitriles. The general methods of preparation and general reaction will be stressed in each case along with the important specific reactions of individual compounds (e.g. chloral, iodoform, hexamine). Ethylene glycol and ethylene oxide; glycerol and glycerides; oxalic acid; urea.

Introduction to the structure and reactions of benzene, toluene, nitrobenzene, chlorobenzene, benzenesulphonic acid, aniline, phenol, benzoic acid.

Practical Examination

Candidates must be prepared to:—

(*a*) Identify by chemical tests the more important non-metallic elements and their compounds as well as the metals and salts indicated in the above list and to analyse mixtures of these containing not more than two basic and two acid radicals.

(*b*) Show a knowledge of the principles of volumetric analysis and to prepare, standardise and use volumetric solutions of acids, alkalis, potassium permanganate, iodine and sodium thiosulphate, silver nitrate and ammonium thiocyanate.

The candidate will be required to bring to the Practical Examination his original laboratory notebooks, duly signed by the teacher, for inspection should the Examiners so desire. These notebooks must be taken away by the candidate at the close of the examination. The use of books for both qualitative and quantitative work is permitted in the Practical Examination.

PHYSICS

(Examination in this subject comprises one written session and one practical session each of three hours' duration. The Examiners are not precluded from asking candidates oral questions during the practical session.)

Dynamics

Laws of motion, force, acceleration, mass and their units; acceleration due to gravity "g," weight.

Momentum; conservation of linear momentum.

Kinetic and potential energy; conservation of energy; work, power; energy units; equivalence of mass and energy with reference to fission and fusion in nuclear reaction.

Gravitation; relation of "g" to gravitational constant "G"; measurement of "g."

Uniform circular motion; centrifugal acceleration; application to centrifuge and motion of planets and satellites.

Simple harmonic motion; pendulum, vibration of a mass attached to a spring; moment of inertia.

Properties of Matter

Surface tension, simple explanation on molecular theory, simple phenomena; angle of contact; measurement of surface tension; variation with temperature.

Viscosity; Newtonian or streamline flow; measurement of viscosity by capillary flow and by Stoke's method (proof of formulae not required); comparison of viscosities.

Heat

Temperature and temperature scales; liquid-in-glass, thermo-electric and platinum resistance thermometers.

Expansion of liquids; coefficient of mean expansion; measurement of coefficient of apparent expansion by weight thermometer and of absolute expansion by balancing columns; anomalous expansion of water.

Thermal behaviour of gases; Charles' law; combined form of gas laws; constant volume gas thermometer; absolute scale of temperature.

Dalton's law of partial pressures.

Heat units; heat in relation to energy; mechanical equivalent of heat.

Melting, boiling, evaporation, latent heats; vapour pressure, saturation vapour pressure and its measurement; simple explanations on kinetic theory.

Relative humidity and dew-point.

Conduction and convection; definition of thermal conductivity.

Radiation; laws of cooling; detection and measurement of infra-red radiation by thermo-pile.

Black-body radiation and spectrum; Planck's formula and Stefan's Law; radiation pyrometer.

Light

Refraction; refraction by a prism, and at a single spherical surface, with application to thin lens.

Lenses; definitions; graphical construction for image formed by thin lens.

Dispersion; dispersion by a prism; spectrometer; line spectra; dispersive power; dispersion in lenses, chromatic aberration and the achromatic doublet.

Colour by absorption, reflection and addition.

Optical instruments; camera, projector lantern, telescopes and microscopes.

Ultra-violet radiation; detection and measurement; properties, including hazards, of near and far ultra-violet radiation.

Wave theory of light; Huygens' theory and treatment of reflection, refraction and interference; Fresnel biprism and interference in thin films; diffraction phenomena and rectilinear propagation.

Sound

Production and propagation of sound; wave nature of sound; velocity, wavelength, frequency, pitch, quality and loudness.

Waves in gas columns, stretched strings and rods; formulae for velocities of wave disturbances (without proof) and their experimental measurement.

Forced vibrations and resonance.

Production, properties and uses of ultrasonics.

Electrostatics

Production of positive and negative charges; simple account of electronic theory of matter; conductors and insulators.

Electrostatic induction; gold leaf electroscope; distribution of charge; action of points.

Electrostatic potential difference.

Condensers; capacitance.

Electrostatic quantities and units.

The electrophorus and Van der Graaf generator.

Magnetism

Revision (ordinary level syllabus, Senior Certificate Examination) as necessary to provide theory for experiments with deflection and vibration magnetometers, or in field plotting.

The Electric Current

General features of current flow in an electric circuit.

Magnetic effect of currents; tangent galvanometer; electromagnetic and practical units of current.

Force on a current-carrying conductor in a magnetic field; moving coil galvanometer; simple electric motor.

Potential differences and electromotive force; electromagnetic and practical units; slide wire potentiometer.

Relationship between potential and current in simple circuits; Ohm's law; resistances in series and parallel; Wheatstone bridge; conversion of galvanometer to ammeter or voltmeter; resistivity and temperature coefficient of resistance; Ohm's law for complete circuit.

Heating effect of currents; Joule's law; electrical energy and power; definitions; energy, power and heating calculations.

Chemical effect of currents; laws of electrolysis; primary and secondary cells.

Electromagnetic induction; laws of electromagnetic induction; application to simple dynamo, transformer, induction coil and eddy currents.

Conduction of electricity through gases; mechanism of discharge; cathode rays; positive ions; production and properties of X-rays.

Natural radioactivity; proton, neutron, α-rays and γ-rays; structure of the atom; isotopes.

Use of cyclotron and nuclear piles to produce artificial radio-activity.

Availability of radio-isotopes (reference to Harwell catalogues); radio-isotope tracers and their use for sterilization.

Thermionic and photo-electric emission simply treated.

Practical Examination

The candidate must be prepared to perform experiments to determine physical constants, measure physical properties of materials or verify laws or formulae, relative to the above syllabus. The apparatus will be as used in experiments normally undertaken by the student in the course of approved instruction.

The candidate will be required to bring to the Practical Examination his original laboratory notebooks, duly signed by the teacher, for inspection should the Examiners so desire. These notebooks must be taken away by the candidate at the close of the examination. The use of books is not permitted in the Practical Examination.

APPENDIX B

Syllabuses for the Part II Qualifying Examination

PHARMACEUTICAL CHEMISTRY

Pharmaceutical Chemistry I

(The Examination in Pharmaceutical Chemistry I comprises one three-hour written session and one three-hour practical session based upon a knowledge of the matter set out below together with the relevant practical work.)

An extension of the treatment of inorganic, organic and physical chemistry covered in the Part I syllabus and examination.

A further study of physical chemistry with special reference to topics of pharmaceutical importance such as reaction velocities, chemical equilibria, colloids and electro chemistry.

A further survey of inorganic elements from the standpoint of periodic classification and electronic theory, including radiochemistry.

Important bifunctional aliphatic compounds; reagents used in syntheses; isomerism including stereoisomerism; alicyclic compounds; aromatic systems and the reactions of the common functional groups when attached to aromatic systems.

Practical Examination

Further qualitative analysis of inorganic compounds; volumetric and gravimetric analysis of inorganic and organic compounds of pharmaceutical importance. Analysis for impurity constituents. Determination of physical constants. Reaction of the main functional groups of organic compounds.

(The candidate will be allowed to bring to the practical session any book or books he wishes. He will be required to bring to the practical session his original notebooks, duly signed by the teacher, for inspection should the Examiners so desire. These notebooks must be taken away by the candidate at the close of the session.)

Pharmaceutical Chemistry II

(The Examination in Pharmaceutical Chemistry II comprises one three-hour written session and one three-hour practical session primarily based upon a knowledge of the matter set out below together with the relevant practical work, although questions involving a knowledge of the work of Pharmaceutical Chemistry I are not excluded. The Examiners are not precluded from asking the candidate oral questions during the practical session.)

Heterocyclic compounds and the more complex alicyclic and aromatic compounds relevant to pharmaceutical work.

The important features of structure and function in selected terpenes, alkaloids, carbohydrates, proteins, steroids and vitamins.

The nature and nomenclature of drugs in common use. The relationship between structure and physiological and chemotherapeutic action.

Practical Examination

Preparative organic chemistry and the identification of simple organic compounds by qualitative analysis. Special tests and analytical procedure relative to the compounds dealt with in the theory section above.

(The candidate will be allowed to bring to the practical session any book or books he wishes. He will be required to bring to the practical session his original laboratory notebooks, duly signed by the teacher, for inspection should the Examiners so desire. These notebooks must be taken away by the candidate at the close of the session.)

PHARMACEUTICS

PHARMACEUTICS I

(The Examination in Pharmaceutics I comprises one two-hour written session based upon a knowledge of the matter set out in A below and a three-hour practical session.)

A. A knowledge of the enactments and subordinate legislation applicable to Pharmacy in Northern Ireland.

B. The historical development of Pharmacy. The principles involved in pharmaceutical operations, small-scale and large-scale, in general use.

A knowledge of the galenical preparations of the British Pharmacopoeia and those of the British Pharmaceutical Codex, in frequent use, including conditions for their storage.

Practical Examination

The compounding of all official preparations; the compounding and dispensing of prescriptions, including deciphering, translation and posology.

(The candidate will be allowed to bring to the practical session any book or books he wishes. He will also be required to bring his original laboratory notebooks, duly signed by the teacher, for inspection should the Examiners so desire. These notebooks must be taken away by the candidate at the close of the session.)

PHARMACEUTICS II

(The Examination in Pharmaceutics II comprises two two-hour written sessions based on the material below and the material under B in Pharmaceutics I and one four-hour practical examination.)

The preparation and standardization of tablets.

Microbiology in relation to pharmaceutical practice; introduction to and classification of micro-organisms; sterilization and the preparation of sterile medicaments and materials; disinfectants and antiseptics including methods for their evaluation; bacteriastats and fungistats; the preparation, properties and storage conditions of immunological and diagnostic agents of the British Pharmacopoeia and the general principles underlying their standardization.

A general survey of the preparation and properties of antibiotics.

Radioactive isotopes, their preparation, properties and uses; the detection and measurement of radioactivity; health hazards; handling, storing, dispensing, dosage and waste disposal.

Practical Examination

Aseptic techniques in pharmaceutical practice: tests for sterility: evaluation of bacteriastatic and fungistatic powers. The compounding and dispensing of sterile medicaments.

(The candidate will be allowed to bring to the practical session any book or books he wishes. He will also be required to bring his original laboratory notebooks, duly signed by the teacher, for inspection should the Examiners so desire. These notebooks must be removed at the close of the session.)

PHARMACOGNOSY

(The examination in this subject comprises one written session of two hours' duration and one practical session of three hours' duration.)

The cultivation, collection, preparation for the market, the commerce in and the storage of crude drugs as illustrated by representative drugs.

The macroscopical characters, the biological and geographical sources, the commercial varieties and adulterants, and the constituents of representative drugs; the types and significance of standards and the diagnostic qualitative tests included in the British Pharmacopoeia and the British Pharmaceutical Codex for these drugs.

The microscopical methods used for the examination of crude drugs as illustrated by representative drugs.

The biological and geographical sources, methods of extraction and constituents of the following oils:—

Castor Oil
Cod-Liver Oil
Olive Oil
Theobroma Oil
Oil of Clove
Oil of Lemon

The microscopy of arrowroot, maize, potato, rice, soluble and wheat starches.

The sources, preparation and properties of the fibres used in the manufacture of surgical dressings; storage of dressings.

Practical Examination

The examination (excluding quantitative determinations) and description, in the entire or broken conditions of representative drugs of good commercial quality; their identification macroscopically and by qualitative chemical means; their biological and geographical sources.

The investigation of the microscopy of representative drugs.

Examination, description and identification of the fibres used for the following:—unmedicated surgical dressings, bandages, gauzes, lints, tissues, tows and wools.

The identification, microscopically, of arrowroot, maize, rice, potato, soluble and wheat starches, mixed and unmixed.

(The candidate will be required to bring to the practical examination his original laboratory notebooks, duly signed by the teacher, for inspection should the Examiners so desire. These notebooks must be taken away by the candidate at the close of the examination.)

PHYSIOLOGY AND PHARMACOLOGY

Physiology

(The Examination in Physiology comprises one three-hour written session.)

The candidate will be required to have a knowledge of the physiology and histology of the following systems of the body and of the main methods by which their functions have been established: the cardiovascular system, the blood and the lymph; the respiratory system; the nervous system; the locomotor system; the digestive system; the urinary system; the endocrine organs and the reproductive system.

Pharmacology

(The Examination in Pharmacology will comprise one three-hour written session and an oral session.)

The candidate will be required to have a knowledge of the actions and uses of drugs in common use, the general principles of pharmacology, chemotherapy, toxicology and of biological assay. The methods employed for the investigation of the action of drugs on fundamental physiological processes. Simple estimation and experiments in physiology and pharmacology, including their chemical aspects. Practical methods of pharmacological testing.

(The candidate will be required to bring to the oral session for discussion with the Examiners his original laboratory notebooks, duly signed by the teacher. These notebooks must be taken away at the close of the session by the candidate.)

APPENDIX C

Draft Articles of Pupilage

It is agreed between .....
of .....
(hereinafter called "the Employer") of the first part .....
..... of .....
.....
(hereinafter called "the Pupil"), son or ward of .....
..... of the second part, and the said .....
..... of .....
.....
(hereinafter called "the Parent or Guardian") of the third part, as follows:—

1. The Pupil for himself and *The Parent* or *Guardian* as surety for him jointly and severally bind themselves that the Pupil shall honestly, faithfully and diligently serve the Employer in his business of Dispensing Chemist for a period of Two years from the ..... day of ....., Nineteen hundred and ....., which is declared to be the commencement of the pupilage of the Pupil; that the Pupil always shall keep the Employer's secrets and shall obey his lawful commands, and shall not without authority make copies of any papers or books belonging to the Employer; that the Pupil shall not absent himself from the Employer's service without leave, shall behave himself civilly and respectfully to the Employer and his customers, shall observe the Regulations appended to these Articles, shall attend such classes as may be determined by the Council of the Pharmaceutical Society and that the Pupil shall both during and outside of business hours abstain from all illegal practices.

2. And The Employer binds himself to instruct the Pupil in his business of Dispensing Chemist; to afford the Pupil such reasonable opportunities and work as may be required to enable him to learn the same; to observe the Regulations appended to these Articles; to grant the Pupil such facilities as may be necessary for the Pupil to attend such classes as may be determined as aforesaid; on their due completion to discharge these Articles in the form provided and if in his opinion correct, to verify the facts set out in the declaration regarding the practical course of study required by the Regulations to be made by the Pupil when entering for either of the Qualifying Examinations.

3. And The Employer further binds his executors and administrators in the event of the death of the Employer before the expiration of these Articles, to make provision for the completion by the Pupil of the remainder of the pupilage under conditions acceptable under the aforementioned Regulations.

4. In Witness Whereof the parties to these Articles have set their hand and seals this ..... day of .....Nineteen hundred and .....

Signed, Sealed and Delivered by the said .....
Employer in presence of (Employer)
.....
(Witness)
Occupation .....
Address .....

Signed, Sealed and Delivered by the said .....
Pupil in presence of (Pupil)
.....
(Witness)
Occupation .....
Address .....

Signed, Sealed and Delivered by the said .....
Parent or Guardian in presence of (Parent or Guardian)
.....
(Witness)
Occupation .....
Address .....

In the foregoing Articles words importing the singular number shall include the plural and vice versa, words importing the masculine gender the feminine, and words importing persons shall include Firms and Corporations, unless there be anything in the context repugnant to such construction.

DISCHARGE

I , ..., in respect that ..... has served me in terms of the foregoing Articles during the whole period therein stipulated, do hereby discharge him and also ..... of all obligations under the said Articles.

In Witness Whereof I have set my hand this ..... day of..... Nineteen hundred and .....

.....

APPENDIX TO DRAFT ARTICLES OF PUPILAGE

Regulations for Practical Course of Study

1. The Employer shall from time to time, if requested, furnish such information as may be required by the Society about the staff, accommodation, equipment and work of the premises at any reasonable time while work is proceeding therein.

2. If the Employer is not a registered pharmacist, or does not undertake personally the practical course of training of the Pupil, he shall appoint some registered pharmacist member of his staff who shall be responsible to the Employer therefor.

3. The practical course of study which the Pupil must undergo shall include:—

(1) experience in—

(*a*) the manipulation of pharmaceutical apparatus in common use;

(*b*) the recognition, by sensory characters, of the chief crude drugs and chemical substances used in medicine;

(*c*) the preparation of galenicals illustrating the principles involved in the commoner pharmaceutical operations;

(*d*) the reading, translation and copying of prescriptions, including the checking of doses;

(*e*) the dispensing of prescriptions illustrating the commoner methods of administering medicaments;

(*f*) the storage of drugs and medicinal preparations.

(2) a knowledge of the keeping of the records required by the various Acts of Parliament affecting pharmaceutical practice.

4. The Employer shall provide such opportunity, accommodation, apparatus, materials and books of reference as shall be required to enable the Pupil to undergo the practical course of study prescribed in regulation 3.

5. The number of pupils that may be employed in any shop shall not exceed two where there is one registered pharmacist engaged in the work in which the Pupil is undergoing the aforesaid course, and where there is more than one registered pharmacist similarly engaged, the number shall not exceed one for each additional such registered pharmacist.