BRITISH OBSTETRIC AND GYNÆCOLOGICAL PRACTICE

Edited by

Sir ANDREW CLAYE, M.D.(Leeds), F.R.C.S., F.R.C.O.G.
Hon.M.D. (Melbourne)
Emeritus Professor of Obstetrics and Gynæcology, University of Leeds ; Consulting Surgeon, Royal Hospital for Women, Melbourne; past President, Royal College of Obstetricians and Gynæcologists; President XIIIth British Congress (1952).

and

ALECK BOURNE, M.A., M.B., B.Ch.(Cantab.), F.R.C.S., F.R.C.O.G.
Consulting Gynæcologist, St. Mary's Hospital, London; Consulting Obstetric Surgeon, Queen Charlotte's Hospital; Consulting Surgeon, Samaritan Hospital for Women, London.

OBSTETRICS

Sir ANDREW CLAYE

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GENERAL PREFACE

THE titles of these volumes explain the aim of the Editors, namely, to present, as far as possible, a description of Obstetrics and Gynæcology as practised in Britain. Not that this branch of British medicine is radically different from that of other countries, but perhaps there are minor, though important, variations that stamp our work in this country with an individuality which has enabled us to contribute to general world progress.

Though, equally with the pioneers of other countries, we have discovered new fields by laboratory and clinical research and devised new methods and techniques, yet it is not so much in detailed additions to the general fund of knowledge that Britain has made its characteristic mark.

There is often a tendency to vagueness when discussing broad generalities, but we feel we are on firm ground when we state our belief that during the last 150 years British Obstetrics and Gynæcology has been guided by the principle of conservatism. We do not claim that this attitude of hesitant acceptance of innovations which have convinced many enthusiasts at different times as " progress ", has always proved judicious or beneficial. Pioneers are impatient of the restraint of the cautious and critical mind which, though sensitive to the promise of the new method or theory, nevertheless will often dissolve away what is unsound and leave a core of new and valid knowledge.

Each country has made its own characteristic contribution to medicine in all its branches. From America have come new ideas of pioneering brilliance many of which have required an appreciable time-lag before acceptance by the gynæcologists of older countries.

Germany has shown us the value of the indefatigable attention to detail, accuracy and records. Radiotherapy, first foreseen in Paris by the Curies, has been developed in Sweden to become one of the major additions to the treatment of malignant disease.

To France belongs the credit of the earliest beginnings of antenatal care by Pinard, whose impulse to begin with derived from sympathy with and care for " the abandoned pregnant women " of the streets of Paris rather than from a desire to establish the clinical supervision of pregnancy.

Although Ballantyne in Edinburgh developed antenatal care as a technique, at first chiefly for the health of the fœtus, the spiritual heirs of Pinard are the obstetricians of Aberdeen under the direction of Professor Dugald Baird. And here is perhaps the chief modern contribution of Britain to obstetrics, the results of the study of the relation of social and economic conditions to the health of the pregnant woman and the condition of her child.

There have been many great figures in British Gynæcology from whom it is difficult to name one of greatest distinction, but if, as we believe, conservatism has been our own characteristic, then we must describe the late Victor Bonney,

not only as a master of technique, but, during his later years, as the apostle of the appeal to conserve as far as possible, in all our surgical operations.

It is inevitable that an edited book should lack the uniformity of style characteristic of a work written by a single author. There is a place here for legitimate criticism ; but, in the present day, so wide is the scope of any medical specialism that it is impossible for one writer to produce an authoritative work that covers the whole subject to the satisfaction of the specialist and post-graduate. Nevertheless, we hope that despite the unavoidable diversity, it is enclosed within a unity which can rightly be described as a British Practice.

Finally may we emphasize that these volumes are essentially an exposition of Obstetrics and Gynæcology as practised in this country to-day with a description of physiology and pathology only so far as is necessary for the understanding of clinical methods.

The Editors wish to thank their contributors for their willing cooperation, and the publishers for their kind and patient assistance.

E. H.
A. W. B.

LONDON, 1955.

EDITOR'S PREFACE TO THE THIRD EDITION

OBSTETRICS has continued to advance during the three years since the publication of the second edition and made a third necessary.

We have lost two authors by death, G. Dick-Read and Subodh Mitra. We are grateful to N. Capon, J. F. Cunningham and N. Mascall for their past work. New chapters have been written by Shîla Ransom and W. C. W. Nixon (Psychophysical Preparation for Labour) and B. G. Maegraith (Tropical Diseases) to replace those of Dick-Read and Subodh Mitra. There are also new authors for other chapters : Arthur Barry (Operations to Enlarge the Capacity of the Pelvis), Roma Chamberlain (The Pattern of British Obstetrics), C. H. G. Macafee and J. MacD. G. Harley (Antepartum Hæmorrhage), R. McL. Todd (neonatal Morbidity and Mortality) and R. R. Willcox (Venereal Diseases). W. S. Craig has contributed an addendum to Waller's chapter on the Breasts, and P. J. Huntingford to Wrigley's chapter on Forceps, and an entirely new chapter on Radiology has been written by Rohan Williams. Rohan Williams died while the book was in the press.

We thank our authors for their care in revising their work, and the publishers for all the help they have given us.

We regret that Sir Eardley Holland, the distinguished Editor of the first two editions, has felt it necessary to hand over the Editorship ; he handled it in a masterly way, giving a wonderful start to this volume, and stamping his individuality on it, especially in the last chapter.

A. M. C.

CAMBRIDGE, 1963.

EDITOR'S PREFACE TO THE SECOND EDITION

DURING the four years that have passed since the publication of this volume an extensive revision of most chapters has been required to include the additions and modifications that have taken place in Obstetric theory and practice.

On the editorial side the fault of overlapping, of repetition of the same subject in different chapters—almost inevitable in the first edition of a book with so many contributors—has been easy to avoid.

We have to thank Dr. Robert Ollerenshaw, Director of the Department of Medical Illustration, Royal Infirmary, Manchester, who personally supervised the blockmaking, for the great improvement he has made in the X-ray illustrations.

In addition, there have been some structural changes in the text. Chaper II of the first edition, on the Physiology of Pregnancy, has been replaced by new Chapters, II and III, the former on the Functions of the Placenta and the latter on Birth, Adaptation from Intrauterine to Extrauterine Life. We consider it should not be out of place in a book on Obstetric Practice to devote these two chapters to the physiology of the fœtus, who actually becomes an infant only after he has coped with the hazards that may arise during pregnancy and parturition and during his dramatic metamorphosis from fœtus into infant. Nor should it be out of place to include also the treatment of his greatest postnatal hazard in Chapter III. Other practical points in physiology have been distributed amongst the chapters to which they belong.

A final chapter describes briefly the pattern of British practice as it exists to-day.

We deeply regret the death of Dr. Harold Waller, the result of whose life-work has ensured that, with remarkably few exceptions, all women who so desire can breast-feed their babies with comfort and confidence. His chapter stands as it was and has been published also as a small book because the subject is of interest alike to doctors, midwives and maternity nurses.

Again it is a pleasure to thank our contributors for their careful and thorough work of revision, and our publishers for the patience with which they have acceded to our demands for such drastic changes in this edition.

E. H.

LONDON, 1959.

LIST OF CONTRIBUTORS

SIR DUGALD BAIRD, M.D.(Glas.), F.R.C.O.G.

Regius Professor of Obstetrics and Gynæcology, University of Aberdeen ; Consultant Obstetrician and Gynæcologist, North-Eastern Regional Hospital Board, Scotland.

Chapters XVII : Dystocia : General Observations on its Incidence, Prevention and Management.

XXI : Dystocia due to Faults in the Pelvis.

XXVIII : Stillbirth—Its Causes and Prevention (with James Walker).

JOSEPHINE BARNES, B.A., D.M., B.Ch.(Oxon.), F.R.C.S.(Eng.), M.R.C.P., F.R.C.O.G.

Assistant Obstetrician and Gynæcologist, Charing Cross Hospital and Elizabeth Garrett Anderson Hospital. Surgeon, Marie Curie Hospital.

Chapter VII : The Normal Puerperium.

ARTHUR BARRY, M.D., M.A.O., F.R.C.O.G.

Consulting Gynæcologist, National Maternity Hospital, Dublin; Gynæcologist to St. Anne's Skin and Cancer Hospital, Dublin, and the Charitable Infirmary, Dublin.

Chapter XXXIV : Operations to Enlarge the Capacity of the Pelvis.

S. BENDER, M.D., F.R.C.S.(Edin.), F.R.C.O.G.

Consultant Obstetrician and Gynæcologist, Chester. Formerly Senior Lecturer in Obstetrics and Gynæcology, University of Liverpool.

Chapters IV : Appendix on Rh Blood Groups.

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XXVII : The Abnormal Puerperium.

J. D. BOYD, M.A.(Cantab.), M.Sc., M.D.(Belfast).

Professor of Anatomy in the University of Cambridge and Fellow of Clare College, Cambridge.

Chapter I : Physiology of Conception and the Development of Placenta and Fœtal Membranes (with W. J. Hamilton).

ALAN BREWS, M.D., M.S.(Lond.), F.R.C.P., F.R.C.S.(Eng.), F.R.C.O.G.

Obstetrician and Gynæcologist, The London Hospital.

Chapter XI : Diseases and Abnormalities of Placenta and Membranes (with S. Bender).

F. J. BROWNE, M.D., D.Sc., F.R.C.S.(Edin.), F.R.C.O.G.

Emeritus Professor of Obstetrics and Gynæcology, University of London ; Consulting Obstetric Surgeon, University College Hospital, London.

Chapters IV : The Pregnant Woman and Her Care (with J. C. McClure Browne).

XV.I : General Diseases Associated with Pregnancy (with J. C. McClure Browne).

J. C. McClure Browne, M.B., F.R.C.S.(Edin.), F.R.C.O.G.

Professor of Obstetrics and Gynæcology, University of London. Honorary Consulting Surgeon, Hammersmith Hospital, London.

Chapters IV : The Pregnant Woman and Her Care (with F. J. Browne).
XV.I : General Diseases Associated with Pregnancy (with F. J. Browne).

Roma Chamberlain, M.B., D.Obst.R.C.O.G., D.C.H., C.P.H.

Medical Officer, Ministry of Health.

Chapter XLII : The Pattern of British Obstetric Practice and its Evolution (with Sir Eardley Holland).

Sir Andrew Claye, M.D.(Leeds), F.R.C.S.(Eng.), F.R.C.O.G.

Emeritus Professor of Obstetrics and Gynæcology, University of Leeds ; Honorary Consulting Surgeon, Royal Women's Hospital, Melbourne.

Chapters VI : Management of Labour.
XXXVI : Obstetric Anæsthesia and Analgesia.

Raymond C. Cohen, M.D., B.S.(Lond.), D.P.H.

Consultant Chest Physician, Black Notley and Broomfield Hospitals, Essex, Braintree and Witham Chest Clinic, and St. Mary's Hospital, Colchester.

Chapter XV.IV : Tuberculosis and Pregnancy.

W. S. Craig, B.Sc.(Glas.), M.D.(Edin.), F.R.C.P.E., F.R.C.P., F.R.S.E.

Professor of Pædiatrics and Child Health, University of Leeds.

Chapter VIII (Addendum) : The Breasts and Breast Feeding.

L. J. Davis, M.D., F.R.C.P., F.R.C.P.(Edin.), F.R.F.P.S.G., F.R.S.E.

Emeritus Professor of Medicine, University of Glasgow. Honorary Consulting Physician, Royal Infirmary, Glasgow.

Chapter XV.III : The Anæmias of Pregnancy.

Ian Donald, M.B.E., M.D.(Lond.), B.A.(Cape Town), F.R.C.O.G.

Regius Professor of Midwifery and Gynæcology, University of Glasgow.

Chapters III : Birth : Adaptation from Intrauterine to Extrauterine Life.
XIV : Diseases of the Urinary System in Obstetrics.

Wilfrid Gaisford, M.D.(Lond.), M.Sc.(Manch.), F.R.C.P.

Professor of Child Health and Pædiatrics, University of Manchester. Honorary Pædiatrician, St. Mary's Maternity Hospital, Manchester. Honorary Physician, Royal Manchester Children's Hospital.

Chapter IX : Management of the Newborn Infant.

John B. Gardner, M.A.(Cantab.), Barrister-at-Law.

Chapter XL : Medico-Legal.

C. J. K. Hamilton, M.B., F.R.C.S.(Edin.), F.R.C.O.G.

Consultant Surgeon, Liverpool Maternity and Women's Hospital, Liverpool ; Gynæcological Surgeon, Walton Hospital, Liverpool ; Lecturer, Obstetrics and Gynæcology, University of Liverpool.

Chapters XXXIII : Cæsarean Section.
XXXV : Destructive Operations.

W. J. HAMILTON, M.D., D.Sc., F.R.C.O.G., F.R.S.(Edin.).

Professor of Anatomy in the University of London, Charing Cross Hospital Medical School ; Sometime Regius Professor of Anatomy in the University of Glasgow ; Formerly Professor of Anatomy in the University of London Medical College, Saint Bartholomew's Hospital.

Chapter I : Physiology of Conception and the Development of Placenta and Fœtal Membranes (with J. D. Boyd).

J. MACD. GRAHAM HARLEY, M.D., M.R.C.O.G.

Lecturer in Midwifery and Gynæcology, The Queen's University, Belfast.

Chapter XXIII : Antepartum Hæmorrhage (with C. H. G. Macafee).

SIR EARDLEY HOLLAND, M.D.(Lond.), F.R.C.P., F.R.C.S., F.R.C.O.G.

Hon. M.D.(Dublin) ; Hon. LL.D.(Birmingham) ; Hon. LL.D.(Leeds) ; Hon. F.R.C.S.(Edin.) ; Consultant Obstetric and Gynæcological Surgeon, London Hospital.

Chapter XLII : The Pattern of British Obstetric Practice and its Evolution (with Roma Chamberlain).

PETER JOHN HUNTINGFORD, M.B., B.S., M.R.C.O.G.

Senior Lecturer in Obstetrics and Gynæcology at St. Thomas's Hospital and Honorary Consultant to the General Lying-in Hospital.

Chapter XXXI : Addendum on the Vacuum Extractor.

IAN JACKSON, M.B., B.Chir.(Cantab.), F.R.C.S.(Eng.), F.R.C.O.G.

Assistant Obstetric and Gynæcological Surgeon, The Middlesex Hospital ; Surgeon, The Chelsea Hospital for Women.

Chapters XXII : Dystocia due to Deformities of the Fœtus.
XXV : Maternal Injuries.

G. W. B. JAMES, C.B.E., M.C., M.D., D.P.M.(Lond.).

Honorary Consulting Psychiatrist to St. Mary's Hospital, London and Queen Charlotte's Hospital, London. Late Honorary Consultant in Psychiatry to the Army.

Chapter XXXVIII : Psychiatry and Obstetrics.

T. N. A. JEFFCOATE, M.D.(Liverpool), F.R.C.S.(Edin.), F.R.C.O.G.

Professor of Obstetrics and Gynæcology, University of Liverpool.

Chapters V : Physiology and Mechanism of Labour.
XVIII : Dystocia due to or associated with Abnormal Uterine Action.

ROBERT KELLAR, M.B.E., M.B., Ch.B., F.R.C.P.(Edin.), F.R.C.S.(Edin.), F.R.C.O.G.

Professor of Obstetrics and Gynæcology, University of Edinburgh ; Obstetrician and Gynæcologist, Royal Infirmary and Simpson Memorial Maternity Pavilion, Edinburgh.

Chapter X : The Toxæmias of Pregnancy.

W. P. D. Logan, M.D.(Glas.), Ph.D., D.P.H., M.R.C.P.

Director, Division of Health Statistics, World Health Organization, Geneva. Formerly Chief Medical Statistician, General Register Office, London.

Chapter XLI : Vital Statistics of Reproduction.

C. H. G. Macafee, C.B.E., Hon. D.Sc.(Leeds), M.B., F.R.C.S.(Eng.), F.R.C.S.I., F.R.C.O.G.

Professor of Obstetrics and Gynæcology, The Queen's University, Belfast ; Gynæcologist and Obstetrician, The Royal Victoria Hospital and the Royal Maternity Hospital, Belfast.

Chapter XXIII : Antepartum Hæmorrhage (with J. MacD. G. Harley).

T. N. MacGregor, M.D., M.R.C.P., F.R.C.S.(Edin.), F.R.C.O.G., F.R.S.(Edin.).

Consultant Obstetrician and Gynæcologist, Western General Hospital, Edinburgh ; Consultant Gynæcologist, Deaconess Hospital, Edinburgh ; Lecturer, Gynæcological Endocrinology, Edinburgh University.

Chapter XXXII : Version.

D. J. MacRae, M.D., F.R.C.S.(Edin.), F.R.C.O.G.

Obstetrician, The Mother's Hospital, London ; Gynæcologist and Obstetrician, North-West Metropolitan Hospitals, Watford.

Chapter XV.II : Heart Disease in Pregnancy.

B. G. Maegraith, M.A., M.B., D.Phil., F.R.C.P., F.R.C.P.E.

Professor of Tropical Medicine, University of Liverpool.

Chapter XV.VII : Tropical Diseases.

The late C. McIntosh Marshall, M.B., Ch.B.(N.Z.), F.R.C.S.(Eng.).

The late Hon. Fellow American Association of Obstetricians, Gynæcologists and Abdominal Surgeons ; Surgeon, The Women's Hospital, Liverpool, and The Liverpool Maternity Hospital ; Consulting Gynæcologist Wallasey Hospital for Women, Warrington General Hospital, Providence Free Hospital, St. Helens; Lecturer in Clinical Obstetrics and Gynæcology, University of Liverpool.

Chapters XXXIII and XXXV : revised by C. J. K. Hamilton.

John D. Martin, M.D., M.R.C.O.G.

Reader, Department of Obstetrics and Gynæcology, University of Western Australia, Perth.

Chapter II : The Function of the Placenta and Fœtal Membranes (with Maureen I. Young).

Bruce T. Mayes, M.V.O., M.B., B.S.(Sydney), F.R.C.S.(Edin.), F.R.C.O.G., F.R.A.C.S.

Professor of Obstetrics, University of Sydney, New South Wales, Australia.

Chapter XX : Dystocia due to Abnormalities of the Genital Tract.

William I. C. Morris, M.B., F.R.C.S.(Edin.), F.R.C.O.G.

Professor of Obstetrics and Gynæcology, University of Manchester.

Chapter XXIV : Third Stage Dystocia and Postpartum Complications : Retained Placenta ; Postpartum Hæmorrhage.

W. C. W. NIXON, M.D.(Lond.), F.R.C.S.(Eng.), F.R.C.O.G.

Professor of Obstetrics and Gynæcology, University of London, at University College Hospital.

Chapter XXXVII : Psychophysical Preparation for Labour (with Shîla Ransom).

J. VINCENT O'SULLIVAN, M.D., M.A.O.(N.U.I.), M.R.C.P., F.R.C.S.(Eng.), F.R.C.O.G.

Senior Gynæcologist and Obstetrician, Kingston Hospital and Hospital of St. John and St. Elizabeth ; Obstetric Surgeon, City of London Maternity Hospital and Bearsted Memorial Hospital ; Gynæcological Surgeon, Grosvenor Hospital for Women.

Chapter XXIV : Third Stage Dystocia and Postpartum Complications : Puerperal Inversion of the Uterus.

SIR JOHN PEEL, K.C.V.O., M.A., B.M.(Oxon.), B.Ch., F.R.C.S.(Eng.), F.R.C.O.G.

Director of Clinical Studies, King's College Hospital Medical School ; Obstetric and Gynæcological Surgeon, King's College and Princess Beatrice Hospitals.

Chapter XV.V : Diabetes Mellitus.

XVI : Duration of Pregnancy and its Variations.

ROBERT PERCIVAL, F.R.C.S.(Eng.), F.R.C.O.G.

Obstetric and Gynæcological Surgeon, The London Hospital ; Gynæcological Surgeon, King George Hospital, Ilford and The Forest Hospital, Buckhurst Hill.

Chapter XIX : Abnormal Presentations.

SHÎLA RANSOM, F.F.A., R.C.S.(Eng.).

Obstetric Anæsthetic Research Assistant, University College Hospital, London.

Chapter XXXVII : Psychophysical Preparation for Labour (with W. C. W. Nixon).

FRANK STABLER, V.R.D., M.D.(Durh.), F.R.C.S.(Eng.), F.R.C.O.G.

Lecturer in Midwifery and Gynæcology, University of Durham ; Gynæcologist, Royal Victoria Infirmary ; Obstetrician, Princess Mary Maternity Hospital, Newcastle upon Tyne.

Chapter XII : Diseases and Abnormalities of the Genital Tract.

JOHN STALLWORTHY, M.A.(Oxon.), Ch.B.(N.Z.), F.R.C.S.(Eng.), F.A.C.S.(Hon.), F.R.C.O.G.

Director, Area Department of Obstetrics and Gynæcology, United Oxford Hospitals; Honorary Consulting Gynæcologist and Obstetrician, Royal Prince Alfred Hospital, Sydney.

Chapters XIII : Abortion.

XXVI : Shock in Obstetrics.

G. W. THEOBALD, M.A., M.D.(Cantab.), M.R.C.P., F.R.C.S.(Edin.), F.R.C.O.G.

Lately Honorary Obstetrician and Gynæcologist to St. Luke's Hospital, Bradford and the Bradford Royal Infirmary ; Honorary Lecturer in Obstetrics and Gynæcology, the University of Leeds.

Chapter XXX : Induction of Labour and of Premature Labour.

R. McL. Todd, M.A., M.D., M.R.C.P., D.C.H.

Senior Lecturer in Child Health, University of Liverpool ; Consultant Pædiatrician, Liverpool Maternity Hospital and Alder Hey Children's Hospital.

Chapter XXIX : Neonatal Morbidity and Mortality.

James Walker, B.Sc., M.D., Ch.B.(Glas.), F.R.C.O.G.

Professor of Obstetrics and Gynæcology, University of St. Andrews ; Consultant Obstetrician and Gynæcologist, Eastern Regional Board, Scotland.

Chapter XXVIII : Stillbirth—Its Causes and Prevention (with D. Baird).

The late Harold Waller, M.B., B.Ch.(Cantab.), F.R.C.O.G.

Formerly Pædiatrician to the British Hospital for Mothers and Babies, and the Poplar Hospital.

Chapter VIII : The Breasts and Breast Feeding.

R. R. Willcox, M.D.(Lond.)

Consultant in Venereology, St. Mary's Hospital, Paddington ; and at King Edward VII Hospital, Windsor ; Member World Health Organization Expert Panel on Venereal Diseases and Treponematoses.

Chapter XV.VI : Syphilis and Gonorrhœa in Obstetric Practice.

Rohan Williams, M.D.(Lond.), F.R.C.P., F.R.C.S.(Eng.), F.F.R., F.C.R.A.(Hon.)

Director, Radiological Department, St. Mary's Hospital, London ; Consultant Radiologist, Queen Charlotte's Maternity Hospital. Late Hunterian Professor, Royal College of Surgeons.

Chapter XXXIX : The Present Position of Radiology in Obstetrics.

A. Joseph Wrigley, M.D., B.S.(Lond.), F.R.C.S.(Eng.), F.R.C.O.G., F.C.O.G.(S.A.)

Obstetric Physician and Lecturer in Midwifery and Diseases of Women, St. Thomas's Hospital.

Chapter XXXI : Forceps.

Maureen I. Young, Ph.D.

Senior Lecturer in Experimental Physiology, Department of Medicine, St. Thomas's Hospital, London.

Chapter II : The Function of the Placenta and Fœtal Membranes (with J. D. Martin).

CONTENTS

CHAPTER I

PHYSIOLOGY OF CONCEPTION AND THE DEVELOPMENT OF PLACENTA AND FŒTAL MEMBRANES

W. J. Hamilton and J. D. Boyd

Cyclic Changes in the Genital Tract

In the females of most mature animals breeding and non-breeding seasons can be recognized. The frequency of the breeding seasons varies from species to species and is associated with a complex cycle of events which occur in the reproductive organs. The chief characteristic of the breeding season in most mammals is the phenomenon of *œstrus* or heat, when the female is receptive to the male. This phenomenon of behaviour is the culmination of a series of morphological and functional changes in the ovaries and reproductive tract which are known as the œstrous cycle. Ovulation occurs at œstrus. Some animals come into œstrus only once in a breeding season and are called *monœstrous*, others, in the absence of pregnancy, show such behaviour at regular intervals and are said to be *polyœstrous*. Domesticity may convert a primarily monœstrous into a polyœstrous condition. As far as the subsequent nourishment of the ovum (zygote) is concerned, the most important of the changes occurring at œstrus is the preparation of the endometrium for the reception of the fertilized egg after it has undergone cleavage in the uterine tube.

Since ovulation normally occurs during the few hours or days when the female mammal is in œstrus, insemination is assured at the most favourable period for fertilization of the eggs. Normally, then, pregnancy follows œstrus and the cycle is not complete until the young have been born and the mother has entered another œstrous period. If for some reason pregnancy does not occur, an œstrous cycle instead of a pregnancy cycle takes place. In this case, after a certain period usually shorter than the pregnancy cycle, the female again comes into " heat ". In a sense these œstrous cycles are abnormal, for the purpose of œstrus is to produce a pregnancy. In many laboratory and domestic animals, however, insemination is artificially prevented, and œstrus cycles recur in long sequences.

In the human female there is no well-defined œstrous period. Striking periodic changes, however, do occur in the ovaries and genital tract and are similar to those that occur in polyœstrous mammals. The changes occurring in the ovary constitute the *ovarian cycle*, and those in the uterus, which chiefly affect its lining the endometrium, constitute the *uterine cycle*. A given uterine cycle, in the absence of fertilization, ends in a stage of hæmorrhagic destruction (*menstruation*) of the greater part of the endometrium. The uterine cycle is thus often called the *menstrual cycle*.

Menstruation must not be confused with œstrus. The latter is a phenomenon of behaviour and it occurs, as has been stated above, at about the time of ovulation.

Menstruation, on the other hand, is separated by about 14 ± 1 days from the time of ovulation. That is, ovulation occurs about halfway between two menstrual periods in a normal twentyeight-day cycle (see later).

During the early part of the ovarian cycle *oöcytes* in the cortex of the ovary grow and, with the surrounding cells (granulosa and thecal), form the *ovarian* (Graafian) *follicles*. In the human female usually only one such oöcyte grows to complete maturity and is shed in each cycle. After ovulation the collapsed ovarian follicle is converted into a *corpus luteum*. The other maturing oöcytes undergo degenerative changes, i.e. become atretic. If pregnancy does not supervene, a new batch of oöcytes matures in the next ovarian cycle.

There is a cyclic production of hormones by the ovary. During the growth of the follicle the follicular cells and the adjacent theca interna cells produce the œstrogenic hormone, *œstradiol*. This is partly stored in the follicular fluid and partly taken up by the thecal blood-vessels. After the rupture of the follicle and the formation of the corpus luteum, the cells of the latter produce a hormone, *progesterone*, which brings about the progestational changes in the endometrium and renders it sensitive for the reception and implantation of the blastocyst. If fertilization of the ovum does not take place, then, after some ten to fourteen days, the corpus luteum retrogresses and menstruation ensues. If however the ovum is fertilized, the corpus luteum increases in size, the luteal zone becoming broader, and usually remains active until about the end of the fourth month of pregnancy. The corpus luteum is essential for the survival and implantation of the blastocyst and for the early development of the placenta. Nevertheless, it has been established that removal, in woman, of the corpus luteum as early as the thirtyfourth day of pregnancy is without apparent effect on gestation. It seems likely that at this time and for the remainder of gestation the placenta is capable of producing hormones which maintain pregnancy (see p. 60).

Time of Ovulation

In mammals, generally, whether rupture of the ovarian follicle (or follicles) is spontaneous (as in most) or is induced by copulation (as in the cat, ferret and rabbit) ovulation occurs in close relation to œstrus. In women, since there is no well-defined œstrous period, the time of ovulation in the menstrual cycle is not manifest. The results of investigation in a number of different aspects of human and higher primate reproductive physiology have, however, clarified this relationship. It is now agreed by most investigators that ovulation, in women, occurs only once during the single ovarian cycle, though two or more ova may be simultaneously shed. Stieve (1952) has brought forward evidence that ovulation may occur more than once in a given cycle, but this opinion has not been confirmed.

The recovery of ova is the most convincing evidence that ovulation has occurred. Ova have now been recovered by a number of investigators from washings from the uterine tubes at a definite period of the menstrual cycle (for a review, see Shettles, 1960). The time relationship between the recovery of the ova and the next expected menstrual period is 14 ± 1 days. Evidence from the results of single coitus and artificial insemination (Schellen, 1957) indicates ovu-