



# THE QUEEN CHARLOTTE'S TEXT-BOOK *of* OBSTETRICS

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*Frontispiece.*

## PREFACE TO THE SIXTH EDITION

SINCE the fifth edition was published, Mr. Trevor B. Davies and Mr. Leslie H. Williams have relinquished their posts on the Obstetric staff of the Hospital. One of these vacancies on the obstetric side has been filled by Mr. H. G. E. Arthure. Dr. E. Rohan Williams has been appointed radiologist in charge of the newly-established diagnostic X-ray department, and is responsible for re-writing and illustrating the X-ray section of this edition.

It is unfortunate that the war has necessitated the closure of the Queen Charlotte's Isolation Block and the Research Laboratories, with the consequence that in this edition we are not able to assess the value of the recently introduced preparations used in chemo-therapy.

A small section has been added on post-natal care ; but in other respects this edition follows an arrangement similar to its predecessors, although in many sections alterations have been made to bring the text into line with the methods of obstetrics as practised at Queen Charlotte's Hospital to-day ; as well as the inclusion of any recent advances which have been introduced since the publication of the last edition.

## PREFACE TO THE FIRST EDITION

THIS book has been written in order to set forth the views held and the methods practised by those at present connected with the staff of Queen Charlotte's Maternity Hospital. It is in no sense intended as an encyclopædia of Obstetrics, and for that reason does not describe a variety of opinions or of treatments.

The member of the staff who has been responsible for the arrangement and general production of the book wishes to express his grateful thanks to his colleagues for the work, time and enthusiasm which they have ungrudgingly given to its compilation. Special mention must also be made of the kindness of Professor Frazer, who has written the chapter on Embryology. Acknowledgment is also due to the effective co-operation of Messrs. Shiells & Ford and Mr. S. A. Sewell, who are responsible for the illustrations, and to Messrs. Allen and Hanbury, who have lent the blocks for the illustrations of Obstetric Instruments.

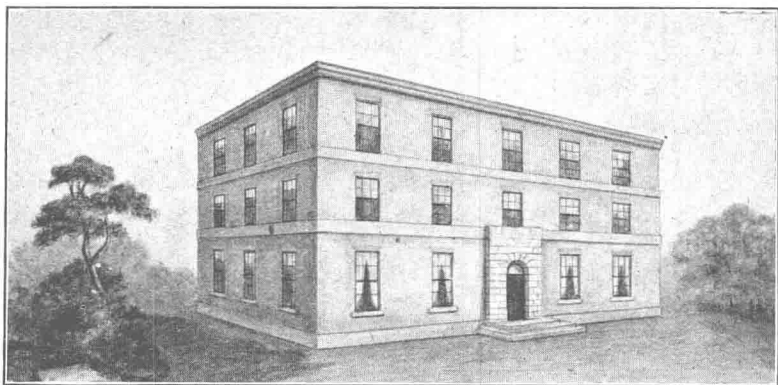
Lastly, it is with great pleasure that the authors take this opportunity of expressing to Mr. J. Rivers, of Messrs. J. and A. Churchill, their appreciation of his unfailing courtesy and kindness and of the very great help which he has so willingly given them in the production of this volume.



# FOREWORD

## A SHORT HISTORY OF QUEEN CHARLOTTE'S MATERNITY HOSPITAL

QUEEN CHARLOTTE'S Maternity Hospital was founded in 1739, and was thus the earliest lying-in hospital not only in London but in the British Isles. Dr. G. C. Peachey (*Medical Press and Circular*, May 1924) found among the Sloane MSS. in the British Museum a letter from Sir Richard Manningham, who was the foremost obstetrician of his time, showing that in 1739 he opened a house in Jermyn Street for the reception of twenty-five lying-in women, known as the General Lying-in Hospital. In 1754, the hospital was transferred to Duke Street,



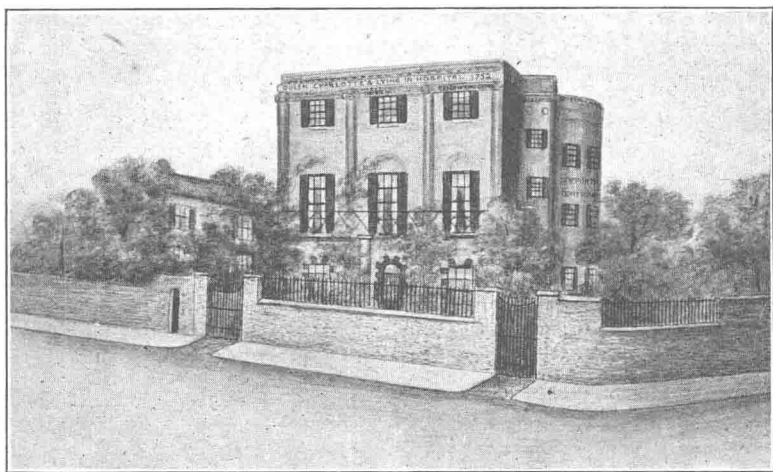
Original Manor House.

Grosvenor Square, and from there, in 1762, to Quebec Street, St. Marylebone. There it remained until 1773, when it was again removed to St. George's Row, within a few yards of the famous Tyburn Turnpike. In 1791 the hospital was removed to Bayswater Gate (near Queen's Road) and was fortunate enough to secure the support of the Duke of Sussex, by whose influence Queen Charlotte became its patron, and the name of the hospital was changed to Queen Charlotte's Lying-in Hospital. The hospital even at this early date received resident male pupils in addition to pupil midwives. In 1813, the Old Manor House, Lisson Green, was acquired, and the hospital until 1940 still occupied the site. Queen Charlotte was followed in succession as patron by King George IV, King William IV, Dowager Queen Adelaide, Queen Victoria (1850), Queen Alexandra and Queen Mary (1910). In 1843, the Duke of Sussex died, and the hospital lost its greatest benefactor after thirty-four years of service. During this time the number of in-patients increased from 30 to 200 per annum, and out-patients attended at their homes from 120 to 330 per annum.

In 1856 the hospital was rebuilt, and in 1865 an additional story was

added. In 1872, the first resident medical officer was appointed, and soon afterwards it was decided to appoint a matron. Previous to this a "resident midwife" had been in complete charge of the patients. In this year (1872), 433 women were delivered in the hospital and 686 in their own homes.

In 1885, a Charter of Incorporation was granted to the hospital and a new wing was erected in 1886, when the number of patients attended was actually double that of 1872. In 1898, the hospital was further enlarged, 1,112 patients were delivered in the hospital and 1,070 in their homes. In 1899, a Nurses' Home and Residential College for Students was erected, and this had to be extended in 1908. During this year, 1,865 women were delivered in hospital and 2,169 in their homes, and this approximately represents the total number attended to at the present time. Numbers of applications have to be



Queen Charlotte's Hospital, Original Buildings.

refused at the present time owing to the lack of accommodation. In 1921, many of the wards were reconstructed, and a new operating theatre was provided in 1926.

The out-patient department, or district, comprises eight large areas, including St. Marylebone, Paddington, Kensington, Hammersmith and Willesden. Each district is under the supervision of a district midwife, residing in that area, together with pupil midwives, the whole being under the control of a district medical officer.

The hospital has in addition an ante-natal department and an infant consultation centre connected with it.

A supplementary charter was obtained in 1924, authorising a further change of name to Queen Charlotte's Maternity Hospital.

In 1929 an important new development was started, and it was decided to rebuild the hospital upon a new site a few miles away. The first stage in the rebuilding of the hospital was completed in 1930-31 by the erection of the "Isolation Block" for the treatment of cases of

puerperal infection, and the "Bernhard Baron Memorial Research Laboratories"; and since then the treatment of puerperal sepsis on a large scale in this special department continued until the outbreak of war, when the Isolation Block and Research Laboratories were closed. The second stage of the rebuilding scheme is well in hand, and in 1940 the hospital was moved from the Marylebone Road building into the first block of buildings which had been finished at Goldhawk Road, Hammersmith. We look forward to the completion of our rebuilding scheme after the war.

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## Section I. Development and Anatomy

### CHAPTER I

#### DEVELOPMENT

THE *mature* but unimpregnated ovum—the female sex-cell—is fertilised by conjunction with the spermatozoon or male sex-cell. As a consequence of this it develops into an embryo, which, with its coverings and adjuncts, grows within the uterus: this organ is then termed *gravid* or *pregnant*. When the full term of this growth is attained, the uterus expels its contents in the act of *parturition*.

In this chapter we will consider the formation of the contents of the gravid uterus, in order to comprehend the conditions obtaining within this organ at the time of parturition, and the effect of this act upon them.

The **ovum** is a single but large cell, about  $\frac{1}{10}$  mm or more in diameter, which is discharged from an **ovarian** or **Graafian follicle** in the ovary as a result of its rupture. It is probable that the “immature” ovum becomes “mature” before it is discharged from the follicle: *maturation* is brought about by two rapidly consecutive divisions of the cell into unequal parts, as a result of which a large “mature” ovum and two very small “polar bodies” are produced. These maturation divisions are peculiar in that they leave the ovum with only half the number of chromosomes proper to the other cells in the body, a fact of primary interest to the biologist, but of no importance from our point of view. The polar bodies soon break up and disappear.

Maturation preceding the possibility of fertilisation, which, as said above, is the probable occurrence in man, is not the sequence usually found in vertebrates, where fertilisation occurs before the casting off of the second polar bodies. The difference probably has to do with variations in time of sexual congress.

**Corpus Luteum.** Certain changes take place in the ovarian (or Graafian) follicle after it has discharged the ovum. The wall of the follicle, before its rupture, is lined by a thick layer of cells, the *stratum granulosum*, in a special part of which, the *discus proligerus*, the ovum is held: the whole structure is distended by the contained *liquor folliculi*. After discharge of the ovum and the greater part of its discus, with the liquor, the cells of the stratum granulosum begin to proliferate and grow inwards. At the same time some connective tissue processes, with small vessels, also grow in from the outside among the cells, and, as a rule, a little hæmorrhagic effusion from these vessels, or clot, is to be found in the cavity into which the growth is taking place. The cells develop a yellowish pigment (lutein) within their bodies, and the name *corpus luteum* is thus given to the yellow-coloured and wrinkled structure which marks the site of a recently ruptured follicle.

It is composed of thick columns of large lutein-containing cells, with intervening capillaries and connective tissue and remnants

of blood clot centrally. The large cells are derived, as already mentioned, from the cells of the *stratum granulosum*, but there are also certain "paraluteal" cells, of smaller size and somewhat stellate form, scattered about between them: these are derived from the *theca interna* of the follicle. The external theca is represented in the *corpus luteum* in the form of sparse cellular ingrowths accompanying the vessels, but this component is not an important one. The whole structure, by its appearance, strongly suggests a gland of internal secretion, which it is. Its hormones are only

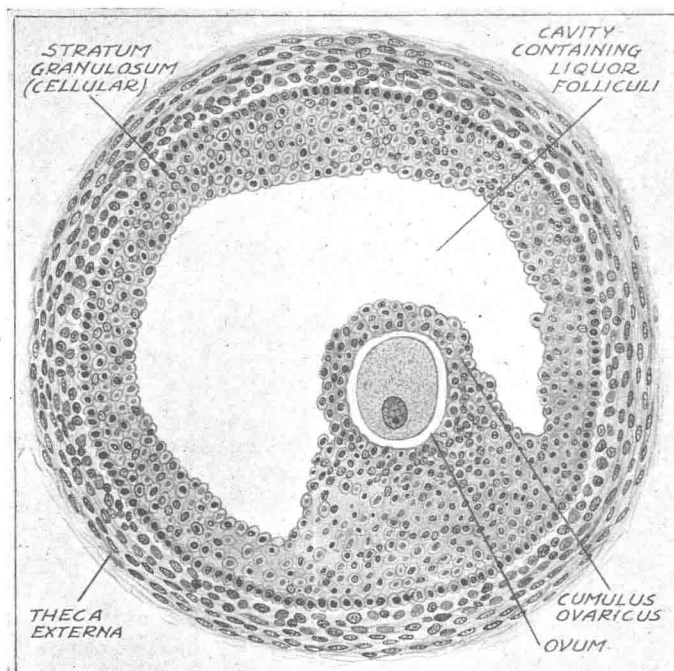


FIG. 1. Diagram of section through an ovarian follicle (Graafian follicle). The ovum is held in a mass of cells projecting into the cavity of the follicle. The so-called corona radiata of the ovum is made directly by the cells of the cumulus.

concerned with regulation of processes of gestation and lactation, as might be inferred from the presence of a definite *corpus luteum* only among mammals.

When fecundation of the ovum does not take place, gradual atrophy of the cells occurs, with increase of the connective tissue element: the *corpus luteum*, which reaches its greatest development in about a fortnight, is in this way reduced to a scar-like *corpus albicans* a few weeks later. But if fertilisation occurs the *corpus luteum* continues to grow slowly till the third or fourth month, being then about an inch across. It persists throughout pregnancy, beginning to regress before parturition, and completing its degeneration a considerable time after this event. This *corpus luteum of pregnancy* is often termed

“true,” the other being “false,” but such terminology is hardly justifiable.

The whole cycle of ovarian activity so far indicated depends for its appearance, apparently, on the proper functioning of the **anterior pituitary**: the morphological structures and their functions are represented, *in posse* at any rate, in the ovary, but can only develop actively and fully under the hormonal influence of the (anterior) pituitary. This influence causes the appearance of the follicle, its final rapid growth and rupture with accompanying symptoms, and the luteal change then occurring in the walls of the empty sac. The *corpus luteum* now comes into action through its special hormones, but these again depend for their effective appearance on the stimulus of the pituitary.

It may be added that the ovarian follicle is found only in mammals above the Monotremes, and that its presence, while doubtless of mechanical value in extruding the ovum, is probably a necessity also in another way, since it provides a relatively large area with the power of creating a *corpus luteum*. The large size of the Monotreme egg serves this double purpose.

The *corpus luteum* of pregnancy has an interest of a special kind in obstetric work, for (under pituitary influence) it leads to growth and preparation of the mammary glands for lactation, and retards or inhibits ovulation: moreover, it has been shown experimentally that its presence and full development appear to be necessary for the effective embedding of the ovum in the uterus, and for the completion of the term of a normal pregnancy. It is not certain, however, whether these later results obtained on animals are altogether applicable to the human subject; a number of factors enter into the question, which in any case it is not necessary to consider in this section.

**Mature Ovum.** This enters the uterine (or Fallopian) tube, and fertilisation if it occurs, takes place usually in the outer third of this tube. It is, of course, quite possible that fertilisation may be delayed so that it may occur in the inner part of the tube, or even in the uterus, though in this last case it would seem likely that the ovum would fail to embed itself in that organ: on the other hand, it is possible, though very rare, for spermatozoa to fertilise an ovum on the surface of the ovary, or even within a Graafian follicle which has failed to discharge its ovum. It may be taken as generally accepted, however, that in most cases of normal pregnancy the ovum has been impregnated within the tube, and probably in its outer half or third.

Investigation of a large amount of material seems to show that the usual time of fertilisation is about the middle of the inter-menstrual period, or a little before this, but it may occur, of course, at any time.

**Fertilised Ovum.** This is now passed on through the remainder of the tube to the uterus, in which it becomes fixed by a process known as “embedding” or “implantation.” The passage through the tube, which probably occupies some days, is presumably effected as the result of movements of the cilia with which the lining cells of the tube are furnished: these were described by Henle as lashing towards the



uterus, so that the ovum, sunk in one of the longitudinal furrows of the tube, is gradually moved in this direction. Peristaltic contractions of the tube walls have been said to occur also, which have been assumed to effect a similar purpose. Whatever may be the relative values of these factors, the ovum in ordinary cases is ultimately passed through the uterine ostium of the tube into the cavity of the womb; if it fails to reach the uterus it may develop within the tube as a *tubal pregnancy*.

In its passage through the tube the ovum undergoes the first changes following fertilisation: these are the *segmentation* divisions. They are concerned with the establishment of a proper proportion between nucleus and cytoplasm, as a preliminary to true development. From the present point of view the important thing about them is that they do not lead to any increase in size of the ovum, so that its passage is not hindered. But as a result of this early development it attains a condition which enables it, on reaching the uterus, to adhere to and embed itself in the mucous membrane of this organ, where it can undergo its full development.

This implantation is said to occur, as a rule, on the posterior wall rather than on the anterior, and towards the upper end rather than below, but, as a matter of fact, it may occur anywhere within the uterus. To understand the process, and the subsequent developments, it is necessary to consider shortly the uterine mucosa.

The **uterine mucosa**, which is about to form the nidus for the ovum, is a thick and vascular membrane containing many long glands: these are lined with a single layer of large cubical or elongated cells, and are embedded in a somewhat embryonic type of connective tissue stroma, in which a large number of vessels run longitudinally between the glands, connecting a plexus near the free surface with the basal vessels close to the muscular wall and communicating with each other by means of branches among the gland-tubes. The blind and pouched ends of the glands are embedded in the adjoining muscular tissue of the uterus: immediately distal to this the tubes have dilated and slightly tortuous lumina, and then, relatively constricted, run a straight course to the free surface of the mucous membrane, where their lining cells are directly continuous with the single-celled layer covering this surface. The intervals between these ducts are, owing to their smaller size and fairly straight course, greater than in the deeper parts of the membrane, and the intervening connective tissue, moreover, is somewhat denser, so that the superficial part of the membrane constitutes what is known as the *stratum compactum*: this contrasts with the deeper part where the dilated tortuous tubes give it a more spongy appearance, and this part is consequently termed the *stratum spongiosum*. There is no definite boundary to these layers, which fade into one another, but the terms are useful in that they distinguish between the superficial and deep part of the mucosa: we will see that the compact layer is that which receives the ovum, while the separation of membrane at parturition involves, as a rule, the spongy layer.

The mucosa thickens slowly during the inter-menstrual cycle. In the middle of this period, the time when impregnation usually takes