

NOVAK'S TEXTBOOK OF GYNECOLOGY

EDMUND R. NOVAK

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HOWARD W. JONES

NINTH EDITION

INTERNATIONAL STUDENT EDITION

Gynecology

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The Williams & Wilkins Company
428 East Preston Street
Baltimore, Md. 21202 U.S.A.

Made in the United States of America

First Edition, 1941
Second Edition, 1944
Third Edition, 1948
Reprinted February, 1950
Reprinted March, 1951
Fourth Edition, 1952
Reprinted June, 1953
Reprinted February, 1954
Reprinted July, 1955
Fifth Edition, 1956
Reprinted September, 1957
Sixth Edition, 1961
Reprinted May, 1962
Seventh Edition, 1965
Eighth Edition, 1970
Ninth Edition 1975

Sales Area of International Student Edition: Greece, Africa (excluding South Africa), Turkey, Syria, Jordan, Israel, Iraq, Iran, Lebanon, Arabian Gulf States, Saudi Arabia, Kuwait

Composed and Printed at the
Waverly Press, Inc.
Mount Royal and Guilford Avenues
Baltimore, Md. 21202 U.S.A.

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International Student Edition



THE WILLIAMS
& WILKINS COMPANY

TO OUR FAMILIES

Preface to the Ninth Edition

Since the appearance of the eighth edition, and even before, medical education has been undergoing evolutionary changes. Particularly noteworthy is the widespread adoption of the core program, one where the medical student receives very scant exposure to any aspect of medicine except the one which is planned as a specialty. Many medical schools offer only a four- to six-week block in obstetrics and gynecology accompanied by perhaps a short series of lectures. This seems rather short-sighted, for unless one should elect to go into male urology, approximately 50 percent of his practice will consist of women. Four to six weeks is hardly sufficient to learn about female diseases. Right or wrong, the core program is here.

In the core programs, the students usually opt to purchase concise textbooks for study of those subjects where the four- to six-week blocks are presented. The comprehensive textbook is sought only in the elective specialty chosen. For this reason, we published with our eighth edition a student paperback edition which selectively was a reduction in size and which proved to be popular. This pattern will be repeated, for a new student edition will be published simultaneously with the ninth edition of the comprehensive book. The individual chapters of the student edition conform to the chapter layout of this ninth edition; in effect, the student can draw upon this ninth edition for additional information and references.

For those students who wish to learn gynecology in depth or who elect to specialize in gynecology, those residents who have made the choice, and those practitioners who encounter diseases peculiar to women, be they generalist or specialist, this ninth edition will serve to update the subject. Major revisions will be noted in the sections on endocrinology, cytogenetics, oncology, and population control. Modernization, however, is part and parcel of all chapters and their references.

We shall continue to avoid the so-called TNM classification for many gynecological lesions; while cognizant of its purpose, nevertheless we feel that TNM is often cumbersome and impractical. We shall likewise take two other liberties. On occasion, we may abbreviate references, being careful not to change the context. Further, where papers are published by multiple authors, we shall list the lead author. Perhaps these innovations will not be misleading nor offensive.

Where graphics are an integral part of the learning process, a supporting textbook should strive to present the best available. We are constantly trying to improve these via our own photographic department, ably staffed by competent professionals such as Mr. Chester Reather, and Mr. Raymond Lund. On occasion, we choose to use illustrations sent to us by cooperative friends. In some instances these may depict only a subtotal hysterectomy, a rare procedure in our own clinic. However, we give the reader a knowledge which otherwise may not be communicated, albeit not of the quality of reproduction consistent with our own.

We authors are sincerely grateful to Dr. John K. Frost for his truly remarkable chapters on cytopathology, which have received highly laudatory remarks in reviews of previous editions. Dr. J. Donald Woodruff has been responsible for the chapters on the vulva and vagina, and in addition has been generally invaluable by means of various suggestions and criticisms. To this truly fine clinician and pathologist, who is an even better friend, go our sincere thanks. We specifically thank Dr. Hyman Strauss (Brooklyn) for his excellent color plates of the vulva. Cooperation and helpfulness by The Williams and Wilkins Company in the preparation of this and every edition has been superb; we express our appreciation to them and to the W. B. Saunders Company, both of whom have kindly permitted generous interchange of various prints, plates, and tables without always specific notation. Lastly, sincere thanks go to Miss Helen Clayton and Mrs. Katheryn Frederick in our offices, and to Dr. Theodore Baramki for his tireless proofreading; without their frequent and unselfish efforts, preparation of this edition would have been impossible.

E.R.N.
G.S.J.
H.W.J., Jr.

Preface to the First Edition

SINCE THE PLAN and scope of this book represent something of a departure from those followed in other textbooks of gynecology, the author feels impelled to state the ideas which furnished the incentive for the preparation of this work, and which dictated its character and scope.

First of all, no especial apology seems necessary for the combined title. While gynecology was formerly often spoken of as a branch of surgery, this is certainly not its present status. Only a small proportion of gynecological patients require surgical treatment. On the other hand, the biological aspects of gynecology have assumed vast importance, chiefly because of the amazing developments in the field of reproductive physiology and endocrinology. Many of these advances find daily application in the interpretation and management of functional disorders in women. In other words, female endocrinology is now an integral and important part of gynecology, and it is so considered in this book.

Secondly, it has always seemed to me that the great majority of readers of textbooks on gynecology must be not at all interested in the details of operative technique, to the consideration of which most authors have devoted many pages. Certainly this applies to the general practitioner, while medical educators are now generally agreed that the medical student should not be burdened with such details in his undergraduate years. Since this book is designed for these two groups primarily, the indication seemed clear to omit the consideration of operative details. The plan followed is to carry the patient up to the point of operation, and to discuss the indications, scope and purpose of the latter, without going into descriptions of the technique itself.

Diagnosis and treatment have been accented throughout the book, as I believe most readers would wish. The traditional chapters on anatomy, history-taking and methods of examination have been boiled down to the essentials. On the other

hand, functional disorders, including especially the large group of gynecological endocrinopathies, have been treated rather elaborately, in keeping with the avowed plan of covering the combined fields of gynecology and female endocrinology. The list of references appended to each chapter makes no pretense of exhaustiveness, and preference has been given to publications most worth while, those most recent, and those written in English. The pathological aspects of gynecological disease, so fundamental to a proper understanding of the whole subject, have received adequate but not disproportionate consideration.

In the consideration of various endocrine disorders a disturbing problem presented itself. In the discussion of endocrine preparations which might be indicated in treatment, there is no doubt that the mention of various products by their commercial names would have had some advantages. On the other hand, these have appeared to be definitely outweighed by the disadvantages of such a plan, apart from its questionable delicacy. These proprietary preparations are constantly multiplying, and their commercial names are being changed from day to day. For example, there are now well over forty estrogenic preparations on the market. It would be almost impossible, in any enumeration of such therapeutic products, to avoid omission of some of them, and this might be very unfair to products perhaps just as effective as those which might be included. A complete list published today is quite likely to be very incomplete within a few months.

The sensible plan seemed to be to rely on the intelligence and initiative of the reader, who should have no difficulty in ascertaining good commercial preparations of estrogen, progesterone, chorionic hormone or any other hormone principle to which reference is made in the treatment of various disorders.

It will be noted that the work is devoted to "straight" gynecology and female endocrinology, and that it does not include a consideration of disorders in allied fields which concededly obtrude themselves frequently into the practice of the gynecologist. For example, many gynecologists include female urology in their practices, while anorectal and abdominal surgical problems are often encountered, as may be problems in almost any field of medicine. For textbook purposes, however, the line must be drawn fairly sharply, and the reader will naturally expect to go to the proper sources for information in any of these allied fields.

In short, the purpose of this book is to present to the reader as much information as is possible in as practical a fashion as possible on the subjects of gynecology and female endocrinology. Whether right or wrong, the ideas behind the book represent the crystallization of many years of teaching and practice in gynecology. The author's goal has been to produce a book which would not only be suited to the needs of the medical student, but which could be carried with him into the practice of his profession.

It is a pleasant obligation to express my indebtedness to those who have been helpful to me in the preparation of this book. To a number of my friends, especially Dr. R. B. Greenblatt, of Augusta, Georgia, I am grateful for the loan of illustrations; to Dr. E. L. Krieg for the excellent colored illustrations as well as for other photographic work; to Mr. Chester Reather, for most of the photomicrographs; to Miss Eva Hildebrandt, technician in the Laboratory of Gynecological Pathology at The Johns Hopkins Hospital and to Sister Mary Lucy, technician at Bon Secours Hospital, for help in the preparation of sections for microscopic illustration; to my artist, Miss Frances Shultz, for many of the illustrations; and to my faithful secretary, Miss Helen L. Clayton, for much

help throughout the project. For permission to use illustrations which have appeared in previously published articles of my own I am indebted to the publishers of the Journal of the American Medical Association; the American Journal of Obstetrics and Gynecology; Surgery, Gynecology and Obstetrics; and the Bulletin of The Johns Hopkins Hospital.

Certain illustrations which appeared in one of my previous books, Gynecological and Obstetrical Pathology, do not have a credit line in the caption. For permission to use these I wish to thank W. B. Saunders Company, the publishers.

Finally, it is a genuine pleasure to acknowledge the efficient and wholehearted cooperation of the publishers, Little, Brown and Co., throughout the preparation of this work.

Baltimore

EMIL NOVAK

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chapter 1

Anatomy

The female reproductive organs are divisible into two groups, the external and internal. The former comprise the vulva and vagina; the latter the uterus, tubes, and ovaries.

THE VULVA

The vulva, representing the part of the genital apparatus visible externally, is a composite structure, its constituent parts being the following: (1) the labia majora, (2) mons pubis or mons veneris, (3) labia minora, (4) clitoris, (5) vestibule, (6) urethral meatus, (7) vaginal orifice, (8) hymen (in virgins), and (9) vulvovaginal or Bartholin's glands.

Labia Majora

The labia majora are two longitudinal raised folds of adipose tissue covered by skin which, especially in brunettes, is rather heavily pigmented. They are markedly developed at puberty, as one of the secondary sex characters. Before puberty the vulva is rather flat, and the labia minora are much more conspicuous than the labia majora. In the postpubertal female, the latter extend posteriorly toward the perineum. On separating them pos-

teriorly, a slightly raised connecting ridge, the *fourchette*, is seen. Just anterior to this, between it and the vaginal orifice, is a shallow, boat-shaped fossa, the *fossa navicularis*. The external surface of the labia shows a heavy growth of hair, usually curly, but the hair on the inner surface is much more sparse.

The substance of the labia majora is adipose tissue, although it contains also a light fascial layer which is the analogue of the dartos in the male. The labia themselves are to be looked upon as corresponding to the scrotum of the male. Mistakes in the diagnosis of the sex of pseudohermaphrodites have not infrequently been made because of the resemblance of the split scrotum to the labia majora of the vulva.

Mons Pubis

The mons pubis is a mound of fat covered by hair, situated just above the level of the symphysis pubis, at the lowest portion of the anterior abdominal wall.

Labia Minora

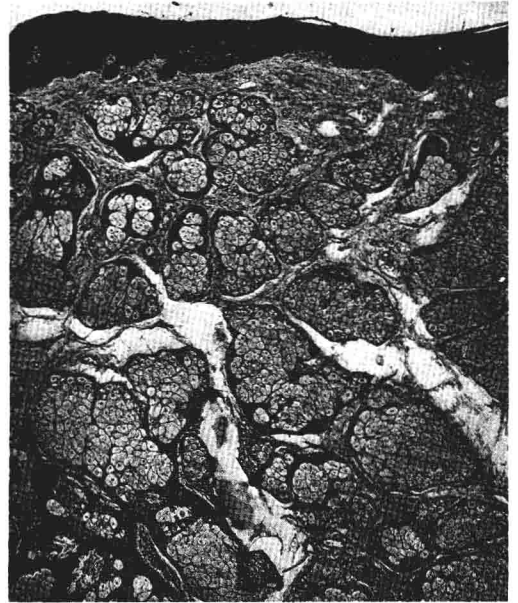
The labia minora are two firm pigmented folds which extend from the clit-

oris posteriorly to about two-thirds of the distance toward the perineum. Anteriorly they subdivide, one fold covering the clitoris to form its prepuce (preputium clitoridis), the other passing beneath the glans to form, with its fellow of the opposite side, the frenulum clitoridis.

The skin covering the labia minora is devoid of hair follicles, but is very rich in sebaceous glands. Sudoriferous glands are exceedingly sparse, and, according to some, completely absent. The substance of the labia minora is described as being of the erectile type, though the degree of erectility is not comparable to that of the clitoris. It contains many venous spaces with much involuntary muscle tissue.

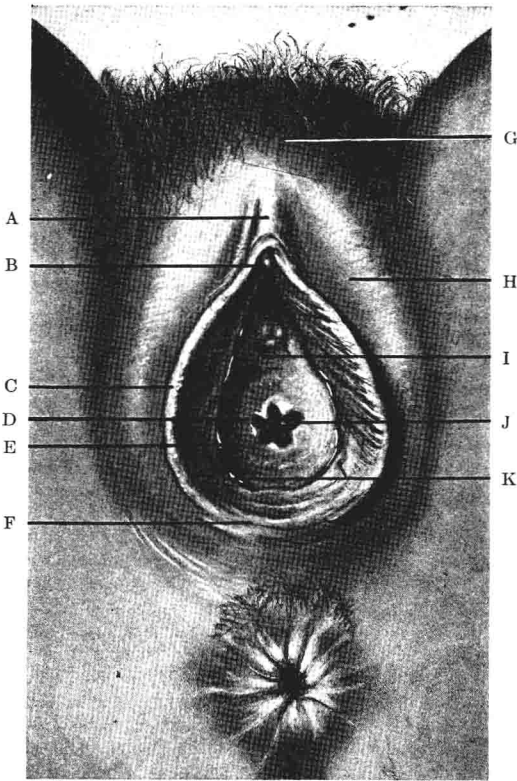
Clitoris

The clitoris is a small, cylindrical, erectile organ corresponding to the male

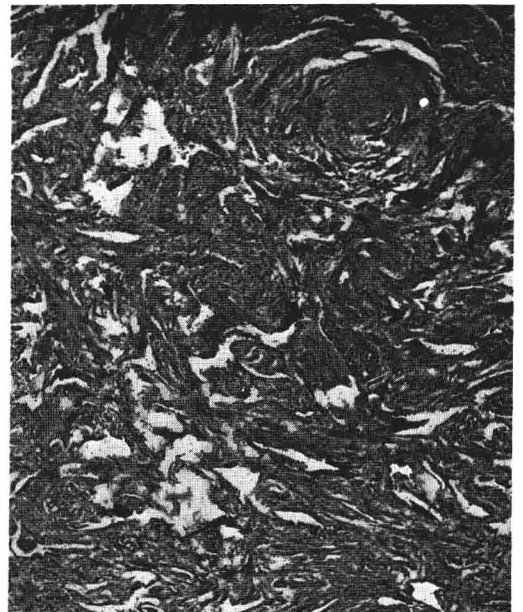


1.2. Histological structure of labia minora, near clitoris, showing large number of sebaceous glands.

penis. Like the latter it consists of a glans, a corpus or body, and the crura. Only the *glans clitoridis*, about 6 to 8 mm. in diameter, is visible externally between the two folds into which the labia minora bifurcates anteriorly, the upper fold



1.1. The vulva. A, prepuce; B, clitoris; C, labia minora; D, hymen; E, vestibule; F, posterior commissure; G, mons pubis; H, labia majora; I, opening of Skene's ducts; J, vagina; and K, vulvovaginal (Bartholin's) glands.



1.3. Microscopic structure of clitoris

forming the *prepuce* and the lower the *frenulum* of the clitoris. The *body* extends upward toward the pubis beneath the skin dividing into two *crura* which are attached to the pubic bones. The clitoris is made up of erectile tissue, with many large and small venous channels surrounded by large amounts of involuntary muscle tissue. The erectile tissue is arranged in two corpora cavernosa, and there is no corpus spongiosum as in the case of the male organ.

Vestibule

The vestibule is the boat-shaped fossa which becomes visible on separation of the labia. In it are seen the vaginal orifice and, anterior to this, the meatus urinarius. In the virgin the former is partly occluded by the *hymen*, a rather rigid membrane of firm connective tissue covered on both sides by stratified squamous epithelium. It is most frequently of annular crescentic shape, but it may be cribriform or sievelike. Under abnormal conditions it may be imperforate, occluding the vaginal orifice completely and leading to retention of the menstrual discharge.

Urethra

The urethral meatus is the small slitlike or triangular external orifice of the urethra. It is visible in the vestibule, at about two-thirds of the distance from the glans clitoridis to the vaginal orifice. At each side of the meatus one usually sees a small pitlike depression in which there are a number of mucous glands, called the lesser glands of the vestibule, to distinguish them from the greater glands, which are the glands of Bartholin.

Just below the outer part of the meatus are the orifices of the *paraurethral* or *Skene's ducts*, which run in a tortuous fashion below and parallel to the urethra for a distance of about 1.5 cm. Except near the orifice, where one finds stratified epithelium, the paraurethral ducts are lined by a transitional type of epithelium.

The *female urethra*, opening externally at the meatus, is lined proximally by a stratified transitional type of epithelium,

whereas its distal portion is covered with stratified squamous epithelium which extends into the canal for a variable but considerable distance. The studies of Huffman have shown that the canal is surrounded by a labyrinth of *paraurethral glands* which he considers to be the homologues of the male prostate. Some of these paraurethral canals enter into the urethra and some into Skene's ducts which open just below the urethral meatus. Their chief clinical importance lies in the fact that they frequently harbor the *Gonococcus*, the infection often being intractable to any treatment except excision or destruction of the ducts. In addition, *suburethral diverticula* may occur as a sequel to infection and cystic enlargement of these glands.

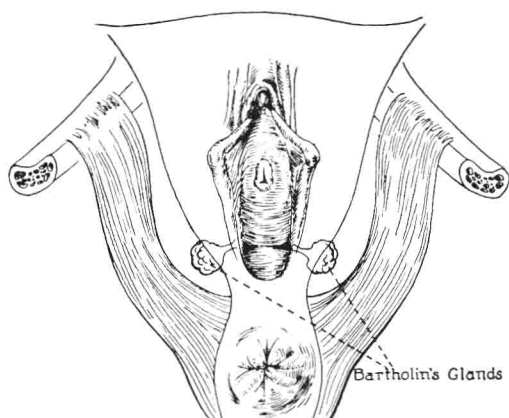
Vulvovaginal or Bartholin's Glands

The vulvovaginal or Bartholin's glands are lobulated racemose glands situated one on each side of the vaginal orifice, at about its middle, and placed deeply in the perineal structures. They are frequently the seat of gonorrheal or other infections.

The main duct of the gland is lined by a stratified transitional type of epithelium, except for a very short distance within the orifice. As the ducts become smaller and smaller, the epithelium is flatter and flatter, so that in the finest branches it consists of a single layer of flat cells. The acini are lined by a layer of cuboidal cells with basal nuclei. The function of the gland is the secretion of mucus for lubrication of the vaginal orifice and canal, especially during coitus.

THE VAGINA

The vagina is a musculomembranous canal which connects the vulva with the uterus. It is about 9 or 10 cm. in length, and, in the erect position of the woman, its direction is in general upward and backward from its vulvar to its uterine end. Its upper end expands into the cup-shaped *fornix*, into which the cervix uteri is fitted. The portions of the fornix in front of, behind, and at the sides of the cervix are designated as the anterior, pos-



1.4. The deep relations of Bartholin's glands.

terior, and lateral fornices. The posterior fornix is of special surgical interest because it gives ready access to the peritoneal cavity, as the upper fourth or so of the posterior wall of the vagina is covered by peritoneum.

In the virgin, the *mucous membrane* of the anterior vaginal wall is horizontally corrugated, with a central vertical ridge, thus producing the arbor vitae appearance. These ridges are absent in the

widened canal of the woman who has borne children.

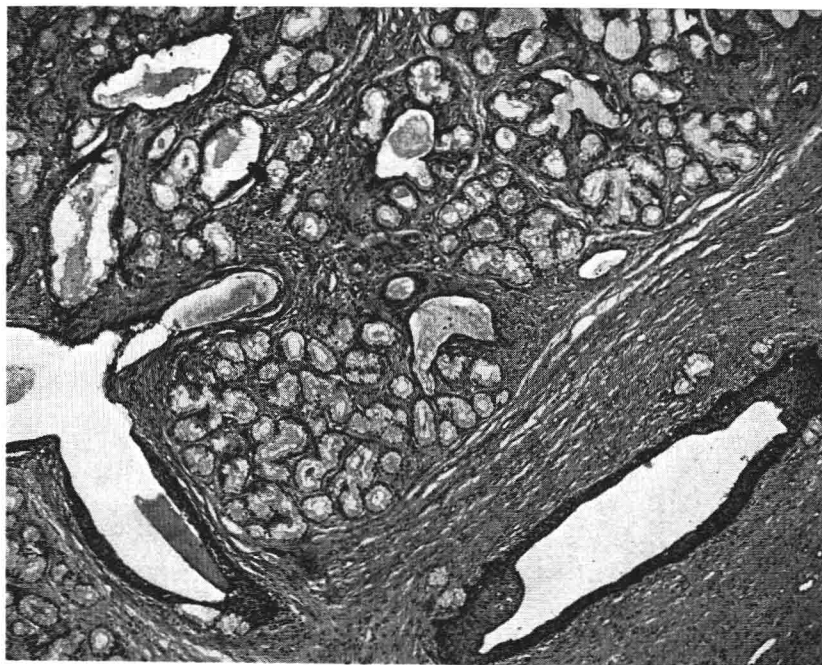
The mucous membrane of the vagina is reddish pink, and is lined by a stratified squamous epithelium into which project many tiny subepithelial papillae of the subjacent fibrous tissue. In the young child the epithelium shows only perhaps six or eight layers of cells, but in the postpuberal phase many more layers are present.

Beneath the mucous membrane is the muscular coat, made up of an inner circular and an outer layer. The outermost layer is the fibrous, derived from the pelvic connective tissue.

The not infrequent finding of certain glands, probably paramesonephric, in the vagina, producing the so-called "adenosis," will be noted in subsequent chapters. The recent review by Forsberg adequately discusses the derivation of the cervico-vaginal epithelium.

Cervix

The cervix is separated from the corpus externally by a slight constriction cor-



1.5. Microscopic appearance of normal Bartholin's gland. Note the transitional epithelium in the large ducts, the flattened epithelium in the small ducts, and the cuboidal secretory epithelium in the gland acini.