

FAMILY PLANNING EDUCATION

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with 47 illustrations

SECOND EDITION

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For
MEGAN CLARISSA HUBBARD
with the hope that
one day all newborns will be wanted
as much as she

FOREWORD

When Charles Hubbard first indicated to me an interest in writing a book emphasizing birth control technology and the venereal diseases in a language readily understood by those in our population in greatest need of such information, my reaction was one of gratitude.

As an epidemiologist with a dedication to the prevention of disease and disability, I have been appalled by the fact that in two areas that have long been the preoccupation of many medical and public health workers—areas in which so much time, effort, and money has been spent to develop and implement preventive measures—we are still faced with serious unresolved problems. I refer to unplanned pregnancies, which can result in unwanted children or abortions, and the continued presence of venereal diseases. To be convinced that, ideally, these could be prevented if taboos and ignorance surrounding birth control and venereal disease were lifted, adds to the discouragement.

If this country were in the midst of a smallpox epidemic, everyone would agree and even insist that all necessary precautions be taken to stem the epidemic's progress and protect our population. How, then, can we assure ourselves that adolescents and young adults, currently caught up in an alarming rise in reported cases of venereal disease, especially gonorrhea, and illegitimate births, can be made aware that throughout their period of greatest sexual activity, the application of simple and not unpleasant precautionary measures will save them from the later effects of disabling venereal diseases or unwanted pregnancies, either of which could interfere with their aspirations for a happy, healthy, and productive future? Obviously it is essential to gain the full interest and cooperation of the vulnerable groups. This can be achieved through early exposure to adequate information that can wield a positive influence on the development of their sexual behavior.

I have read this book with great interest and am convinced that Mr. Hubbard has made a creditable contribution to the solution of this knotty problem.

Anna C. Gelman, M.P.H.

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of Public Health and Administrative Medicine, New York City

PREFACE

Over sixty additions have been made to this second edition. The basic coverage has been extended, and many new developments and study results have been analyzed, reworded for the nonphysician, and added to this text. The book still conforms to the basic plan in the first edition. It offers information in four areas of the sexual aspects of living: contraception, abortion, sterilization, and the venereal diseases.

This book is written for every student and particularly for those whose interests are in the health-oriented professions. Readers needing an introduction to, or review of, reproductive anatomy and function will find it in Chapter 1. Most scientific terms are explained within the text and spelled phonetically and defined in the Glossary. Supplementary readings, which should be comprehensible to one who has studied this text, are suggested throughout. An Appendix offers an introduction to technical matter for those inclined to go a little farther. Here, such things as population growth rates, fertility rates, study design, natural increase, and other population mathematics are offered introductorily.

Highlights of information added to this edition include a treatise on family planning counseling: the purpose of counseling, what is counseling, counseling the deprived, the counselor facing coercion, and more. A brief recent history of family planning in the United States and England has been included. Many new developments and study results have been interpreted: the minipill, new male contraceptives under study, the metal-bearing IUDs, vasectomy and the threat of autoimmune disease, the Shield story, abortion with drugs, menstrual extraction (very early abortion), the Supreme Court abortion decision, some of its consequences for Americans, and the efforts to nullify it. In the final chapter on VD, a section on the "new" venereal diseases has been added, as well as an explanation of the United States Public Health Service's disputed syphilis study, its legal complications and the findings, and much more.

Knowledge is for use. Pursuing goals of personal, familial, and societal well-being takes place very much in the realm of sexuality and, like the pursuit of any goal, requires knowledge from which planning may occur.

Today there is still too much evidence of a lack of essential knowledge and planning. As late as 1975 in the United States about one million out-of-wedlock teen-age pregnancies occurred, with nearly 300,000 resulting in illegitimate (and mostly unwanted) births. Additionally, the VD situation remains unacceptable. During 1975, 25,303 cases of primary and secondary syphilis and 991,162 cases of gonorrhea were reported to the United States Public Health Service. Investigators think that these figures represent only 30% of the real number of cases. An earlier major study indicated that there are about 640,000 young female carriers of gonorrhea in the United States who are unaware that they are infected. The disease fails to give rise to symptoms in 80% of its female victims and in 5% to 20% of male victims, yet subjects their health to its potential ravishment.

The venereal diseases occur largely during the prime childbearing ages, 20 through 29 years, and are no longer only companions of poverty. The greatest number of births also comes within this age group. All of the disease and about 15% of the births are unwanted. These tragedies are chargeable to ignorance and are preventable. The main idea behind this book is to put information necessary to their prevention into one source, to do so with a minimum of technicality, and where technicality is unavoidable, to fully explain it in nonmedical terms. Thus, the information can be used by individuals, nurses, counselors, educators, and many others. Additionally, I have tried to make the book self-contained; that is, understandable without reference to any other source of information.

My opportunity to research the greater part of this text came as a result of graduate work at Columbia University and Columbia's International Institute for the Study of Human Reproduction. There, I was given the valuable guidance of Dr. Samuel M. Wishik, Program Development and Evaluation Director at the Institute; Susan F. Klein, Research Associate and Health Educator at the Institute; and Professor Anna C. Gelman, Epidemiologist at Columbia, my advisor and frequent consultant. I also want to express my gratitude to Dr. John W. Fertig, Emeritus Professor of Biostatistics at Columbia's School of Public Health and Administrative Medicine, for the time he spent discussing specific problems with me; and to Drs. Pincus Gross, Carolyn and Calvin Pinkard, and Ann Landsman, all associated with the Rehabilitation Counseling Program, College of Social and Behavioral Sciences, University of South Florida, for their intense and valuable guidance in the counseling realm and for their frequent assistance with many problems in the client-counselor relationship.

To such people any writer and investigator is indebted. My thanking them should not be interpreted as meaning that they are necessarily in accord with all the contents of this book. The contents are my own inter-

pretations, analyses, explanations, and occasional opinions of some of the scientific data and other activities in family planning and venereology today.

The several photographs of cases of venereal disease were reproduced with the permission of Technical Information Services, State and Community Services Division, Center for Disease Control, Health Services and Mental Health Administration, Department of Health, Education, and Welfare, Atlanta, Georgia.

Charles William Hubbard

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EDUCATION**

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STRUCTURE AND FUNCTION

FEMALE ORGANS

For ease of discussion the female reproductive organs can be divided into external and internal *genitalia*.^{*} The word *genitalia* is plural and is equivalent to “genital organs,” “organs of reproduction,” or simply “genitals.”

The external genitalia are all located outside the vaginal opening. They consist of two *labia majora* (singular, *labium majus*), two *labia minora* (singular, *labium minus*), a *clitoris*, and a *vestibule*, which are illustrated in Fig. 1-1.

The internal genitals are internal in the sense that they cannot be seen without instruments that make it possible to look inside the lower abdominal cavity (the pelvic cavity) and vaginal canal. They consist of two ovaries (singular, *ovary*), two *uterine tubes* (also called *fallopian tubes*), a *uterus*, and a *vagina*, which are shown in Fig. 1-2.

Structures and functions of the genitalia are given in the following pages.

External genitalia

Vestibule. The vestibule is a pocket, or space, formed by parts of the innermost surfaces of the external genitals. It may be visualized as a continuation of the vaginal opening and as a space roofed mainly by surfaces of both *labia minora*, which are in contact with each other along a longitudinal midline. This contact is not shown in Fig. 1-1, because the *labia minora* and *majora* have been drawn apart in order to reveal underlying structures.

The vestibular surfaces contain the urethral and vaginal openings as well as the openings of many mucus-secreting glands.[†] There are two kinds of vestibular glands that secrete mucus, the differentiation as to

^{*}Throughout the book italics indicates that the word or phrase is included in the Glossary, with the exception of genus and species of bacteria.

[†]Mucus is a slippery, syrupy liquid. In strict usage the word “mucus” is a noun, and “mucous,” an adjective. Thus one could write: “Mucous [adjective] glands secrete mucus [noun].”

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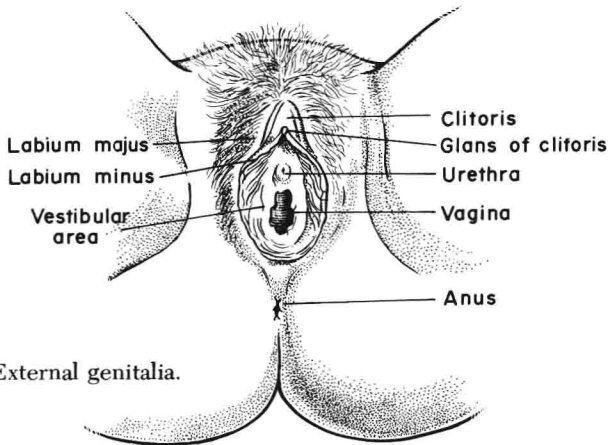


Fig. 1-1. External genitalia.

“kind” being based on size. The smaller, which are microscopic in size, are called the *lesser vestibular glands* and are found mostly near the clitoris and the urethral opening. The larger are not microscopic in size and are called the *greater vestibular glands*, or glands of Bartholin. Usually there are two of these large glands, one on each side of the vaginal opening. There are many small glands. Both large and small are active mainly during sexual excitement, producing their lubricative exudate. The glands of Bartholin are frequently invaded by various kinds of bacteria and are important because of this in the consideration of gonorrhea. (See Chapter 15.) Often an incomplete, thin membrane, the *hymen*, separates the vestibule from the vaginal opening. When present, it partially occludes the vaginal entrance.

Labia majora. The labia majora are composed of two rounded skin folds. These skin outpocketings envelop fibrous and fatty tissues that give each labium its consistency and shape. The outer labial skin, as well as some skin of the lower abdomen, is covered with hair after adolescence. This hair, called *pubic hair*, is shown in Fig. 1-1. Both labia majora along with the cleft between them are referred to as the *vulva*. Sometimes the word *vulva* is used to refer collectively to all the external genitalia.

Labia minora. Also folds of skin, the labia minora are of much smaller size and flatter than the labia majora, are hairless, and are located immediately within and beneath the labia majora. As can be seen in Fig. 1-1, the skin of the labia minora is continuous in front with that covering the protruding glans (head) of the clitoris.

Clitoris. The clitoris is composed of two small parallel cylinders of erectile tissue capped in front by a pea-sized mass of the same kind of tissue. This cap is called the *glans*. The structure and function of erectile tissue are also discussed in the section on the penis (pp. 10-11). Tissue

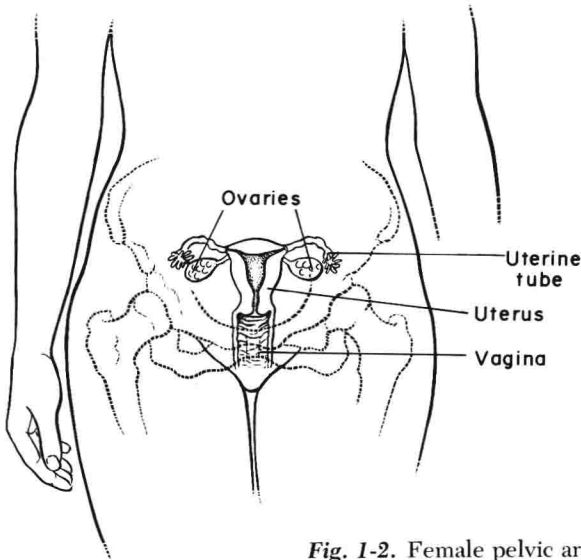


Fig. 1-2. Female pelvic area, schematic front view.

forming the clitoris is similar in structure and function to that of the penis; in fact, the clitoris might be thought of as a miniature penis without a urethra. It is a sensory organ. Being covered with skin, it is not free to extend outward from the body during erection as a penis does. From the glans the cylindrical body of the clitoris arcs backward toward the pelvis and is suspended from a part of it by ligament attachment.

Urethra. Although its opening is in the vestibule, the *urethra* is part of the urinary system, not of the reproductive system. In the female it is a short tube through which the bladder is drained of urine.

Internal genitalia

Ovary. As shown in Fig. 1-2 there are two ovaries, one on each side of the body. An ovary is a gland about $1\frac{1}{2}$ inches long that produces the female sex cell (the egg, or *ovum*). The product of fusion of an ovum with a male sex cell (a *sperm*) is the *zygote*, which has a potential of giving rise to a new human being. Generally one egg is matured and released each month, usually by alternate ovaries. In addition to ovum maturation, the ovaries have other complex functions, some of which are discussed in Chapter 2.

Uterine tubes. A uterine tube is also called a fallopian tube, or *oviduct*. There are two uterine tubes, each closely adjoining but not making contact with an ovary. When an ovum is released, it is picked up by the open, wide end of the horn-shaped (like a bull's horn) uterine tube, which is the end nearest the ovary. A released ovum is drawn toward a tube's open end by currents resulting from rhythmic movements of the tube.

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Each uterine tube serves three important functions: it is an egg conveyor; it is the place where fertilization usually occurs, the sperms having migrated there from the vagina; and its inner lining secretes a mucous substance that is necessary to continued life of the egg after its release from an ovary. An ovum is propelled through the uterine tube by the tube's muscular contractions and by wavelike movements of tiny single projections called *cilia* from cells lining the tube's innermost surface.

Uterus. An organ of many functions, the uterus has the capacity to permit implantation of a fertilized ovum and to then retain the ovum and aid in its nourishment until it has reached the birth stage. Being a highly muscular structure capable of powerful contractions, the uterus also assists in the birth process by taking a major role in expelling the infant.

In the nonpregnant woman the uterus is a pear-shaped organ about 3 inches long, 2 inches wide, and 1 inch thick. It is divided anatomically into three sections (Fig. 1-3): an upper domelike part called the *fundus*, a central portion about 2 inches long called the *body*, and an end (lowest) part called the *cervix*, which is continuous with and projects into the vagina. The cavity of the uterus is small and triangular in form, with the triangle's base located uppermost. This is shown schematically in Fig. 1-2. A fallopian tube opens into each side of the fundus. The *cervical canal* is

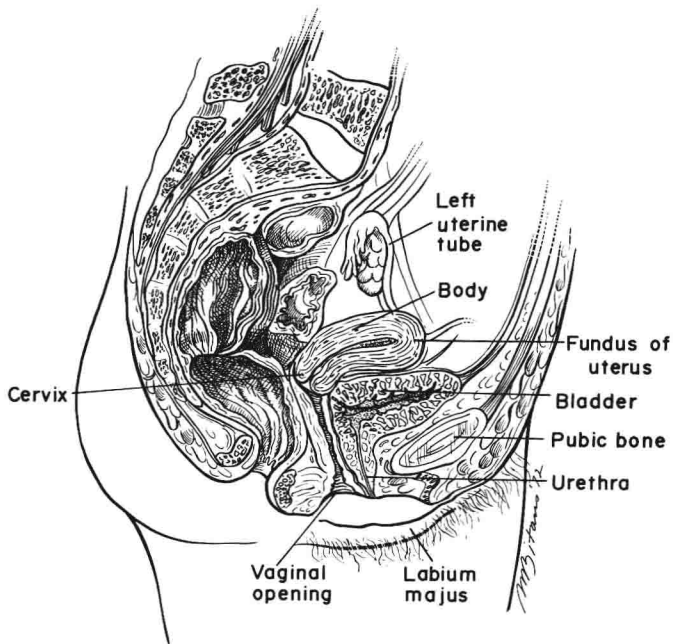


Fig. 1-3. View of the left half of the female body, with the intestines removed.

the lowest opening of the uterus and forms a passageway by which the uterine cavity opens directly into the upper end of the vagina.

The uterus is composed of three layers, which can be referred to most simply by location: an inner layer, a middle layer, and an outer layer (that facing the lower abdominal, or pelvic, cavity). Preceding menstruation the inner layer of the fundus and body thicken and develop a rich blood supply. If no pregnancy occurs, a few strata of this layer decay and are shed along with some blood and tissue fluid. This mixture of cells and fluids passes through the cervical canal into the vagina and hence out of the body where it appears as the menstrual flow. The cervical portion of the uterus does not undergo much change during premenstrual buildup or during shedding. Menstruation is more fully explained in Chapter 2. During pregnancy the uterus expands considerably in size, its cavity enlarges, and the walls thicken.

Vagina. The vagina is a cylindrically shaped structure when its walls are held apart by a penis or speculum (an instrument for enlarging the aperture of any canal or cavity). When a penis is inserted, the vagina can act as a place for the male to deposit his sex cells, which is an early requisite to causing a pregnancy. Capable of great expansion, the vaginal canal also functions as a birth passage.

MALE ORGANS

The male reproductive organs are divided into two *main* and several *accessory* structures. The main organs are the male sex cell producers, the *testes*. All the remaining structures are referred to collectively as the accessory organs and include many glands; a tubular system for collecting, storing, and conducting the products of the glands and testes; the penis; and the scrotum, or "sack."

Testes

Since the testes are the producers of the male sex cells, which are called sperms, they are, in this sense at least, comparable to the female's ovaries, which are also sex cell producers. (Testis is the singular of testes; these are also called testicles, the singular of which is *testicle*.) Unlike the ovaries, each testicle continuously produces sex cells—about 50 million every 24 hours in a young man of good health.

There are two testicles, each located inside the scrotum, one on each side of it. Each testicle is an oval-shaped gland about 2 inches long. Interiorly a testicle is composed of a number of pyramidal sections, each filled with many intricately coiled tubes of small diameter but long length (Fig. 1-4). The tubes in any pyramidal section are called *convoluted seminiferous tubules*, and the section itself is called a *lobule*. The interior of these tubules is the site of sperm production. Specialized cells that give rise to sperm line the center cavities of the tubules. (The center

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cavity, or bore, of any tubule, artery, or vein is called the *lumen*.) As sperms are produced, they move out of the testicle via the conducting tubes and into the main area of sperm storage, the *vas deferens*. Their passage can be traced in Fig. 1-4.

Within each pyramidal lobule the convoluted seminiferous tubules are surrounded by connective tissue, the substance that supports them and helps hold all the testicular substructures in place. Scattered throughout the connective tissue are groups of large, ovoid cells called *interstitial*

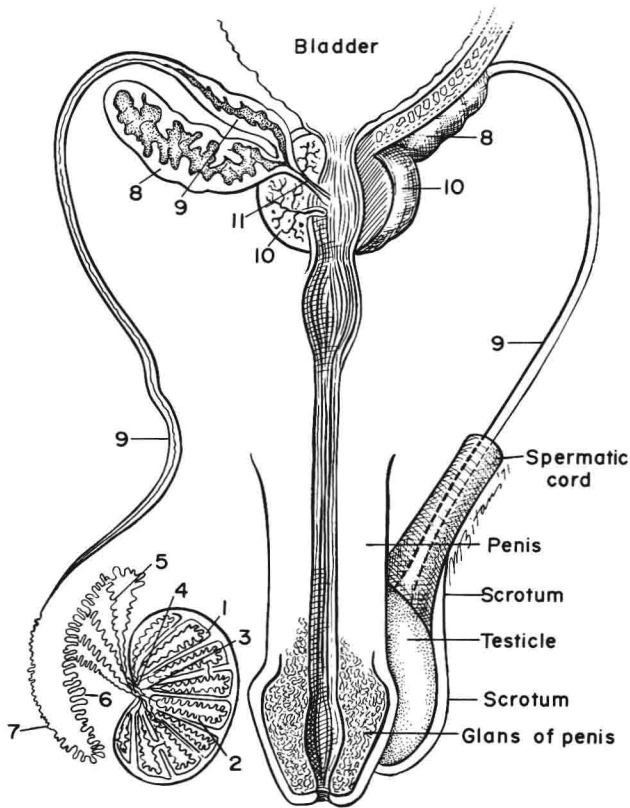


Fig. 1-4. Male reproductive organs, front view. 1, Pyramidal lobule. 2, Convoluted seminiferous tubule. 3-5, The progressively diminishing number of tubules is shown in this area. Their eventual convergence into a single convoluted duct that straightens as it passes upward out of the scrotum and into the pelvic cavity is shown. This duct is called the vas deferens from about point 7 on. The part of it labeled 6 is called the epididymis; it can also be seen in Fig. 1-5 crossing the testicle. The first portion of the straightened vas deferens is within the upper part of the scrotum. 7, 9, Vas deferens. 8, Seminal vesicle. 10, Prostate gland. 11, Ejaculatory duct.

cells. They secrete testosterone, the male hormone that is responsible for the development and maintenance of the male *secondary sex characteristics*. Examples of these characteristics are face and chest hair, the male pattern of body fat distribution, and the lower-pitched voice. Testosterone also acts as a stimulus to the activities and development of the accessory sex organs, influences general body metabolism, and to some extent determines a man's psychosexual behavior.

Interstitial cells function independently of sperm-producing cells and sperm-conducting tubes. Injury to the main conducting tube (the vas deferens) or deliberate surgical severance of both of them (as in the operation called *vasectomy*) does not affect the functioning of the interstitial cells and therefore cannot affect any of the male secondary sex characteristics. Vasectomy is explained in Chapter 11.

As shown in Fig. 1-4, all the testicular tubules eventually merge into a single conducting tube called the vas deferens, or *ductus deferens*. The beginning of each vas deferens (plural, *vasa deferentia*) is within the scrotum. The convergence of sperm-producing tubules with sperm-conducting tubes and consequent formation of the *epididymis* (which lies along the top and side of the testicle) is illustrated in Fig. 1-4, points 2 through 6. The epididymis of each testis is a single, closely coiled tube. If straightened out, it would be about 20 feet long. As shown in Fig. 1-4, it eventually turns upward, changing its name to vas deferens.

Vas deferens

The two vasa deferentia are the main genital ducts. Most of the vas deferens is straight, although its first part, being a direct derivative of the highly coiled epididymis, is coiled. It straightens before leaving the scrotum. The vas deferens is about 18 inches long and of varying outside diameter, on the average being as thick as a piece of cooked spaghetti. After emerging from the testicle, it passes upward into the pelvic cavity and to the side of, and then behind, the bladder, where it joins with the duct of the *seminal vesicle*, a gland that is discussed in the next section. During part of its upward passage, inside the scrotum and partly within the pelvic cavity, the vas deferens is ensheathed, along with blood and lymph vessels and nerves, by a structure called the *spermatic cord*. The cord, shown in Fig. 1-4, is part of the suspending structure of the testis. Since the left cord is usually a bit longer than the right, it is normal for the left testis to hang a little lower than the right.

Seminal vesicle

There are two seminal vesicles. They are essentially elongated, convoluted sacs, each with a single outlet, or duct. The outlet joins with the vas deferens to form another duct (a common duct) called the ejaculatory duct (Figs. 1-4 and 1-5). The two ejaculatory ducts pass through the substance of the *prostate gland* and empty high in the