

## Chapter 2 — The Biology of Sex

from the 1938 edition of *The Sex Life Before and After Marriage* (a.k.a. *Living a Sane Sex Life*)  
by  
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### Sources for Chapter 2, in the order in which they first appear

- (1) Havelock **Ellis**, *Psychology of Sex: A Manual for Students* (New York: Emerson Books, Inc., 1933, 1938)
- (2) Paper 84 (“Marriage and Family Life”) of the **Urantia** manuscript

### Key

- (a) **Green** indicates where a source author (other than Sadler) first appears, or where he/she reappears.
- (b) **Magenta** indicates an earlier Sadler book.
- (c) **Yellow** highlights most parallelisms.
- (d) **Tan** highlights parallelisms not occurring on the same row, or parallelisms separated by yellowed parallelisms.
- (e) An underlined word or words indicates where the source and Sadler pointedly differ from each other.
- (f) **Pink** indicates passages where the Sadlers specifically share their own experiences, opinions, advice, etc.
- (g) **Light blue** indicates passages which strongly resemble something in the Urantia Book, or which allude to the Urantia phenomenon.
- (h) **Red** indicates either an obvious error on the Sadlers’ part, brought about, in some cases, by miscopying or misinterpreting their source, or an obvious inconsistency brought about by the Sadlers’ use of an earlier Sadler text.

- (i) **Gold** highlights key words or themes which will be discussed in the analysis of the chapter.

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## II — THE BIOLOGY OF SEX

2:0.1 The only natural and scientific approach to sex is through the biologic sciences. The best escape from the sordid and sensuous in its discussion is to be attained by recognizing that sex is a phase of human nature as well as a phenomenon associated with the reproduction of the species and with the inhibitions and taboos of civilized society.

### 1. THE PHYSICAL BACKGROUND OF SEX

2:1.1 Sex and reproduction, while not synonymous, are of course closely related, but the pleasures and selfish gratification of sexual indulgence are far removed from the burdens and responsibilities of home-making and parenthood.

PAPER 84 — MARRIAGE AND FAMILY LIFE ([The Urantia Papers](#))

Primitive man comprehended no connection between sex indulgence and the subsequent birth of a child (84:1.3). [See also 4:6.8.]

The savage early conceived the idea that babies were made in spiritland; pregnancy was believed to be the result of a woman's being entered by a spirit, an evolving ghost (84:1.3).

It is highly probable that primitive man wholly failed to connect his passing sexual relations with the subsequent birth of children.

Early peoples, generally, thought that pregnancy was due to the influence of cunning spirits

## SOURCE

Many early peoples associated ghosts with the sea; hence virgins were greatly restricted in their bathing practices; young women were far more afraid of bathing in the sea at high tide than of having sex relations (84:1.4).

## II: THE BIOLOGY OF SEX (Ellis 8)

*The Physical Basis of Sex* (Ellis 8)

In mammals generally, indeed (it is the reverse in birds), the male elaborates two kinds of gametes,

[See endnote.]

X-bearing, and non X-bearing, or Y-bearing,

while the female elaborates but one.

An X-bearing egg can be fertilized either by an X-bearing sperm, to become XX and female, or a Y-bearing sperm to become XY and male (E 8-9).

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or to the misfortune of bathing in sea water.

Only relatively civilized human beings relate the sex act with the birth of a child some nine months afterwards.

2:1.2 It is interesting to know that the male gonad (testicle) produces two kinds of gametes, or sperms,

and that this explains how sex is determined.

The living cells of the human species possess forty-eight chromosomes, the female ovum always having this number.<sup>1</sup>

One-half of the minute tadpolelike male spermatozoa are known as x-bearing sperm, while the other half are non-x-bearing, or y-bearing.

2:1.3 Since the female produces only x-bearing ova,

it develops that they can be fertilized by either an x-bearing sperm, which will produce a double x female zygote, or by a y-bearing sperm, which will yield a male or x-y zygote.

It is therefore evident that sex is determined by the x and y chromosomes of the sperm, and that, as regards the human species,

## SOURCE

We have to conclude that sex is normally determined at conception, and to put aside all the various devices for determining sex during pregnancy (E 9).

At the outset we assume as accepted that when a complex of glands to which the testes is central predominates in the organism we have an individual of male sex;

when a complex of glands to which the ovary is central predominates we have a female. Thus are secured normally the primary sexual characters. Associated with them is the development of the respective sexual organs.

Finally sexual maturity is established with the full acquisition of the manifest secondary characters, with which are associated, as tertiary sexual characters, many differences which are not obvious (E 9).

The syndromes [observed in intersexual types] are, as we now believe, in the majority of cases traceable either to the stimulating influence, or to the defect of such influence, of the internal secretions—the hormones or chemical messengers—entering the blood from the various ductless glands of the body.... Any dysfunction of one is apt to unsettle the balance of others (E 10).

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sex is determined at conception, all other notions—psychic, chemical, or dietetic—to the contrary notwithstanding.

2:1.4 Thus, by chromosome determination,

one human embryo is directed along sexual lines toward maleness, the sexual organs developing into testes;

another is directed toward femaleness, the gonads becoming ovaries.

Not only is this true,

but in the case of the male, the secondary or tertiary sexual characteristics—such as bodily contour, voice, and the growth of hair upon the body—all pertain to the masculine gender, whereas, with females, these secondary sexual features are definitely of the feminine type.

2:1.5 In those rare cases of what might be called intersexuality, or bisexuality, it is undoubtedly true that one of the ductless glands has a good deal to do with the sexual development;

## SOURCE

New facts and new viewpoints are constantly appearing, and great importance now attaches to the activating influence of the **anterior lobe of the pituitary** gland and also to the adrenals ... (E 10).

[W]hile previously we regarded the **nervous system** as the active agent in these processes,

we now regard the chemical **endocrine system** as even more active, sometimes under the influence of the nervous system, and frequently apart from nervous action, the nerves and nerve centers being themselves sometimes subject to chemical regulation (E 10-11).

The anterior part of the pituitary, again, appears to yield three hormones,

one which promotes growth,

one which stimulates the ovaries, causing maturation of the **Graafian follicles, which produce oestrin**, which initiates changes in the uterus to receive the fertilized ovum;

while a third hormone leads to further uterine changes for the fixation of the ovum.

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especially is it probable that the **anterior pituitary** secretes a number of hormones which function as regulators of the behavior of both the male and the female sex glands.

For some time it has been known that the **nervous system** has a part in sexual development and sex phenomena,

but until very recent years there has been a tendency to underestimate the influence of the **endocrine system** in this direction.

2:1.6 The influence of the anterior pituitary upon the male gonad, or testicle, is not very well understood,

but it is now definitely believed that the anterior pituitary furnishes at least two hormones which regulate the female gonad, or ovary.

One of these so stimulates the **ova** as to cause maturation of the **Graafian follicles, which produce a substance called *estrin***; this, in turn, stimulates those changes in the uterine wall that enable it to receive and protect the fertilized ova.

Another hormone of the pituitary produces further changes in the lining of the uterus which enable it securely to hold the ovum.

## SOURCE

The second is of special practical importance as its presence in the urine is the basis of the Zondek-Aschheim test of pregnancy (E 12-13).

[See E 10 and 11.]

*The Nature of the Sexual Impulse* (Ellis 14)

In the old popular belief the sexual impulse is simply the expression of a need of evacuation.

comparable to that experienced periodically in the bowels and bladder.

That was an inaccurate and misleading view; the male semen is not a waste product for excretion and the female scarcely presents even the semblance of a sexual desire for excretion.

A more respectable theory sometimes put forward defined the sexual impulse as an “instinct of reproduction.” There is, however, strictly speaking, no such instinct, nor is it needed in bisexual organisms (E 14-15).

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It is this **latter** hormone which is secreted into the urine and forms the basis for the Zondek-Aschheim test for pregnancy.

Both the thyroid and adrenals also have considerable influence in the growth and development of both the male and female sexual systems.

## 2. THE SEXUAL DRIVE

2:2.1 From time immemorial it has been believed that the sexual impulse, especially that of the male, was but the expression of the need of evacuation—the relief of overdistended seminal vesicles.

Even in medical works of the last generation this phenomenon of sex was actually

compared to the periodic relief of overdistended bladder or bowel.

This is a wholly erroneous view as the male semen is in no sense a waste product which should be excreted, and the sexual impulse of the female is certainly in no way comparable to excretory phenomena.

2:2.2 Neither can we properly regard the sex impulse as being definitely linked up with the so-called reproductive act.

## SOURCE

[See 2:1.1, above.]

[Compare E 15.]

The question of the analysis of the sexual impulse was placed upon higher ground, when, in 1897, Moll set forth his theory of the constitution of this impulse. As Moll understood it, there are two components in the sexual impulse:

one which urges to a local genital function, which in man is the expulsion of semen, and is thus a process of evacuation comparable to the emptying of the bladder,

and the other which urges each partner to physical and psychic contact with the other partner.

The first component Moll terms the *impulse of detumescence*, the second the *impulse of contrectation* (E 16-17).

It presents, however, certain difficulties: it is, for instance, less satisfactory when applied to women than to men, and it has the disadvantage, pointed out by Robert Müller, Saint-Paul, and others, that it divides the sexual process.

In order to avoid this and other difficulties, the theory of Moll was by me somewhat modified with the aid of the least contested part of the Darwinian doctrine of sexual selection (E 17).

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Without question, the sex act and the parental instinct are definitely associated in the minds of civilized men and women, but they are not thus correlated in the minds of primitive human beings.

2:2.3 Many factors make up the sex drive, or the sex urge. These factors are psychic, chemical, physical, and esthetic. It is highly probable that we are not cognizant of all of them.

2:2.4 Forty years ago, Moll claimed that the sex impulse consisted in two features—

one which urged the individual to seek relief for localized or genital sex tension,

and another which led the male and female to seek for physical contact and psychic association.

Moll called the first the impulse of detumescence; the second he termed the impulse of contrectation (spooning).

2:2.5 The criticism of this concept is that, while it very fittingly describes the sex drive of the male, it is not so satisfactory an explanation of the sex urge of the female.

Moll's theory is better adapted to the female if we accept the modification suggested by Havelock Ellis, based more on the Darwinian theory of sexual selection,

which explains how tumescence is achieved by the various aspects of sexual attraction,

Before *detumescence* can take place, *tumescence* must be achieved (E 17).

“Contractation,” whether **physical** or **psychic**, has at its end the **heightening of tumescence** and may be regarded as part of the process (E 17).

for it must be recognized that **tumescence must precede detumescence.**

2:2.6 The whole process of courtship and love-making, the **psychic** and **physical** contact of the sexes, has to do with **heightening the sex drive**

and insuring the subsequent sex contact for the achievement of mental and physical gratification, and with its remoter association with the reproduction of the species.

Courtship, as we commonly term the process of tumescence which takes place when a woman is first sexually approached by a man, is usually a highly prolonged process. But it is always necessary to remember that **every repetition of the act of coitus**, to be normally and effectively carried out on both sides, demands a similar double process; detumescence must be preceded by an **abbreviated courtship** (E 18).

In a sense, **every sexual act of coitus** is an **abbreviated indulgence in courtship**,

some technic of love-making which heightens sex desire (tumescence), this being presently relieved by detumescence, or the completed sexual embrace.

### 3. COURTSHIP

*The Biology of Courtship* (Ellis 30)

Even among the hermaphroditic slugs an elaborate courtship is found ... (E 31).

The phenomena of courtship are most conspicuous, and have been most carefully studied, among various species of birds in widely different parts of the world.

The beautiful plumage of birds, their song, their self-display, their parades, their dances, are all (as most authorities now agree) primarily a part of courtship, a method of attaining in the male himself, and exciting in the female he desires for his partner, an adequate stimulation of the pairing impulse (E 31).

In civilization, indeed, owing to the idleness, luxury, and over-nutrition which make sexual erethism comparatively easy, and tumescence sometimes almost constant,

the phenomena of courtship become less important (E 31).

2:3.1 Even the lower animals engage in definite periods of courtship.

This phenomenon of love-making is especially exhibited by the various species of birds.

Their plumage and their songs are all a part of the courtship technic.

2:3.2 Among civilized races,

where the sexes are so constantly in close contact with one another,

there is a great tendency to lessen or shorten courtship.

It seems that the sexual preparatory process of tumescence is a rather constant and unconscious experience.

## SOURCE

The phenomena of courtship are biologically connected with the fact that in animals, in savage man, to some extent perhaps in civilized man, and especially in women, sexuality is **periodic**, and not constant, in its manifestations (E 31-32).

[?]

It is during the *oestrus*, or **“heat,”** only that female animals generally allow intercourse (E 34).

Most of the higher animals have a **breeding season** once or sometimes twice a year, in spring or in autumn or both (E 32).

Of recent years traces of sexual periodicity have been found among civilized **men**, quite apart from their relationships to women (E 32).

[My] evidence shows clearly that there are two periods in the year of increased spontaneous sexual activity; one in early **spring** and the other in **autumn**;

it is often found that the autumn maximum is the highest (E 33).

In the **monkeys** among whom menstruation begins to appear, it co-exists with the more primitive seasonal influence, so that the monkeys which menstruate at approximately monthly intervals still **only procreate at certain periods of the year** (E 34).

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In the case of the female, among both animals and the human species, the sex impulse, generally speaking, is **periodic**,

strong sex impulses only being exhibited during the mating season

or, in the case of certain mammals, when they are in **“heat.”**

The male is in a constant state of more or less sexual excitement.

Most of the higher animals have a **definite breeding season**.

**Some authorities** think that the sex drive of the **human male** even tends to be periodic.

**Many students of sex** believe that man has a strong periodic sex drive that manifests itself in both **springtime** and **autumn**,

more especially in the former.

2:3.3 It is interesting to note that while **monkeys** menstruate monthly, much as does the human female, they **procreate only at certain regular annual periods**.

## SOURCE

Dr. G. V. Hamilton in his examination of 100 married women of educated class—a small number, but carefully studied—found that 25 had sex desire just **after** menstruation only, 14 just **before** only, 21 **just before and just after,**

11 **during** menstruation **and** just before and just after, 19 had no periodicity at all, while the remaining 10 gave no information (E 35).

Thus Dr. Katharine Davis, in her study of the sex life of over two thousand women, found that maximal sexual desire nearly always fell within the period **from two days before to a week after menstruation,** although, unlike most investigators, she found that it was more often before than after the menstrual flow (69 to 38 cases) (E 35).

At the outset **modesty** may be said to be the gesture of sexual refusal by a female animal who is not yet at the period of *oestrus*.

Modesty, however, tends to overlap that period, as we should expect with an impulse which is active during the greater part of the year, and combines with the sexual impulse, constituting **coquetry**; then the female alternately approaches and runs away from the male, or **runs away from him in a circle** (E 35-36).

Still, in any case, modesty remains from first to last an **essential condition** of courtship.

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2:3.4 There is no question that many human females experience an increased sex desire either **before** or **after** menstruation, in some cases **both**.

With others the strongest desire is **during** the actual period of menstruation.

In a very exhaustive study of this matter, Dr. Katherine Davis found that woman's period of greatest sex desire extends **from two days before, to a week after, menstruation.**

2:3.5 **Some writers** have contended that female **modesty** grew out of a gesture on the part of primitive **woman** to prevent courtship by the male during those periods when she was not biologically prepared to receive sexual attentions.

It is probable that this has evolved among later races into the **coquetry** and playfulness of the girl in her efforts to run away from the boy, even though she sometimes **runs in circles**.

2:3.6 Modesty, after all, is a very **essential feature** of normal human courtship.

## SOURCE

Without the reticences and delays of modesty, tumescence could not be adequately aroused in either sex, nor would the female have time and opportunity to test the qualities of the candidates for her favors, and to select the most fitting mate (E 36-37).

*Preferential Mating: The Factors of Sexual Selection* (Ellis 37)

[contd] The process of tumescence is achieved, directly or indirectly, by the stimulating influence of impressions received through the various senses (E 37).

Sexual selection is the choice of the person who most adequately imparts these impressions (E 37).

[contd] In using the term “sexual selection” we may seem to assume a theory in the Darwinian doctrine of evolution which, in its original form, is not always accepted. We must especially remember that such selection is not to be reckoned as primarily esthetic. It is not beauty

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Otherwise it appears that tumescence would not be adequately promoted in either sex.

There is a definite biologic basis for the phenomenon of courtship.

## 4. SEXUAL SELECTION

2:4.1 While Darwin’s theory of sexual selection has not altogether withstood the investigations of the last half century, there are certain phases of this doctrine which have stood the test of time.

2:4.2 Apparently, sexual tumescence largely owes its existence to impressions received through the various physical senses,

and sexual selection consists in the choosing by one individual of another who most acceptably arouses those sex impressions

which directly or indirectly contribute to the building up of a strong sex drive.

Many investigators believe that sex attraction is not merely of beauty,

## SOURCE

but greater **vigor**, or greater conspicuousness, that counts (E 37-38).

[See 2:4.24, below.]

Even in our present phase of civilization a **large number of women and men remain unmated**, many of them because they have failed to **evoke the pairing impulse** in the opposite sex (E 39).

Courtship, we cannot make too clear, by no means necessarily involves, as some still believe, a struggle or a choice between **rival candidates** for a sexual partner.

It is just as pronounced and just as necessary, even though only in an abbreviated form, **when rivalry is excluded**, and throughout the sexual life.

The act of union is not accomplished in an **effective** and happy manner except as the climax of an ever fresh courtship (E 40).

The senses concerned are **touch**, **smell**, **hearing**, and **vision** (E 40).

### (1) **Touch** (Ellis 41)

[contd] Touch is **the primary and most primitive form of conrectation**.

The sexual act itself is essentially an act of conrectation, in which touch is supreme.

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but that it depends a great deal more on certain types of **vigor** and on superior intelligence.

Preferential mating is more dependent on adequately satisfying the longing for security than upon esthetic tastes.

2:4.3 Among modern peoples, **large numbers remain unmarried** for numerous reasons, one of the most important probably being that failure followed all attempts to **arouse a mating impulse** in any individual contacted in the social environment.

2:4.4 The older idea was that courtship is always a **rivalry between two or more sexual candidates**, and that natural selection serves to determine the final choice of a mate.

**We believe that courtship is a desirable preliminary to sex mating even when there exists no competition between rival candidates,**

**and that every succeeding sex contact, even in married life, is most effectively promoted and satisfactorily experienced when it is preceded by an adequate period of courtship—love-making.**

2:4.5 Of the special senses more directly concerned in courtship, or love making, **touch**, **smell**, **hearing**, and **vision** should be mentioned.

### 2:4.6 1. **Touch**.

Touch is a **primitive form** and universal technic of **conrectation**.

The sex act itself is basically a technic of touch—physical contact.

## SOURCE

Among children, hugging, kissing, and embracing are the main signs of affection in general and of sexual affection in particular (E 41)

This primitive character of the great region of tactile sensation, its vagueness and diffusion, serve to heighten the emotional intensity of skin sensations.

So that, of all the great sensory fields, the field of touch is at once the least intellectual and the most massively emotional (E 41).

As we might expect, touch is frequently predominant in the courtship of the lower animals. Touch determines mating among Crabs and Crayfish and is usually the chief sexual sense for Spiders.

In Cattle, Deer, Horses, Dogs, etc., licking is an important part of courtship.

Neumann, who watched Elephants love-making, observed that the male fondled the female with his trunk, and then, standing side by side, they crossed trunks, putting the tips in each other's mouths (E 41-42).

For many people, especially women who have not become habituated to complete intercourse, close tactile contacts furnish in themselves adequate sexual pleasure and satisfaction (E 42).

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Preliminaries to sex relations—at least among the civilized races—are those very personal contacts so commonly observed in childhood: hugging, kissing, and embracing.

2:4.7 Touch is a primitive contactual relationship.

It is the least intellectual and therefore the most largely animal.

As a technic of courtship it appears in such lowly animals as the crab and crayfish,

whereas, on up through various species to cattle, horses, and dogs, there are to be observed different forms of physical contact.

Even elephants court by standing side by side, crossing their trunks, and putting the tips of their trunks in each other's mouths.

With certain types of women, close physical contact, with its various refinements, affords them adequate pleasure and sex gratification without the indulgence of the sexual impulse.

## SOURCE

The sexual awakening of girls at puberty shows itself in a desire for kisses and caresses rather than for intercourse (E 42).

The instinctive recognition by women of the importance of touch in love is additional evidence of the fact that touch is really the primary and primitive erotic sense (E 42).

The special perversion of frottage, as it is termed, on the other hand, is only found in a pronounced degree in men

and consists in a desire to bring the clothed body, and usually though not exclusively the genital region, into contact with the clothed body of a woman, and in seeking to gratify this passion in places of public resort with women who are complete strangers.

Many women have at some time, when standing in a crowd (as at the back of a theater gallery or sometimes even in church), become unpleasantly aware of a deliberate contact of this kind (E 43).

Ticklishness may here be noted as a kind of by-product of tactile sensation, founded on reflexes developing even before birth, which is closely related to sexual phenomena.

It is, as it were, a play of tumescence, on which laughter comes as a play of detumescence, to disperse undesired sexual emotions (as often among bashful sex-conscious girls) (E 43).

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The sexual awakening of the young girl at puberty is very definitely shown by her desire to kiss and caress and affectionately touch the opposite sex rather than by any direct or conscious desire for intercourse.

2:4.8 Touch is definitely the primitive basic erotic sense.

This primitive sex impulse—the desire to make physical contact—

is exhibited in a practice sometimes called frottage,

which consists in the attempt to bring the clothed body into contact with some part of the clothed body of another individual.

This practice is carried on by some men in crowds and by others who annoy women in adjoining seats at movies by attempting to rub knees with them.

2:4.9 Ticklishness is probably a by-product of the sense of touch

and a factor in the arousal of tumescence, while laughter is a technic of detumescence.

All forms of amorous contrectation, and especially the sexual embrace, have an intimate connection with the phenomena of ticklishness. That, indeed, is the basis of Spinoza's famous definition of love: *Amor est titillatio quaedam concomitante idea causæ*, for, as Gowers said, the sexual act is primarily a skin reflex (E 44).

The intimate connection between the skin and the sexual sphere is indicated, not only by the phenomena of tickling, but by the behavior of the sebaceous glands,

which are the vestiges of former hair glands, and survive from a period when hair covered the body.

[?]

The attempts of these glands at puberty, or when the sexual system is disturbed, to produce hairs frequently lead to pimples, and actual hairs often appear in women after the menopause (E 45).

These secondary centers [*i.e.*, erogenic zones] have in common the fact that they involve the entrances and the exits of the body regions, that is, where skin merges into mucous membrane, and where, in the course of evolution, tactile sensibility has become highly refined (E 46).

The kiss is the typical example of this group of phenomena [which utilize the sexual excitation obtainable through the channels of the erogenic zones].

The whole sexual act is basically the phenomenon of a complex skin reflex.

2:4.10 The behavior of the sebaceous (fat) glands during puberty is a type of sex activity.

These glands are the remains of one-time hair follicles,

and their overexcitation during adolescence is a part of the stimulation of the growth of hair which is induced by the newly appearing hormones of the sex glands as a secondary sex characteristic.

The abortive attempts of the sebaceous glands to produce hair leads directly to pimples.

2:4.11 The most effective of all the erotic skin areas are pilose points where the skin merges with the mucous membrane.

This, of course, explains why kissing is such a strong sexual excitant.

We have in the lips a highly sensitive frontier region between skin and mucous membrane, in many respects analogous to the vulvo-vaginal orifice, and reinforcing, moreover, by the active movements of the still more highly sensitive tongue.

Close and prolonged contact of these regions, therefore, under conditions favorable to tumescence sets up a powerful current of nervous stimulation (E 47).

[See four rows down.]

[See E 29 and E 48.]

*Cunnilingus* (often incorrectly termed *cunnilingus*) and *fellatio* cannot be regarded as unnatural for they have their prototypic forms among animals, and they are found among various savage races.

All orifices of the body are definitely erotic zones.

The mucous membranes of the lips and mouth, particularly when stimulated by active movement of the highly sensitive tongue,

constitute a means of erotic contact which is highly effective in producing rapid tumescence.

These practices, even when carried to lengths that are hardly esthetic, should not be regarded as perversions when practiced by normal-minded, well-behaved specimens of the human race. They are largely matters of individual taste.

2:4.12 Other junctions of the skin and mucous membrane, such as the vulvovaginal orifice and even the anus, are definitely erotogenic zones in the average individual.

Some of the questionable or more unusual forms of sexual contact are very much more commonly practiced than is generally understood;

but when they are a part of the otherwise normal love life of a normal sex mating,

As forms of contraction and aids to tumescence they are thus natural and are sometimes regarded by both sexes as quintessential forms of sexual pleasure, though they may not be considered **esthetic**. They become deviations, however, and thus liable to be termed “perversions,” when they **replace the desire for coitus** (E 48).

[contd] The **nipples** constitute yet another orificial frontier which is a highly important tactile sexual focus (E 48).

[See E 49.]

It is easy to see why [the] normal association of sexual emotion with **suckling** should have come about. It is essential for the preservation of the lives of young mammals that the mothers should have an adequate motive in pleasurable sensation for enduring the trouble of suckling (E 49).

(2) **Smell** (Ellis 50)

they can hardly be considered **perversions**, unless they tend to **replace the desire for normal coitus**.

2:4.13 The **nipples** are a sort of disguised orificial erotogenic zone since they contain a type of erectile tissue and in addition have a very delicate tactile response.

There is tremendous reflex relationship between the nipples and the arousal of the sex desire.

The mild sex gratification enjoyed by the mother when **suckling** her baby had not a little to do with inducing primitive woman to see that her infant was well nourished.

Fondling the breasts and even the sucking of the nipples is a part of the love life of the vast majority of normal married persons.

2:4.14 2. **Smell**.

The lower animals, and even many of the higher ones, are greatly stimulated sexually by certain smells characteristic of the opposite sex.

The cerebral cortex itself, indeed, as Edinger and Elliot Smith show, was originally little more than the receptive center for impressions of smell and the instrument for enabling that sense to influence the animal's behavior; and these olfactory impulses reached the cortex directly and not by passing through the thalamus.

So that, psychologically, smell occupies a unique position (E 50-51).

No sense has so strong a power of suggestion, the power of calling up ancient memories with a wide and deep emotional reverberation, while at the same time no sense furnishes impressions which so easily change emotional color and tone, in harmony with the recipient's general attitude (E 52).

Odors are powerful stimulants to the whole nervous system, causing, like other stimulants, an increase of energy which, if excessive or prolonged, leads to nervous exhaustion (E 52).

These impulses from the olfactory nerves probably reach the higher brain centers directly rather than by passing through the region of the thalamus, which conveys most other sensory impulses.

The sense of smell therefore occupies a unique position in its ability to reach the higher brain centers.

There is probably no other of the special senses more highly influential in arousing the sex impulse than that of smell

in stimulating reaction to certain pleasant odors or types of perfumes which have become associated with the opposite sex.

The whole nervous system, as well as the sex nature, is particularly stimulated by certain odors,

both those which are pleasurable as well as those which are revolting.

2:4.15 With primitive man, the value of smell probably grew out of the fact that

We approach the specifically sexual aspect of odor in the human species when we note that all men and women are **odorous** (E 53).

all animals, especially the human species, are more or less **odorous**.

It has even been asserted that odors change every decade of human life,

The infant, the adult, the aged person, each has his own kind of smell, and, as Monin remarks, it might be possible, **within certain limits, to discover the age of a person by his odor** (E 53).

so that an expert might **very accurately determine the age of a person by the characteristic odor**.

Venturi, indeed, described the odor of the body as a **secondary sexual character** (E 53).

**Some writers** have even spoken of body odor as a **secondary sexual character**.

Nevertheless, in many people, certain odors, especially those that are correlated with a healthy and sexually desirable person, tend to be agreeable; they are fortified by their **association with the loved person**, sometimes to an irresistible degree; and their potency is doubtless increased by the fact that many odors, including some bodily odors, are nervous stimulants (E 53).

2:4.16 It is said that certain individuals form a sexual **association** with the odor that is characteristic of their **lovers**.

In a few exceptional, but still quite normal, people smell would appear to possess an emotional predominance which it cannot be said to possess in the average person. These exceptional people are what Binet in his study of sexual fetishism called **olfactive type**; such persons form a group which, though of smaller size and less importance, is fairly comparable to the well-known groups of **visual type**, of **auditory type**, and of psycho-motor type (E 54).

It is probable that some people are of the **olfactory type**, just as others are of the **visual** or **auditory type**.

## SOURCE

Many women who may be considered normal are sexually excitable (occasionally even to the point of orgasm) by special odors, as of the general body odor of a beloved man (sometimes when blended with that of tobacco) or of leather (which is ultimately a skin odor), and are sometimes overcome by a sudden almost hallucinatory recollection of the body odor of a lover (E 54).

It has thus happened that when personal odor acts as a sexual allurement it is the armpit, in any case normally the chief focus of odor in the body, which chiefly comes into play, together with the skin and the hair.

We have further to recognize the significant fact that even those personal odors which are chiefly liable under normal circumstances to come occasionally within the conscious sexual sphere, and indeed purely personal odors of all kinds, may fail to exert any attraction, but rather tend to cause antipathy, unless some degree of tumescence has already been attained, and even then may prove repulsive,

and so be liable to constitute what may be an even serious trouble in sexual relations (E 55-56).

Smell with us has ceased to be a leading channel of intellectual curiosity.

Personal odors make an appeal that is mainly of an intimate, emotional, imaginative character. They are thus liable to arouse what James called the anti-sexual instinct (E 56).

## 2: LIVING A SANE SEX LIFE

It is likely that certain women who have a special love for the smell of leather are unwittingly indulging a sex impulse, as the odor of leather, after all, is a modified skin smell.

Some individuals have confessed that the odors of the armpit have a very definite sexual stimulus.

Among highly civilized peoples the body odors more frequently act as a sex repellent than as a means of sex attraction.

Many careless married couples have ruined their sex lives by attempting to indulge in love feasts when their bodies were emitting fetid odors.

2:4.17 To civilized men, smell is not the source of sexual attraction as it was among primitive peoples.

One psychologist, James, even went so far as to say that unpleasant odors might arouse such an antipathy as to warrant the designation of the sense of smell as an antisexual instinct.

## SOURCE

In America Alice Thayer showed that girls are considerably more influenced by odor in their likes and dislikes than are boys (E 56).

### (3) *Hearing* (Ellis 58)

[Compare E 58.]

[In *dancing* there is spectacle combined with muscular action, each becoming under some conditions a sexual stimulus, and the spectacle sometimes more so than the exercise (E 75).]

Since not only in the animals nearly related to Man, but in man himself, the larynx and the voice undergo a marked sexual differentiation at puberty, it is easy to believe that the change has an influence on sexual selection and sexual psychology (E 61).

The music of less important composers, however, especially Massenet, has been found to have a definite sexual effect (E 62).

### (4) *Vision* (Ellis 63)

It is not surprising that from the viewpoint of sexual selection vision should be the supreme sense (E 63-64).

The richly laden word *beauty* is a synthesis of complex impressions obtained through a single sense (E 64).

## 2: LIVING A SANE SEX LIFE

Girls are much more influenced by odors, either pleasant or unpleasant, than are boys.

### 2:4.18 3. *Hearing*.

There is undoubtedly an association of certain types of rhythmical behavior with the sex impulse.

Many forms of *dancing* contribute directly to the process of tumescence.

The male voice undergoes a definite change at puberty

and unquestionably thereby becomes much more attractive to the female.

Certain forms of music are more voluptuous than other less sensuous melodies.

### 2:4.19 4. *Vision*.

Vision must have a great deal to do with the so-called sexual-selection impulse.

It is undoubtedly the supreme sense in love-making

and is the gateway to all those influences which appeal to the appreciation of *beauty*;

but as already suggested, beauty is not the sole basis of sexual selection.

2:4.20 Among primitive peoples a beautiful face did not have the sex appeal that was made by virile sex organs,

**Phallus-worship** may almost be said to be a universal phenomenon;

it is found even among races of high culture, among the **Romans** of the Empire and the **Japanese** today (E 67).

Even from the first the **secondary sexual characters** have been a far more widespread **method of sexual allurements** than the primary sexual characters, and in the most civilized countries today they still constitute the most attractive of such methods to the majority of the population (E 68).

Among these secondary sexual characters most of the indigenous people of Europe, Asia, and Africa regard the **large hips** and buttocks of women as an important feature of beauty (E 68).

Sometimes admiration for [an unusual development of the buttocks] is associated with admiration for marked **obesity** generally, and it may be noted that a somewhat greater degree of fatness may also be regarded as a feminine secondary sexual character (E 69).

as was shown by the one-time almost universal practice of **phallus worship**.

Such cults were found among even such highly cultivated peoples as the **Romans** and later among the **Japanese**.

The **secondary sexual characters** are very influential as a **means of sex allurements**.

2:4.21 From century to century and in various countries those characteristics of the female which have most strongly appealed to the sexual choice of the male have varied greatly.

During one age and among one race, **large hips**

and a tendency to **obesity** were looked upon as sexual assets.

Only second to the attraction of the feminine pelvis, and in civilization usually higher, we must place the breasts (E 69).

Various savage peoples even regard the development of the breasts as ugly and adopt devices for flattening them. The feeling that prompts this practice is not unknown in modern Europe, while in medieval Europe, indeed, the general ideal of feminine slenderness was opposed to developed breasts, and the garments tended to compress them (E 70).

Another tendency which is apt to an even greater extent to limit the cultivation of the purely esthetic ideal of beauty is the influence of national or racial type (E 72).

Thus we have scopophilia (mixoscopia) or the sexual excitement aroused by the sight of sexual scenes, or even simply of the sexual organs of the opposite sex.... The persons who cultivate this mixoscopia recklessly are commonly termed "peepers" (E 73-74)

In another age and among other races, they were a liability, the more streamlined type of female making a stronger appeal to the opposite sex.

Among most civilized races not merely a spacious pelvis but also well-developed breasts are attractive,

though it must be noted that among other peoples the small breast has come to be preferred.

2:4.22 Beauty is largely a question of national and racial type.

We are inclined to regard as beautiful that which our immediate confreres recognize as such.

2:4.23 Vision as a sex lure is well illustrated by the peeping Toms who seek to promote tumescence by surreptitiously viewing lascivious scenes.

Another different but somewhat related type of sexual excitation is that indulged by

## SOURCE

Very many people, especially young women, go evening after evening to the cinema to gaze in a state of sexual excitement at an adored hero, perhaps living thousands of miles away, whom in real life they will never see (E 74-75).

Even when dancing becomes an epidemic not in itself desirable, it still deserves to be cultivated in so far as it acts as a compromise between the two opposing streams of desire and repression, and serves as a safety valve for repressed tension (E 76).

[contd] It must be added finally, that while beauty is primarily a quality of woman, being as such a perpetual meditation of men—and even for women still a feminine quality which they admire—the normal woman experiences no corresponding cult for the beauty of man.... Women admire a man's strength, physical or mental, rather than his beauty (E 76).

In a woman the craving for visual expression of pressure energy is much more pronounced and predominant than in a man (E 77).

[See 2:4.2.]

## 2: LIVING A SANE SEX LIFE

those who go to moving pictures so that they can utilize their favorite artists as means of sexual excitement, though these heroes and heroines may be innocently disporting themselves two thousand miles away.

Thus do the theatre, novel reading, and even dancing serve as a sort of safety valve for the relief of repressed sexual emotions.

2:4.24 While men admire women for their beauty of face and form, it is far more likely that what women most admire in men is strength of mind, body, or character rather than any so-called type of masculine beauty.

The female, after all, usually craves the pressure

of a strong embrace—security—rather than the visual gratification of masculine comeliness.

## 5. PREPARATION FOR THE SEX ACT

*The Nature of the Sexual Impulse* (Ellis 14)

[contd from 2:2.6] This abbreviated courtship, by which tumescence is secured or heightened in the repetition of acts of coitus which have become familiar,

is mainly tactile.

As tumescence, under the influence of sensory stimulation, proceeds toward the climax when it gives place to detumescence, the physical phenomena become more and more acutely localized in the sexual organs.

The process which was at first predominantly nervous and psychic now becomes more prominently vascular (E 18-19).

The face tends to become red, and exactly the same phenomenon is taking place in the genital organs;

“an erection,” it has been said, “is a blushing of the penis.”

2:5.1 The preparatory process of sexual gratification,

while it is in many ways largely psychic, having to do with mutual understanding and sympathy as well as with the esthetic recognition of physical beauty or other desirable traits of personality,

is, nevertheless, largely a matter of tactile or physical contact of various parts of the cutaneous or mucous-membrane surfaces of the body,

all of which process, of course, is most highly and acutely localized in the sexual organs.

2:5.2 The whole sexual process, which begins as a psychic manifestation, progressively develops into a nervous response and, in its more advanced stage, becomes predominantly vascular.

This vascular phenomenon not only produces flushing of the skin of the face and other parts of the body but leads to a definite engorgement of the genital organs.

Someone has even spoken of the erection of the male sex organ as a “blushing of the penis.”

## SOURCE

The difference is that in the genital organs this heightened vascularity has a definite and specific function to accomplish—the erection of the male organ which **fits** it to enter the female parts— [continued four rows down]

[We cannot explain the basis of Adjuster assignment, but we conjecture that these divine gifts are bestowed in accordance with some wise and efficient policy of eternal fitness of adaptation to the indwelt personality (108:1.1).]

and that consequently there has been developed in the penis that special kind of vascular mechanism consisting of veins in connective tissue with unstriped muscular fibers, termed *erectile tissue*.

This process, which may be set in action either centrally or peripherally, is probably controlled by the sympathetic plexuses in the pelvis (E 19).

## 2: LIVING A SANE SEX LIFE

2:5.3 There is a beauty of adaptation, an eternal **fitness**, about this whole phenomenon of the preparation of both the male and female for the sex act which suggests something more subtle than could have been expected from a purely accidental evolution of the species.

It is amazing how the sex impulse prepares both sexes for the subsequent performance of the sex act, and how in the human species the physical technic of coitus permits the lovers to behold each other's faces and to engage in the associated highest types of expressing human affection.

2:5.4 The nervous control of the erectile mechanism of the penis is very complicated, probably being definitely directed from the sympathetic plexus of the pelvis,

but in its manifestation being chiefly due to the organ's specialized vascular mechanism consisting principally of veins imbedded in connective tissue and involuntary muscle fibers, all of which is termed *erectile tissue*.

It is interesting to observe that this erectile mechanism can be excited either by external physical stimuli or by internal psychic imagery.

## SOURCE

[contd] It is not only the male who is supplied with erectile tissue which in the process of tumescence becomes congested and swollen.

The female also in the corresponding external genital region is likewise supplied with **erectile tissue** now also charged with blood ... (E 19).

The whole feminine genital canal, including the uterus, indeed, is **richly supplied with blood-vessels**, and is capable during sexual excitement of a high degree of turgescence, a **kind of erection** (E 19-20).

[contd] The process of erection in woman is accompanied by the **pouring out of fluid which copiously bathes** all parts of the vulva around the entrance to the vagina (E 20).

There is, however, a real **ejaculation of fluid** which, as usually described, comes largely from **glands**, situated near the mouth of the vagina, which are already able to secrete at birth.

The fluid poured out in this manner whenever a high degree of tumescence is attained, and before the onset of detumescence, performs an important function in lubricating the entrance to the genital canal and so **facilitating the entrance of the male organ**.

A similar process takes place **during parturition** when the same parts are being stretched for the protrusion of the foetal head (E 20).

## 2: LIVING A SANE SEX LIFE

2:5.5 The female genitalia also share in this phenomenon of vascular congestion.

**Erectile tissue** is found in the clitoris,

as well as in the whole female sexual mechanism, which, because of its **rich blood supply**, is capable of a high degree of vascular turgescence (a **kind of erection**) during wholehearted sexual excitation.

This vascular engorgement results in the **secretion of copious viscous fluids which bathe** the external genitalia

and thus greatly facilitate the completion of the sexual act.

2:5.6 There is, in addition to this passive secretory or lubricating function of the female genitalia, something which comes from certain **glands** situated about the vaginal entrance that is somewhat analogous to **fluid ejaculated** by the male.

This phenomenon occurs at the height of tumescence and, when normal, serves a very valuable purpose in **facilitating the entrance of the male organ**.

These same glands act in a similar manner **during childbirth**, making the birth of the fetal head less difficult.

2:5.7 This physiology indicates how important it is that the female as well as the male should be wholeheartedly enlisted in the act of love-making and subsequent sexual gratification. Satisfactory sexual relations are not to be had when one partner is but halfheartedly enlisted in the performance of the act.

When erection is complete in both the man and the woman the conditions for conjugation have at last been fulfilled (E 20).

Normal sex relations are expressed only when this so-called process of tumescence, or erection, is developed in both partners.

2:5.8 The difference in sexual approach between the higher animals and man is very significant.

In all animals, even those most nearly allied to Man, coitus is effected by the male approaching the female posteriorly.

Even in those mammals most closely related to man, the male approaches the female posteriorly.

In man, the normal method of male approach is anteriorly—face to face—the position of so-called *Venus observa*.

In the human species the normal method of sexual approach is anteriorly—face to face—

While, however, the *Venus obversa* may be regarded as the specifically human method of coitus, there are modifications of it, and other more animal-like methods which have been adopted by various peoples as national customs, and which, therefore, come within the normal range of variation.

although there are numerous other positions of sexual intercourse which are modifications of this, some of which more nearly approach the animal technic;

It is a mistake to regard them as vicious perversions (E 21).

but even so, it is a mistake to regard such variations of posture as evidence of sexual perversion.

## 6. EROTOGENIC ZONES

*Erogenic Zones* (Ellis 29)

[contd] This is the name now given to regions of the body which in the process of tumescence are found to be sexually hyper-esthetic (E 29).

The genital region, the mouth, and in woman the nipples may be said to be normal erogenic zones.

The ears, the nape of the neck, the nipples in men, the armpits, the fingers, the anus, the thighs are all not uncommon erogenic zones (E 29).

Every woman has her own system of manifest or latent erogenic zones, and it is the lover's part in courtship to discover these zones and to develop them in order to achieve that tumescence which is naturally and properly the first stage in the process of sexual union (E 30).

2:6.1 Erotic zones are those regions, either skin or mucous membrane, of hyperesthetic sensitivity which, when stimulated, so greatly contribute to the heightening and intensification of tumescence.

The understanding and utilization of these zones are a part of the art of love making.

2:6.2 The zones which are universally hypersensitive in both the male and female are the genitalia, mouth, tongue, and nipples.

Those which are more or less sensitive in different individuals are the lobe of the ear, nape of the neck, arm pits, fingers, thighs, and anus.

2:6.3 Many cases of failure of the art of love-making in married life are due to ignorance of these important auxiliaries of sexual excitation, and it often follows that, when husbands or wives are enlightened on this subject, they are able to greatly improve their love life.

It appears that married people who are ingenious and investigative, as a rule, discover these auxiliary zones of sexual excitation,

but physicians constantly encounter couples who have lived together for decades without indulging in that curiosity and familiarity which would lead them to discover such aids to the art of sexual gratification.

## 7. THE SEX ACT

*The Nature of the Sexual Impulse* (Ellis 14)

[contd from 2:5.8] Now a new element comes in: **muscular action**.

With the onset of muscular action, which is largely **involuntary**, even when it affects the **voluntary** muscles, **detumescence** proper begins to take place (E 21).

We approach the **decisive moment** when, under the influence of the stimulus applied to the penis by **friction** with the vagina,

the tension of the seminal fluid poured into the urethra **arouses the ejaculatory centers located in the lower part of the spinal cord and also, it appears, in the pelvic plexuses,**

and the bulbo-cavernosus muscle surrounding the urethra responsively **contracts in rhythmic spasms**. Then it is that **ejaculation** occurs (E 21-22).

2:7.1 With the sexual stage set by the technics already discussed, the actual indulgence of sex relations is **muscular action**.

These muscular movements are both **voluntary** and **involuntary**, and they mark the beginning of the technic of **detumescence**.

In the case of the male, that **decisive moment** of sexual climax is arrived at by the continuous **friction** stimulus resulting from the to and fro, or other, movements upon the male organ as it is held in the grasp of the vaginal musculature.

The associated tension of the seminal vesicles **excites the ejaculatory system situated in the lower portion of the spinal cord and in the pelvic sympathetic plexuses,**

so that the associated urethral muscles respond by **rhythmic contractions**, this arrangement initiating **ejaculation**.

## SOURCE

The respiration becomes shallow, rapid, and to some extent arrested. This arrest of respiration tends to render the blood venous, and thus aids in stimulating the vasomotor centers, raising the blood-pressure in the body generally, and especially in the erectile tissues.

High blood-pressure is one of the most marked features of the state of detumescence ... (E 22).

The heart-beats are stronger and quicker, the surface arteries are more visible, the conjunctivæ become more red.

At the same time we find a general tendency to glandular activity (E 22).

Perspiration is copious, with a general activity of the skin and its odoriferous secretions; salivation also occurs (E 22).

The tendency to diffused activity of involuntary muscle is illustrated by the contraction of the bladder associated with detumescence. While this occurs in both sexes, in men erection usually produces a mechanical impediment to any evacuation of the bladder.

In women there may be not only a desire to urinate but, occasionally, actual urination (E 23).

Normally under the influence of the stimulation furnished by the contact and friction of the vagina, this process effectively carried out, mainly by the rhythmic contractions of the bulbo-cavernosus muscle, and the semen is emitted in a jet (E 23-24).

## 2: LIVING A SANE SEX LIFE

2:7.2 It is believed that the shallow respirations attendant upon sexual excitation tend to render the blood more venous, and that this indirectly aids in raising the blood pressure, particularly in the erectile tissue of the sexual organs.

At the height of the sex act the blood pressure is decidedly raised,

the heart beat is stronger and faster, and the surface arteries are definitely distended.

Glandular activity in general is also stimulated,

and perspiration is greatly increased.

2:7.3 Throughout the sex act, in the case of the male, the bladder is effectively prevented from emptying.

In the female, this arrangement is not so positive and certain during the later stages of detumescence.

2:7.4 The climax of coitus is characterised by the rhythmic contractions of the involuntary muscles in the bulbo-cavernosum section of the urethra;

in the typical sexual relationship,

## SOURCE

[contd] The specifically sexual muscular process is less visible in the woman, more obscure, more complex and uncertain. Before detumescence actually begins there are at intervals involuntary rhythmic contractions of the walls of the vagina, seeming to have the object of at once stimulating and harmonizing with those that are about to begin in the male organ (E 24).

This vaginal contraction, which may become well marked just before detumescence,

and is due mainly to the action of the sphincter cunni (analogous to the bulbo-cavernosus in the male), is only a part of the localized muscular process (E 24).

[Compare E 24 and E 28.]

The dilation of the pupils, the expansion of the nostrils, the tendency to salivation and to movements of the tongue,

all go to make up a picture which indicates an approaching gratification of sensory desires; it is significant that in some animals there is at this moment erection of the ears.

There is sometimes a tendency to utter broken or meaningless words.

The dilatation of the pupils produces photophobia, and in the course of detumescence the eyes are frequently closed from this cause.

## 2: LIVING A SANE SEX LIFE

the female responds by exciting similar rhythmic vaginal contractions

which are sometimes very marked in the early stages of detumescence,

and which are mainly due to the action of that muscular mechanism known as the sphincter cunni, which is the female analogy of the male bulbo-cavernosum.

2:7.5 Following the completion of the sex act, the facial expression of the male is characterized by supreme satisfaction, while that of the female portrays the loveliness of profound relaxation.

The dilatation of the pupils, the expansion of the nostrils, together with the characteristic tongue movements,

go to make a picture which attends the climax of approaching completed sex gratification.

At this stage many persons exhibit a tendency to utter affectionate words or tender phrases.

The dilatation of the pupils produces photophobia, so that in detumescence the eyes are frequently kept closed.

## SOURCE

At the beginning of sexual excitement, tonicity of the eye-muscles seems to increase; the elevators of the upper lids contract, so that the eyes look larger and their mobility and brightness are heightened; with the increase of muscular tonicity strabismus may occur (E 26-27).

[contd] So profound is the organic convulsion involved by the process of detumescence that serious effects have sometimes followed coitus (E 27).

[T]hese results being mainly due to the vascular and muscular excitement involved by the process of detumescence.

Fainting, vomiting, involuntary urination and defaecation, have been noted as occurring in young men after a first coitus (E 27).

In men of mature age the arteries have at times been unable to resist the high blood-pressure, and cerebral hemorrhage with paralysis has occurred.

In elderly men the excitement of intercourse with young wives or with prostitutes has sometimes caused death (E 27).

## 2: LIVING A SANE SEX LIFE

At the beginning of sexual excitement the eyes appear large, bright, and unusually active.

2:7.6 The physical convulsion (orgasm) involved in the process of detumescence is so profound that serious results sometimes follow coitus

in aged persons suffering from high blood pressure.

These untoward consequences are largely due to the vascular and nervous excitement concerned.

Fainting, vomiting, involuntary urination and defecation have been noted as occurring in nervous young men after the first coitus.

In men of mature age, with hardened arteries, cerebral hemorrhage with paralysis has occurred.

In elderly men the unusual excitement of sex relations with young wives or with prostitutes is many times fatal.

### 1. From William J. Fielding, *Sex and the Love-Life* (New York: Dodd, Mead & Company, 1927):

In the female, according to Winiwarter, there are 48 chromosomes, which include two X-chromosomes, one representing the heritage of each parent. After the maturation division, each egg contains 24 chromosomes (23 regular and one accessory). If an egg is fertilized by a spermatozoon with 24 chromosomes, the resultant 48 chromosomes produce a female; if fertilized by a spermatozoon containing 23 chromosomes, the combined 47 chromosomes produce a male (F 183).