

face, located in longitudinal grooves with genital sinus in front and orifice of uterus behind it. Eggs brown, thick shelled, 63 μ by 48 to 50 μ in diameter. Found in

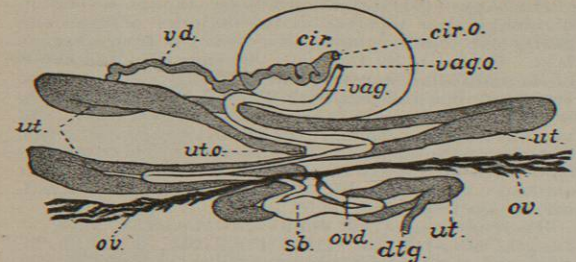


FIG. 1244.—Sinistral Set of Reproductive Organs from Sexually Mature Proglottis of *Diplogonoporus grandis*. $\times 140$. (After Ijima and Kurimoto.)

man in Japan; larva unknown. The first account of this remarkable species was given by Ijima and Kurimoto. It is unique not only in the extreme size manifested, but also in the double genital apparatus which occurs in some species from seals, but save for this species is unknown among human parasites of this group. The sexual organs (Fig. 1244) are characteristically bothriocephaline, but they are found in double sets right and left in each segment, and the orifices open at the bottom of two longitudinal grooves which are characteristic features in the appearance of the worm (Fig. 1245).

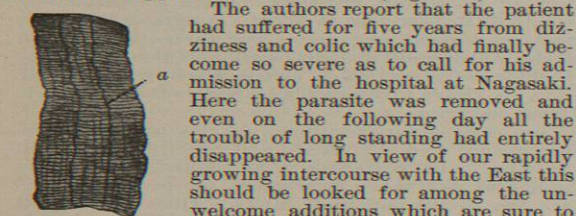


FIG. 1245.—Ventral View of Portion of Chain from *Diplogonoporus grandis*. a, Ventral groove. Natural size. (After Ijima and Kurimoto.)

The authors report that the patient had suffered for five years from dizziness and colic which had finally become so severe as to call for his admission to the hospital at Nagasaki. Here the parasite was removed and even on the following day all the trouble of long standing had entirely disappeared. In view of our rapidly growing intercourse with the East this should be looked for among the unwelcome additions which are sure to be made to our helminthological fauna.

Quite recently Kurimoto has given an account of a second case (also from Japan) in which two specimens of the same parasite were passed. Unfortunately, both scolices were wanting here also. In other particulars the agreement with the original specimen of this species was complete. Anomalies such as fenestration, intercalated proglottides, and those of asymmetrical form were frequent.

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CHALYBEATE SPRINGS.—Meriweather County, Georgia.

POST-OFFICE.—Chalybeate Springs. Hotels and cottages.

ACCESS.—Take Southeastern Railroad to Bostwick, thence Talbottom Branch Road to Talbottom, thence 20 miles west to Springs.

These springs were discovered by Mr. Rawlings about 1835, and opened by him for the reception of visitors a few years later. The improvements were of a rude character until about 1850, at which time they were considerably enlarged. With the exception of a few years' interval they have been open to the public ever since. Analysis by Prof. W. J. Land:

ONE UNITED STATES GALLON CONTAINS:	
Solids.	Grains.
Silicic acid (soluble).....	2.83
Iron proto-carbonate.....	.62
Iron sesqui-carbonate.....	.17
Lime carbonate.....	.76
Potassium sulphate.....	.33
Sodium sulphate.....	.13
Aluminum sulphate.....	.43
Sodium chloride.....	.03
Total.....	5.30
Carbonic acid gas, 6.55 cubic inches.	

The water is a light chalybeate. There are also traces of hydrogen sulphide, carbonate of magnesia, crenate of iron, and a minute trace of nitric acid, lithium, and organic matter. The proportion of soluble salicylic acid is larger than usual. This compound is not used in medicine, but silica is contained in the human body, and may not be without therapeutical value. It is possible that the trace of sulphureted hydrogen also slightly influences the action of the water. It has been recommended in all cases requiring a chalybeate water. The flow is abundant, being about twenty-five gallons per minute. Near by is a sulphur and magnesia spring, but no analysis has been made of the waters. The improvements are extensive, consisting of two hotels and cottages, sufficient to accommodate five hundred guests. Bathing facilities are ample, both hot and cold water being supplied. The climate of this region is of a salubrious character.

James K. Crook.

CHAMÆLIRIUM. See *Unicorn Root, False*.

CHAMIQUEL.—Coalcoman, Michoacan, Mexico. A lukewarm mineral water classified by Dr. Zuniger as a sulphureted calcic water, and containing, according to Forbes, of Coalcoman, carbonic acid, large quantities of lime and magnesia, silica, and traces of copper and iron.

No bathing facilities have been established so far. The bathers are recruited from among those suffering from leprosy and diseases of the skin. N. J. Ponce de Léon.

CHAMOMILE.—*ANTHEMIS.* *Roman Chamomile.* "The flower-heads of *Anthemis nobilis* L. (fam. *Compositae*), collected from cultivated plants" (U. S. P.). In this definition the Pharmacopœia recognizes the fact that under cultivation the aroma and flavor of the chamomile grow finer and less rank and heavy, notwithstanding that the percentage of volatile oil, and very likely the medicinal strength, are somewhat decreased.

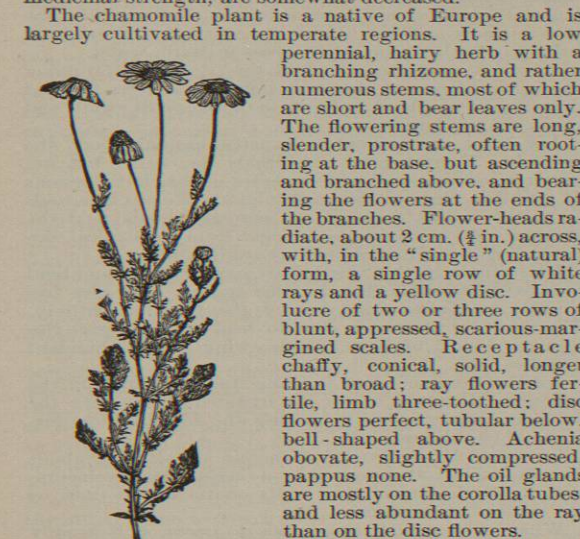


FIG. 1246.—Chamomile, Wild or Single-Flowered Plant. One-third natural size. (Ballou.)

The plant is a native of Europe, and is largely cultivated in temperate regions. Under cultivation, ligulate flowers largely replace the tubular disc flowers, so that the heads become "double" and large and white, which condition, by careful and rapid drying, should be preserved in the dried heads.

Chamomile contains nearly one per cent. of a blue volatile oil, turning greenish or yellowish with keeping and having a specific gravity of .905 to .915. The important constituents of this oil are *anethol* (C₁₀H₁₆O) and *cumin aldehyde* (C₈H₈, C₂H₅, CHO). The composition of the remainder of the oil is very complex. With the oil there are an amaroid, some resin, and a little tannin.

Chamomile is one of the very best of the aromatic bitters, and is strongly carminative and somewhat antispasmodic. The dose is 1 to 4 gm. (3½ to i.). There is no official preparation. The best form of administration is a tincture, so as to contain all the oil. As a simple stomachic a decoction or infusion is excellent. This should be well diluted, taken slowly before meals, and the dose should be small. The oil is often given as a carminative and antispasmodic, in doses of \mathfrak{m} i. to \mathfrak{v} .

ALLIED PLANTS.—The genus contains about eighty species, and includes the common mayweed (*Anthemis cotula* Linn.). They are generally less agreeable than chamomile, and although of similar qualities, not in use. *Chrysanthemum parthenium* Pers. (Feverfew) is sometimes used as a substitute or adulterant of this article. It can be told by its flatter and less chaffy receptacles. Henry H. Rusby.

CHAMOMILE, GERMAN.—*MATRICARIA.* "The flower-heads of *Matricaria Chamomila* L. (fam. *Compositae*)" (U. S. P.). This drug is the product of a daisy-like plant, one to two feet in height, native of Europe and

Western Asia, and introduced, as a roadside weed, into many countries. The reflexed rays are about fifteen in number, nearly half an inch long, white, three-toothed. These rays, together with its elongated, conical, and hollow receptacle, which bears no scales, distinguish it from all drugs or substitutes which might be mistaken for it.

Its active constituents are its anthemic acid, which is very bitter, and less than half of one per cent. of a dark blue volatile oil. There are also a small amount of tannin and some anthemidin.

The drug is very largely used as an ingredient of proprietary "teas" and other herb mixtures, but possesses only ordinary aromatic-bitter properties of the *Compositae*, which see. The ordinary dose is 1 to 4 gm. (gr. xv. to lx.), and it is commonly given in infusion or fluid extract. Henry H. Rusby.

CHANCRE. See *Syphilis*.

CHANCROID.—Chancroid is a local, contagious, venereal disease, appearing as suppurating ulcers about the genitals, and is due to contact with secretions from the same kind of ulcerations. Aside from causing more or less severe inflammatory reaction in the lymph glands in the immediate vicinity of the sores, chancroid is always a local process and never causes constitutional infection.

Until within the last half-century it was generally believed that syphilis and chancroid were due to the same cause, but their individual entity has now so long been established that the old opinions interest us simply as a matter of history. The two diseases very frequently exist in the same individual at the same time, but they are, of course, due to inoculation at the same time and spot with two entirely separate and distinct poisons.

At the outset too much emphasis cannot be placed on the necessity of a careful examination and accurate diagnosis of all venereal sores. Cases of initial syphilis are constantly being diagnosed as chancroids. Many men have married with their doctor's approval (and reassurance that their sore was a soft one and therefore harmless), only to see syphilis appear in themselves and be transmitted to their wives and children.

To the clinical observer the purulent secretion from chancroids is the medium which conveys the contagion, and it has been claimed that the leucocytes alone contain the virus, and that inoculations with a solution from which the pus cells had been removed yielded negative results. We also know that cold has apparently little effect upon the vitality of the organism, while it is readily destroyed by heat, drying, and antiseptics.

ETIOLOGY.—Chancroid is undoubtedly due to a specific micro-organism, but what that organism is has not yet been conclusively demonstrated.

At the present time there are only two opinions that are deserving of consideration: first, the claim that the ordinary pyogenic bacteria are capable of producing typical chancroidal ulcers; second, that the bacillus of Ducrey is the pathogenic organism. It has also been claimed that cases of chancroid have arisen *de novo*, there having been no active chancroidal ulcerations present in the party giving the infection.

In asserting that chancroids are of purely pyogenic origin, it has been pointed out that the secretions from chancroids always contain streptococci, staphylococci, and non-pathogenic bacilli, as well as the streptobacillus first described by Ducrey and claimed by him to be the specific organism of chancroid. It is also claimed that chancroid is to mucous membranes what impetigo and pus infection are to the skin, and that the streptobacillus is an accidental accompaniment and not the cause; and, furthermore, that chancroid is usually found in broken-down prostitutes and among the poorer classes in general, a class whose vitality is lowered by lack of proper food, over-indulgence in alcoholics, by filth and unhygienic surroundings; in other words, a class in whom we know that slight abrasions of the skin become easily infected with pus cocci, suppurate freely, and do badly in general.

Certainly the genitals in the uncleanly, with heat, moisture, and decomposing smegma, furnish an excellent medium in which the pus organisms may grow.

Now it is well known that chancroid is by no means confined to the cachectic and debilitated, but may occur in the robust and healthy when exposed to chancroidal infection. If pyrogenic bacteria alone were capable of causing chancroids, those individuals with long foreskins and excoriative balanitis, with acquired phimosis and a foul subpreputial discharge, would develop chancroids. Furthermore, women with peri-urethral or vulvo-vaginal abscesses, complicating gonorrhœa, or men with ulcerations dependent on scabies of the genitals, would also develop chancroids. Clinical experience shows that such is not the case.

It was pointed out by Ducrey that in repeated inoculations with chancroidal pus the accompanying streptococci, staphylococci, and other bacteria rapidly disappeared, leaving nearly pure cultures of the streptobacillus, which he looks upon as the pathogenic organism of chancroid. Unna, Krefting, Wielander, and others have found, both in smear preparations and in sections from the floor and walls of chancroidal ulcers, these same bacilli described by Ducrey.

They are short and thick, with rounded ends, and have a slight constriction in the middle which gives them a sort of figure-of-eight or dumb-bell appearance, and tend to group themselves in parallel chains. The bacilli usually lie outside the cells, though occasionally within them, and they are said not to be found in the pus of suppurating chancroidal buboes. The bacilli of Ducrey stain readily with fuchsin or gentian violet, and are decolorized by Gram's method of staining.

Bacteriological investigation is handicapped by the inability to grow the bacilli on artificial media, and also from the fact that up to the present time animals have not been successfully inoculated.

Until these bacilli can be cultivated and inoculations made producing characteristic lesions, and from these lesions the organisms recovered, the claims for the Ducrey bacillus cannot be accepted as conclusive.

CLINICAL HISTORY.—There is no period of incubation in chancroid. The process begins as soon as the virus gains an entrance to the tissues, and usually is noticed within two or three days after exposure.

The first thing that appears is a small papule with a yellowish centre situated on an inflammatory base and surrounded by a slight halo of congestion. The yellow vesicle in the centre increases and soon ruptures, leaving a small ulcer with a grayish, velvety base and sharp, well-marked edges, giving it a punched-out appearance. The edges become undermined and give way, and the size of the ulcer increases in this manner, the surrounding congestion spreading as the ulceration advances. The floor of the ulcer then has a grayish, uneven, worm-eaten appearance, is bathed in pus, with little tendency to bleed, unless roughly handled. There may be only one ulcer at the start, or there may be several, but soon fresh points of auto-infection appear and each new ulceration goes through the stages of destruction, rest, and repair like its predecessors. This tendency to spread by auto-inoculation is one of the most striking and constant of the characteristics of chancroid. The floor and edges of a chancroidal ulcer, no matter how long it has existed, are never indurated unless it has been cauterized.

Within a short time after the appearance of chancroidal ulcerations the glands in the immediate vicinity may become inflamed. Usually but a single gland in the chain swells, becoming both painful and tender, but the glands in both groins may become affected. Not infrequently the glands break down and require surgical care.

In trying to determine the character of a doubtful sore, great care should be taken to notice the condition of the neighboring glands, for their behavior in chancroid is so entirely unlike the condition in syphilis that it is one of the chief features in diagnosis.

In chancroid the glands are either not affected at all, or when affected, are inflamed, painful, and tender, and

tend to suppurate, while in syphilis the process is non-inflammatory, the glands are neither painful nor tender, and they very rarely undergo suppuration.

In men with long foreskins soft chancres situated on the mucous membrane of the prepuce or along its free margin often cause an acquired phimosis with a good deal of heat, redness, swelling, and pain. The whole prepuce then feels thickened, brawny, and tender, and may entirely obscure the beginning induration of a sore beneath, so that in this condition one should be very guarded as to the outcome of such a case. When the ulcers are seated about the ostium preputii, micturition is usually painful, as the urine comes in contact with the raw surfaces. This pain may be greatly relieved by urinating with the penis immersed in warm water.

It is not uncommon to find the lymphatics running along the dorsum of the penis inflamed and tender, and occasionally a gland at the base of the penis swells and may even suppurate.

LOCATION.—Chancroid is usually located about the genitals. Extra-genital chancroids do occur, but are very rare as compared with the extra-genital initial lesions of syphilis. In men the most common site of chancroids is in the sulcus, back of the corona glandis, next the frænum. Here minute tears occur from mechanical violence during intercourse and are readily infected.

Ulcerations in this location are more painful and tend to bleed more easily than in other spots. They also frequently perforate and destroy the frænum entirely. The resulting ulcers are slow to heal and may give rise to a good deal of hemorrhage, owing to the abundant blood supply.

Another common spot is along the free margin of the prepuce. Here the ulcers are irritated in handling the penis in urinating, in retracting the foreskin for purposes of cleanliness, etc.

In women the lesions of chancroid are situated about the clitoris, introitus vaginae, and on the labia, perineum, and about the anus; very rarely on the cervix uteri or the walls of the vagina.

When extra-genital chancroids do occur, it is usually by auto-infection rather than by direct infection; e.g., a careless patient in caring for his chancroids may smear some of the discharge on his fingers and inoculate some part of his integument by scratching.

The number of lesions in a case of chancroid is variable; it may remain as a single sore, but is usually multiple, the multiplicity being due to the highly inoculable character of the chancroidal pus. The virus can undoubtedly penetrate sound mucous membranes when deposited thereon, while on the skin entrance is gained through hair follicles or minute abrasions.

The power of reproducing itself in the same individual is perhaps best shown in the case of filthy women who allow the discharges from chancroids about the vulva to run down over the perineum and about the anus, or even the upper part of the thighs, thus causing very numerous ulcerations in the localities named.

In determining the character of a doubtful sore, it is sometimes of value to try auto-inoculation. In doing this a spot well removed from the large chains of lymph glands should be selected. The pus from chancroids is always capable of auto-inoculation.

The size of chancroidal ulcerations varies from that of a pea in mild cases up to a silver dollar or larger in severe serpiginous cases. The size of the lesion is of comparatively little value in making a diagnosis. The shape of the ulcer is perhaps oftener roundish or oval, but this depends upon the location and is of no importance.

The duration of the disease is modified so much by the patient's general physical condition and habits of life, as well as by the medical management of the case, that it is difficult to give anything like an exact time limit.

There are three fairly well-marked stages in the disease: the period of destruction, followed by an interval in which the condition remains about stationary, the ulcerations not extending; and this in turn is followed by the period of repair, where the character of the ulcer changes;

it appears less sluggish, bright red granulations begin to show in the floor of the ulcer, and there is then a greater tendency to bleed; any necrotic tissue which may be present comes away and the sore heals by granulation. In uncomplicated cases in otherwise healthy individuals, the course is run in from two to six weeks. Too vigorous exercise, alcoholic indulgence, and complications such as phimosis, gangrene, or phagedæna (the two latter are very rarely seen at the present time), may extend the course much longer.

DIAGNOSIS.—Chancroid is to be differentiated from the initial lesion of syphilis, from the mucous patches of secondary syphilis and the gummatous ulcerations of late syphilis, from herpes progenitalis, from ulcerations accompanying scabies of the genitals, and from epithelioma.

The initial lesion of syphilis is to be distinguished from chancroid by its well-marked period of incubation, the sore usually appearing in from two to four weeks after exposure. Instead of a suppurating ulcer we are apt to find a more or less well-marked infiltration of the tissues about the sore with an erosion of the surface, and with very little purulent secretion. The striking features of chancroid are the non-indurated, suppurating ulcers which are always capable of auto-inoculation. In syphilis, on the other hand, we are impressed by the induration (the sore often feels like a foreign body in the tissues when taken between the thumb and fingers), and by the fact that the number of sores, representing so many points of inoculation, always remains the same from the beginning to the end.

Another important difference is the behavior of the neighboring lymph glands in the two diseases. It has already been pointed out that usually in chancroid a single gland in the chain is swollen, painful, and tender, and the process not infrequently ends in suppuration. In syphilis the glands in the whole chain are affected, are non-inflammatory, neither painful nor tender, they are freely movable under the fingers and have a peculiar hard, shotty feel. It is rare for the glands accompanying the initial lesion to break down.

In a case of chancroids one can never rule out the possibility of a coexisting syphilis until the incubation period of the latter is past.

In women especially, mucous patches of syphilis occurring about the vulva and anus may very closely simulate chancroids. The same lesions are found in men usually about the glans penis. These lesions will be found to have not the clean-cut edges, purulent secretion, or the velvety, worm-eaten-appearing base of chancroids, but a grayish, smooth, opaline appearance. The secretions from these mucous patches are highly contagious and foul-smelling, but are never capable of auto-inoculation.

The diagnosis, in the case of mucous patches, can generally be easily determined by the presence of other syphilitic manifestations or by the history.

At times a late syphilitic ulcer may appear about the genitals and very closely simulate a chancroid. The history of a previous syphilis, the non-involvement of the glands in the vicinity, and the lack of evidence of auto-infection will hardly allow a mistake to be made.

Herpes progenitalis.—In herpes there is a sense of burning and itching before the eruption appears. At first the contents of the vesicles are clear and not yellow like chancroids, though they may become yellowish later, when pus is present. The covering of the vesicle easily ruptures and the small ulceration resulting may extend somewhat in depth, but not in breadth, unless two or more vesicles run together. There is seldom any disturbance in the lymph glands and the disease runs a self-limited course. The spots dry up and disappear in a week or ten days. There is often no history of exposure, and certain individuals are prone to repeated attacks. It occurs in both sexes, and it is not very uncommon to see a person with a herpes progenitalis and a herpes labialis at the same time.

Ulcerations about the genitals due to scabies are to be distinguished from chancroid by the presence of burrows

and marks of scratching on the foreskin, and evidence of scabies on other parts of the body.

A *peri-urethral abscess* occurring in the sulcus, back of the glans, might at times suggest a chancroid, but if its sharply circumscribed appearance and inflammatory character are borne in mind, together with the history of a previous gonorrhœa, the liability of a mistaken diagnosis is very small.

COMPLICATIONS.—The complications of chancroid are phimosis and paraphimosis, lymphangitis and suppurating bubo; phagedæna and gangrene are very rarely seen nowadays.

Phimosis and paraphimosis not infrequently occur during the course of chancroid. In phimosis the whole prepuce may become swollen, red, or reddish purple in color, tender and doughy to the touch, with a more or less profuse foul, purulent discharge.

Often there will be one or two small ulcerations at the margin of the foreskin which show the nature of the sores within. Occasionally, in unrelieved cases, the prepuce ulcerates through and allows the glans to protrude. Paraphimosis is less common, though not much less severe a complication. The swelling of the parts may be very great, and the line of ulceration which occurs in the line of constriction back of the œdema, at right angles to the shaft of the penis (nature's attempt at relief of the condition), becomes infected with the chancroidal virus and extensive destruction of tissue may result.

Lymphangitis and lymphadenitis.—As has already been mentioned, the lymphatics of the penis are often involved and are felt as a hard, tender cord beneath the skin.

The condition of the lymph glands has already been described.

TREATMENT.—In the treatment of chancroids it is essential that the patient keep as quiet as possible. All excessive or violent exercise, running, skating, dancing, etc., is to be avoided.

The next step is to keep the sores thoroughly cleansed with soap and water and antiseptic solutions. It is always well to use the lotions as hot as is grateful to the patient, for heat in itself is exceedingly beneficial in the treatment. The principal solutions in use to-day are corrosive sublimate, 1 to 1,000 or 1 to 2,000; creolin, 1 to 250; lysol, 1 to 500; formalin, 1 to 50; carbolic acid, 1 to 50; boric acid in saturated solution. After cleansing with the wash, the surface of the ulcers should be carefully dried and dusted over with one of the following powders: aristol, europhen, iodol, camolene, acetanilide, or iodoform.

Perhaps the last named is the most efficacious of any of the powders named for use in the early stages or up to the appearance of healthy granulations. Of course its odor is a great objection, and its use is as a promoter of healthy granulations. It should ordinarily be used as a fine powder, but may be suspended in ether or glycerin. The deodorized iodoform is of little value. Care should always be taken not to irritate the sores, either by manipulation or by the dressings employed.

This may be termed the conservative or symptomatic treatment; opposed to this may be given the heroic or radical treatment.

Here the attempt is made to change at once the chancroidal ulcer into a simple one by thoroughly destroying the surface of the sore. This is usually accomplished by the actual cautery or by the application of caustic acids. Nitric and carbolic are the ones commonly used to-day. Excision should rarely, if ever, be done. Before cauterizing a sore it should be carefully cleansed and cocainized, and then the acid applied thoroughly to the floor and edges of the ulcer, with a bit of absorbent cotton wound around the end of a wooden toothpick. Care must be taken to restrict the action of the acid to the diseased tissue, and the action of nitric acid can be controlled by the use of bicarbonate of soda.

The stick of silver nitrate is a popular caustic with the laity, but its use is to be severely condemned. Its action is superficial, irritating to the tissues, productive of œdema and suppurating bubo, and should never be employed as a means of destruction of the sore, but as a

stimulant to sluggish granulations it may be of service. However, it should never be used early. Caustics should never be applied to a sore that cannot be thoroughly exposed and properly cared for. After cauterizing, the sore should be treated with moist bland dressings for a time, lint soaked in lead-water wash or a solution of boracic acid or black wash, and changed frequently. After a few hours this dressing should be changed to one of the powders already named.

As a general rule, ointments and greasy preparations should not be employed, except, perhaps, over the powder to keep the cloth from sticking and thus prevent bleeding when the dressing is changed, or when the ulcer is granulating, to promote healing. Internal medication, unless the individual is much run down, is not usually needed. General tonics (iron, cod-liver oil, syrup hypophosphites, etc.) may often be of service in debilitated cases.

Mercury should never be given in a case of chancreoid.

In old sluggish chancroidal ulcers, a thorough curetting is sometimes of service. In women the treatment is more difficult by reason of the inability to keep the parts clean and reach all the points of infection. Hot injections of soap and water or borax and water followed by a corrosive douch, 1 to 5,000, should be used once or twice daily, and one of the powders already mentioned dusted on all the available spots.

A ten to forty per cent. solution of formalin gently applied, or a saturated solution of pyoktanin blue, has been highly recommended in sluggish cases.

In general, it is always advisable, in the vast majority of cases, to avoid using any sort of caustic. When used, it should be applied only to carefully selected cases, and should be used with the greatest care.

C. Morton Smith.

CHANGE OF LIFE.—This term, in common use, signifies the series of phenomena which are apparent at the end of the child-bearing period.

It is applied exclusively to women, though an analogy has been observed between some of the conditions which affect women at the period in question and similar conditions which have frequently been noted in men at the time when their physical powers have reached their culmination.

The term which is generally accepted and used by medical writers as correlative with *change of life* is *menopause*.

This term is sufficiently explicit for only one link in the chain of phenomena which comprise the *change of life*, to wit, the cessation of the monthly flow. For this reason the common term is the more exact and comprehensive and therefore presents claims for its general use.

The *change of life* is really one of the great epochs in the life of woman, for it not only serves as the boundary line between the period in which she is able to reproduce herself and her species—period of fruitage,—but it marks the limit of the progressive stage of her physical condition in general, deterioration being henceforth the prevailing process, whether it develops slowly or rapidly.

Time of its Occurrence.—Like all the other functions of animal life, this one also is subject to great variations both as to the time of its occurrence and the events which characterize it.

According as it occurs early or late in life it may be premature, normal, or retarded, and it may be natural or artificial according as it is or is not solely the product of physiological forces.

In temperate climates we may expect its appearance in the majority of cases between the fortieth and forty-fifth years; family or race peculiarities may advance it two or three years or defer it for an equal period. It is premature when it occurs prior to the fortieth year and it is retarded when it occurs later than the fifty-fifth.

Influences which Modify its Occurrence and its Course.—Race. The nearer a tribe or race of human beings approaches the lower animals in its intellectual develop-

ment the less marked will be the menstrual function in its women.

Menstruation is quite clearly the development or evolution of the *rut* or *estrus* in the lower animals. In the apes and monkeys we observe very frequently a distinct regularity in what may be termed for them the menstrual flow. Neither in the animals nor, so far as my knowledge extends, in the lower orders of human beings are there well-defined conditions which might constitute the *change of life*, at least as this experience is observed in the more advanced races.

In proportion as a community or race advances in civilization do we see the menstrual function and the *change of life* assume distinctness and character. While it does not follow that their unusual or pathological features are necessarily the result of civilization, since there are countless examples in which no appreciable disturbance is experienced from either, it is certainly true that such disturbance does accompany civilization.

Climate. The influence of extremes in temperature acts upon the *change of life* precisely as we would anticipate. In the tropics vegetation is luxuriant, matures early, and is profuse in its fruitfulness, but the duration of its life is shortened by the very excess of this profuseness. It is the same, to a certain extent at least, with human females who are native to the tropics: they mature and bear their children early, and in frequent instances reach the menopause between twenty and thirty. This has been observed especially of the Arabs of the desert. To the Caucasian races transplantation to the tropics means a distinct lowering of vitality, with a great diminution in reproductive power and a consequent tendency to the early cessation of the menstrual function, and the advent of the *change of life*. In the Arctic regions the effect of extreme cold upon vitality is similar to the effect of extreme heat, though it may be made endurable to a greater degree than the latter. The natives of the Arctic regions are stunted in form and more or less deficient in vitality. This is especially the case after they have endured the rigors and the darkness of the long Arctic night. The women seldom mature earlier than the twentieth year, menstruate very infrequently, and seldom have more than one or two children. The duration of life is not great, and the *change of life* comes between thirty and forty.

Altitude. The significance of this factor is due, of course, to the change in the air pressure. Women may gradually become habituated to any condition of atmospheric pressure, but the effects which obtain prior to such habituation are very distinct. A change to the sea level by one who has lived away from the sea and at more or less of an elevation generally suspends or otherwise disturbs the menstrual flow, and in cases in which there is decided constitutional disturbance it is possible that the *change of life* might be hastened by such residence.

Those who go from the sea level to reside at altitudes of six thousand to seven thousand feet or more experience, on the other hand, increased profuseness in the menstrual flow, the external air pressure being greatly reduced. Of the influence of such reduced pressure upon the *change of life* except in prolonging its duration and increasing the frequency and profuseness of its hemorrhages, I am not prepared to speak. I know of no statistics bearing directly upon this subject, which is one of the many fruitful themes in climatology still awaiting investigation.

General Physical Condition.—The general condition of a woman has much to do with the inauguration of the *change of life* and with the events by which it may be characterized. Those who suffer with grave constitutional and visceral diseases which seriously impair their vitality are almost certain to experience an arrest of menstruation and often other symptoms which accompany the *change of life*. Those who suffer with tuberculosis, syphilis, general anemia, chronic diseases of the liver or kidneys, etc., are in this category. The acute wasting diseases sometimes produce so profound an impression that the menstrual function is entirely obliter-

ated. On the other hand, the malignant diseases of the genital organs, if present at a time when the *change of life* might be expected, cause its unlimited delay. I do not recall a case of such disease, in a very large experience, in which the *change of life* ensued after the malignant disease had begun its destructive career. In fibroid tumors of the uterus, especially those which are characterized with much discomfort and hemorrhage, it was formerly the custom to hold out the hope that all trouble would cease when the *change of life* brought its beneficent issue. In most cases this has proven the most unsatisfactory will-o'-the-wisp hunting by which a poor mortal could be deluded. The *change of life* again and again escapes the grasp, until finally it comes to mean that transformation which arrives for us all "when this mortal shall put on immortality."

The beneficent influence of modern gynecology has removed the veil of ignorance in regard to this subject, and the early removal of these tumors has alike brought on the *change of life* and the relief of many troublesome symptoms. The *change of life* comes quite early in women who become excessively fat. Such women are usually sterile. Their physical condition unfits them for the normal experiences of pregnancy and parturition, menstruation is infrequent, scanty, and painful, and it is not unusual for the *change of life* to occur within a few years of the appearance of the obese condition.

Surgical Procedures.—Certain surgical operations are conducted with the deliberate intention and purpose of bringing about the *change of life*. Such are all operations in which the ovaries are entirely removed. It is estimated that in ninety per cent. of cases of removal of the ovaries menstruation is at once arrested. If the uterus and Fallopian tubes are also removed the percentage in which such a result is obtained will be even greater. There are no other surgical procedures which act so directly to induce the *change of life* as does extirpation of the ovaries. Operations which may be followed by prolonged suppuration and invalidism by impairing the general nutrition and reducing vitality may result in arresting menstruation temporarily or permanently and in bringing about the premature appearance of the *change of life*.

Occupation.—Both a direct and an indirect influence may be exerted by occupation upon the subject which is under consideration. Such occupations as keep a woman in an elevated temperature during most of the day are very disturbing to the menstrual function, have a very decided tendency to produce obesity and may induce the *change of life* prematurely. Cooks, laundresses, and bakers are particularly subject to such influences. Other occupations which impair nutrition and vitality also disturb the menstrual function and hasten the *change of life*. Workers in chemical factories and laboratories upon arsenic, copper, lead, phosphorus, and other poisonous substances, workers in mines, cellars, in badly lighted, badly ventilated, and damp surroundings are included in this category. Other sufferers are those whose work is exhausting and unwomanly and predisposes to wrinkles and premature old age; such are fishwives, field workers, bearers of heavy burdens on the shoulders or head, mechanics' assistants who may carry tubs of mortar, casks of water or other heavy burdens, all these being types of laborers which one sees much more frequently among the laboring classes in Europe than in this country.

Excessive Fertility.—With many women the reserve capital of vital force is not large. Bearing children in rapid succession until five, six, or more have been borne in as many years exhausts that capital, and then follows the *change of life* while the woman is yet young. The reason for this is perfectly plain and is seen in the results which follow over-productiveness in animal or vegetable life wherever we may take the trouble to investigate it. Such a result can hardly be regarded as disease, but simply as the taking up of a certain amount of capital to which nothing remained to be added by way of replenishment.

Dissipation and Vice.—The number of women who lead irregular and vicious lives is so great that it would

seem as if important deductions might be made from the study of such lives. It has happened to my experience to see quite a large number of women of the vicious and depraved class of all ages. These women suffer greatly both with acute and chronic diseases of the pelvic organs; they frequently suffer with profuse hemorrhage from the uterus, and their excesses very often result in sterility, so that if the vicious life is followed by marriage, it is not likely to be a fruitful marriage. It has been a matter of surprise to me, again and again, that the excesses in sexual intercourse on the part of prostitutes and others do not arrest menstruation and bring on the *change of life*. Of course irregular habits, late hours, excesses in alcohol, etc., frequently break down the health, and the menses may be arrested as the result of anemia, etc., if the woman does not die promptly from exhaustion or some acute disease, as is the result with many. As a matter of fact I have seldom been called to record such an occurrence; indeed, the stimulation of the sexual organs and the careless, irresponsible life of many of these women seem to improve nutrition, and for a long time, at least, their physical condition is surprisingly good.

Phenomena and Duration.—There are certain phenomena which are almost invariable and others which are only occasional to the *change of life*. We must also remember that with some women the transition is immediate and without appreciable symptoms, except that the ordinary monthly flow abruptly ceases. The leading symptoms are practically the same whether the condition is the natural change or one which is induced by disease or surgical procedure. To those who experience it while still far removed from the usual period of time when it is to be expected, the symptoms may be exaggerated; but not necessarily so, for I have seen young girls go through this change with scarcely any discomfort or unusual happening.

Cessation of the Menstrual Flow.—The leading symptom is the disappearance of the regular monthly bloody discharge. This cessation may occur abruptly, the flow appearing one month, disappearing the next and never reappearing. This may be explained by the fact that physical maturity has been reached, just as the fruit falls from the tree when it is ripe; or it may be the result of disease, of removal of the ovaries, of intense emotion, etc. If the cessation of the menses occurs in young women, the possibility of its restoration in due season must be considered. Instead of an abrupt cessation the flow may reappear at regular or irregular intervals, two months, four months, six months or longer, finally ceasing altogether after one, two, or three years.

Excessive Flowing.—A very marked feature in some cases, when the flowing has become irregular, is its profuseness. It was formerly thought proper to do nothing for this symptom on the supposition that it was simply a natural discharge. I have striven diligently for years to combat this view. Excessive loss of blood is always unusual, abnormal, and should be investigated and arrested. The condition of the uterine mucous membrane usually calls for active treatment in such cases by the application of astringent substances to it or the removal of granulation tissue, which may be the cause of the hemorrhage, by the curette. Tumors and other disease of the uterus assume particular importance at this time, and one should never leave to the unaided efforts of nature the disposal of a burden at this time which she may be unable to dispose of or only with great risk to the patient's life.

Flushing and Other Vaso-Motor Disturbances.—Almost as common a symptom as the arrest or irregularity of the menses is the vaso-motor disturbance which occurs without warning many times a day until toward the end of the change, and is manifested now by flushing and heat, and now by pallor and chill. The experience of each paroxysm may continue but a moment, but it is annoying and in some cases depressing and weakening. What should cause this peculiar vaso-motor influence, now paralyzing and again stimulating the vascular system,