THE PHENOMENA OF SEXUAL PERIODICITY.

I.

The Various Physiological and Psychological Rhythms—Menstruation—The Alleged Influence of the Moon—Frequent Suppression of Menstruation among Primitive Races—Mittelschmerz—Possible Tendency to a Future Intermenstrual Cycle—Menstruation among Animals—Menstruating Monkeys and Apes—What is Menstruation—Its Primary Cause Still Obscure—The Relation of Menstruation to Ovulation—The Occasional Absence of Menstruation in Health—The Relation of Menstruation to "Heat"—The Prohibition of Intercourse during Menstruation—The Predominance of Sexual Excitement at and around the Menstrual Period—Its Absence during the Period Frequently Apparent only.

Throughout the vegetable and animal worlds the sexual functions are periodic. From the usually annual period of flowering in plants, with its play of sperm-cell and germ-cell and consequent seed-production, through the varying sexual energies of animals, up to the monthly effervescence of the generative organism in woman, seeking not without the shedding of blood for the gratification of its reproductive function, from first to last we find unfailing evidence of the periodicity of sex. At first the sun, and then, as some have thought, the moon, have marked throughout a rhythmic impress on the phenomena of sex. To understand these phenomena we have not only to recognize the bare existence of that periodic fact, but to realize its implications.

Rhythm, it is scarcely necessary to remark, is far from characterizing sexual activity alone. It is the character of all biological activity, alike on the physical and the psychic sides. All the organs of the body appear to be in a perpetual process of rhythmic contraction and expansion. The heart is rhythmic, so is the respiration. The spleen is rhythmic, so also the bladder. The uterus constantly undergoes regular rhythmic contractions at brief intervals. The vascular system, down to the smallest capillaries, is acted on by three series of vibrations, and every
separate fragment of muscular tissue possesses rhythmic contrac-
tility. Growth itself is rhythmic, and, as Malling-Hansen and
subsequent observers have found, follows a regular annual course
as well as a larger cycle. On the psychic sides attention is
rhythmic. We are always irresistibly compelled to impart a
rhythm to every succession of sounds, however uniform and
monotonous. A familiar example of this is the rhythm we can
seldom refrain from hearing in the puffing of an engine. A
series of experiments, by Bolton, on thirty subjects showed that
the clicks of an electric telephone connected in an induction-
apparatus nearly always fell into rhythmic groups, usually of two
or four, rarely of three or five, the rhythmic perception being
accompanied by a strong impulse to make corresponding muscular
movements.\footnote{Thaddeus L. Bolton, "Rhythm," American Journal of Psychology, January, 1894.}

It is, however, with the influence—to some extent real, to
some extent, perhaps, only apparent—of cosmic rhythm that we
are here concerned. The general tendency, physical and psy-
chic, of nervous action to fall into rhythm is merely interesting
from the present point of view as showing a biological predis-
position to accept any periodicity that is habitually imposed
upon the organism.\footnote{It is scarcely necessary to warn the reader that this statement
does not prejudice the question of the inheritance of acquired characters,
although it fits in with Semon's Mnemic theory. We can, however, very
well suppose that the organism became adjusted to the rhythms of its
environment by a series of congenital variations. Or it might be held,
on the basis of Weismann's doctrine, that the germ-plasm has been
directly modified by the environment.}

Menstruation has always been associated
with the lunar revolutions.\footnote{Thus, the Papuans, in some districts, believe that the first men-
struation is due to an actual connection, during sleep, with the moon in
the shape of a man, the girl dreaming that a real man is embracing her. (Reports Cambridge Expedition to Torres Straits, vol. v, p. 206.)}

Darwin, without specifically men-
tioning menstruation, has suggested that the explanation of the
allied cycle of gestation in mammals, as well as incubation in
birds, may be found in the condition under which ascidians live
at high and low water in consequence of the phenomena of tidal
\footnote{Darwin, Descent of Man, p. 164.}
origin of the vertebrates has since been contested from many sides, and, even if we admit that at all events some such allied conditions in the early history of vertebrates and their ancestors tended to impress a lunar cycle on the race, it must still be remembered that the monthly periodicity of menstruation only becomes well marked in the human species.\footnote{While in the majority of women the menstrual cycle is regular for the individual, and corresponds to the lunar month of 28 days, it must be added that in a considerable minority it is rather longer, or, more usually, shorter than this, and in many individuals is not constant. Osterloh found a regular type of menstruation in 68 per cent. healthy women, four weeks being the most usual length of the cycle; in 21 per cent. the cycle was always irregular. See Näcke, "Die Menstruation und ihr Einfluss bei chronischen Psychosen," Archiv für Psychiatrie, 1896, Bd. 28, Heft 1.} Bearing in mind the influence exerted on both the habits and the emotions even of animals by the brightness of moonlight nights, it is perhaps not extravagant to suppose that, on organisms already ancestrally predisposed to the influence of rhythm in general and of cosmic rhythm in particular, the periodically recurring full moon, not merely by its stimulation of the nervous system, but possibly by the special opportunities which it gave for the exercise of the sexual functions, served to implant a lunar rhythm on menstruation. How important such a factor may be we have evidence in the fact that the daily life of even the most civilized peoples is still regulated by a weekly cycle which is apparently a segment of the cosmic lunar cycle.

Mantegazza has suggested that the sexual period became established with relation to the lunar period because moonlight nights were favorable to courting,\footnote{Among the Duala and allied negro peoples of Bantu stock dances of markedly erotic character take place at full moon. Gason describes the dances and sexual festivals of the South Australian Blacks, generally followed by promiscuous intercourse, as taking place at full moon. (Journal of the Anthropological Institute, November, 1894, p. 174.)} and Nelson remarks that in his experience young and robust persons are subject to recurrent periods of wakefulness at night which they attribute to the action of the full moon. One may perhaps refer also to the tendency of bright moonlight to stir the emotions of the young,
especially at puberty, a tendency which in neurotic persons may become almost morbid.¹

It is interesting to point out that, the farther back we are able to trace the beginnings of culture, the more important we find the part played by the moon. Next to the alteration of day and night, the moon’s changes are the most conspicuous and startling phenomena of Nature; they first suggest a basis for reckoning time; they are of the greatest use in primitive agriculture; and everywhere the moon is held to have vast influence on the whole of organic life. Hahn has suggested that the reason why mythological systems do not usually present the moon in the supreme position which we should expect, is that its immense importance is so ancient a fact that it tends, with mythological development, to become overlaid by other elements.² According to Seler, Quetzalcoatl and Tezcatlipoca, the two most considerable figures in the Mexican pantheon, are to be regarded mainly as complementary forms of the moon divinity, and the moon was the chief Mexican measurer of time.³ Even in Babylonia, where the sun was most specially revered, at the earliest period the moon ranked higher, being gradually superseded by the worship of the sun.⁴ Although such considerations as these will by no means take us as far back as the earliest appearance of menstruation, they may serve to indicate that the phases of the moon probably played a large part in the earliest evolution of man. With that statement we must at present rest content.

It is possible that the monthly character of menstruation, while representing a general tendency of the human race, always and everywhere prevalent, may be modified in the future. It is

¹ It has often been held that the course of insanity is influenced by the moon. Of comparatively recent years, this thesis has been maintained by Koster (Über die Gesetze des periodischen Irreseins und verwandter Nervenzustände, Bonn, 1882), who argues in detail that periodic insanity tends to fall into periods of seven days or multiples of seven.

² Ed. Hahn, Demeter und Baubo, p. 23.

³ E. Seler, Zeitschrift für Ethnologie, 1907, Heft 1, p. 39. And as regards the primitive importance of the moon, see also Frazer, Adonis, Attis, Osiris, Ch. VIII.

⁴ Jastrow, Religion of Babylonia, 1898, pp. 68, 75-79, 461.
a noteworthy fact that among many primitive races menstruation only occurs at long intervals. Thus among Eskimo women menstruation follows the peculiar cosmic conditions to which the people are subjected; Cook, the ethnologist of the Peary North Greenland expedition, found that menstruation only began after the age of nineteen, and that it was usually suppressed during the winter months, when there is no sun, only about one in ten women continuing to menstruate during this period.\(^1\) It was stated by Velpeau that Lapland and Greenland women usually only menstruate every three months, or even only two or three times during the year. On the Faroe Islands it is said that menstruation is frequently absent. Among the Samoyeds, Mantegazza mentions that menstruation is so slight that some travelers have denied its existence. Azara noted among the Guaranis of Paraguay that menstruation was not only slight in amount, but the periods were separated by long intervals. Among the Indians in North America, again, menstruation appears to be scanty. Thus, Holder, speaking of his experience with the Crow Indians of Montana, says: "I am quite sure that full-blood Indians in this latitude do not menstruate so freely as white women, not usually exceeding three days."\(^2\) Among the naked women of Tierra del Fuego, it is said that there is often no physical sign of the menses for six months at a time. These observations are noteworthy, though they clearly indicate, on the whole, that primitiveness in race is a very powerless factor without a cold climate. On the other hand, again, there is some reason to suppose that in Europe there is a latent tendency in some women for the menstrual cycle to split up further into two cycles, by the appearance of a latent minor climax in the middle of the monthly interval. I allude to the phenomenon usually called *Mittelschmerz*, middle period, or intermenstrual pain.

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\(^1\) Even in England, Barnes has known women of feeble sexual constitution who menstruated only in summer (R. Barnes, *Diseases of Women*, 1878, p. 192).

PSYCHOLOGY OF SEX.

Since the investigations of Goodman, Stephenson, Van Ott, Reinl, Jacobi, and others, it has been generally recognized that menstruation is a continuous process, the flow being merely the climax of a menstrual cycle, a physiological wave which is in constant flux or reflux. This cycle manifests itself in all a woman's activities, in metabolism, respiration, temperature, etc., as well as on the nervous and psychic side. The healthier the woman is, the less conscious is the cyclic return of her life, but the cycle may be traced (as Hegar has found) even before puberty takes place, while Salerni has found that even in amenorrhoea the menstrual cycle still manifests itself in the temperature and respiration. (Rivista Sperimentale di Freniatria, XXX, fasc. 2-3.)


Mittelschmerz is a condition of pain occurring about the middle of the intermenstrual period, either alone or accompanied by a slight sanguineous discharge, or, more frequently, a non-sanguineous discharge. (In a case described by Van Voornveld, the manifestation was confined to a regularly occurring rise of temperature.) The phenomenon varies, but seems usually to occur about the fourteenth day, and to last two or three days. Laycock, in 1840 (Nervous Diseases of Women, p. 46), gave instances of women with an intermenstrual period. Depaul and Guéniot (Dictionnaire Encyclopédique des Sciences Médicales, Art., "Menstruation," p. 694) speak of intermenstrual symptoms, and even actual flow, as occurring in women who are in a perfect state of health, and constituting genuine "règles surinométraires." The condition is, however, said to have been first fully described by Valleix; then, in 1872, by Sir William Priestley; and subsequently by Fehling, Fasbender, Sorel, Halliday Croom, Findley, Addinsell, and others. (See, for instance, "Mittelschmerz," by J. Halliday Croom, Transactions of Edinburgh Obstetrical Society, vol. xxi, 1896. Also, Krieger, Menstruation, pp. 68-69.) Fliess (Die Beziehungen zwischen Nase und weiblichen Geschlechts-Organen, p. 118) goes so far as to assert that an intermenstrual period of menstrual symptoms—which he terms Nebenmenstruation—is "a phenomenon well known to most healthy women." Observations are, at present too few to allow any definite conclusions, and in some of the cases so far recorded a pathological condition of the sexual organs has been found to exist. Rosner, of Cracow, however, found that only in one case out of twelve was there any disease present (La Gynécologie, June, 1905), and Storer, who has met with twenty
cases, insists on the remarkable and definite regularity of the manifestations, wholly unlike those of neuralgia (Boston Medical and Surgical Journal, April 19, 1900). There is no agreement as to the cause of Mittelschmerz. Addisell attributed it to disease of the Fallopian tubes. This, however, is denied by such competent authorities as Cullingworth and Bland Sutton. Others, like Priestley, and subsequently Marsh (American Journal of Obstetrics, July, 1897), have sought to find the explanation in the occurrence of ovulation. This theory is, however, unsupported by facts, and eventually rests on the exploded belief that ovulation is the cause of menstruation. Rosner, following Richelet, vaguely attributes it to the diffused hyperemia which is generally present. Van de Velde also attributes it to an abnormal fall of vascular tone, causing passive congestion of the pelvic viscera. Others again, like Armand Routh and MacLean, in the course of an interesting discussion on Mittelschmerz at the Obstetric Society of London, on the second day of March, 1898, believe that we may trace here a double menstruation, and would explain the phenomenon by assuming that in certain cases there is an intermenstrual as well as a menstrual cycle. The question is not yet ripe for settlement, though it is fully evident that, looking broadly at the phenomena of rut and menstruation, the main basis of their increasing frequency as we rise toward civilized man is increase of nutrition, heat and sunlight being factors of nutrition. When dealing with civilized man, however, we are probably concerned not merely with general nutrition, but with the nervous direction of that nutrition.

At this stage it is natural to inquire what the corresponding phenomena are among animals. Unfortunately, imperfect as is our comprehension of the human phenomena, our knowledge of the corresponding phenomena among animals is much more fragmentary and incomplete. Among most animals menstruation does not exist, being replaced by what is known as heat, or oestrus, which usually occurs once or twice a year, in spring and in autumn, sometimes affecting the male as well as the female. In the male, the phenomenon is termed rut, and is most familiar in the stag. I quote from Marshall and Jolly some remarks on the infrequency of rut: "The male wild Cat, Mr. Cocks informs us, (like the stag), 'has a rutting season, calls loudly, almost day and night, making far more noise than the female.' This information is of interest, inasmuch as the males of most carnivores, although they undoubtedly show signs of increased sexual activity at some times more than at others, are not known to have anything of the nature of a
allied zoological series. Heat in domesticated cows usually occurs every three weeks. The female hippopotamus in the Zoological Gardens has been observed to exhibit monthly sexual excitement, with swelling and secretion from the vulva. Progression is not only toward greater frequency with higher evolution or with increased domestication, but there is also a change in the character of the flow. As Wiltshire,¹ in his remarkable lectures on the "Comparative Physiology of Menstruation," asserted as a law, the more highly evolved the animal, the more sanguineous the catamenial flow.

It is not until we reach the monkeys that this character of the flow becomes well marked. Monthly sanguineous discharges have been observed among many monkeys. In the seventeenth century various observers in many parts of the world—Bohnius, Peyer, Helbigius, Van der Wiel, and others—noted menstruation in monkeys.² Buffon observed it among various monkeys as well as in the orang-utan. J. G. St. Hilaire and Cuvier, many years ago, declared that menstruation exists among a variety of monkeys and lower apes. Rengger described a vaginal discharge in a species of cebus in Paraguay, while Raciborski observed in the Jardin des Plantes that the menstrual hemorrhage in guenons was so abundant that the floor of the cage was covered by it to a considerable extent; the same variety of monkey was observed at Surinam, by Hill, a surgeon in the Dutch army, who noted an abundant sanguineous flow occurring at every new moon, and lasting about three days, the animal at this time also showing signs of sexual excitement.³

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¹ A. Wiltshire, British Medical Journal, March, 1883. The best account of what is known to me is contained in Ellenberger's Vergleichende Physiologie der Haussäugerthiere, 1892, Band 4, Theil 2, pp. 270-284.
² Schurig (Parthenologica, 1729, p. 125), gives numerous references and quotations.
³ Quoted by Icard, La Femme, etc., p. 63.
The macaque and the baboon appear to be the non-human animals, in which menstruation has been most carefully observed. In the former, besides the flow, Bland Sutton remarks that "all the naked or pale-colored parts of the body, such as the face, neck, and ischial regions, assume a lively pink color; in some cases, it is a vivid red." The flow is slight, but the coloring lasts several days, and in warm weather the labia are much swollen.

Heape\textsuperscript{2} has most fully and carefully described menstruation in monkeys. He found at Calcutta that the \textit{Macacus cynomolgus} menstruated regularly on the 20th of December, 20th of January, and about the 20th of February. The \textit{Cynocephalus porcaria} and the \textit{Semnopithecus entellus} both menstruated each month for about four days. In the \textit{Macaci rhesus} and \textit{cynomolgus} at menstruation "the nipples and vulva become swollen and deeply congested, and the skin of the buttocks swollen, tense, and of a brilliant-red or even purple color. The abdominal wall also, for a short space upward, and the inside of the thighs, sometimes as far down as the hecl, and the under surface of the tail for half its length or more, are all colored a vivid red, while the skin of the face, especially about the eyes, is flushed or blotched with red." In late gestation the coloring is still more vivid. Something similar is to be seen in the males also.

Distant, who kept a female baboon for some time, has recorded the dates of menstruation during a year. He found that nine periods occurred during the year. The average length between the periods was nearly six weeks, but they occurred more frequently in the late autumn and the winter than in the summer.\textsuperscript{3}

It is an interesting fact, Heape noted, that, notwithstanding menstruation, the seasonal influence, or rut, still persisted in the monkeys he investigated.

\textsuperscript{1}Bland Sutton, \textit{Surgical Diseases of the Ovaries, and British Gynecological Journal}, vol. ii.
\textsuperscript{3}W. L. Distant, "Notes on the Chacma Baboon," \textit{Zoologist}, January, 1897, p. 29.
In the anthropoid apes, Hartmann remarks that several observers have recorded periodic menstruation in the chimpanzee, with flushing and enlargement of the external parts, and protrusion of the external lips, which are not usually visible, while there is often excessive enlargement and reddening of these parts and of the posterior callosities during sexual excitement. Very little, however, appears to be definitely known regarding any form of menstruation in the higher apes. M. Deniker, who has made a special study of the anthropoid apes, informs me that he has so far been unable to make definite observations regarding the existence of menstruation. Moll remarks that he received information regarding such a phenomenon in the orang-utan. A pair of orang-utans was kept in the Berlin Zoological Gardens some years ago, and the female was stated to have at intervals a menstrual flow resembling that of women, and during this period to refrain from sexual congress, which was otherwise usually exercised at regular intervals, at least every two or three days; Moll adds, however, that, while his informant is a reliable man, the length of time that has elapsed may have led him to make mistakes in details. Keith, in a paper read before the Zoological Society of London, has described menstruation in a chimpanzee; it occurred every twenty-third or twenty-fourth day, and lasted for three days; the discharge was profuse, and first appeared in about the ninth or tenth year.¹

What is menstruation? It is easy to describe it, by its obvious symptoms, as a monthly discharge of blood from the uterus, but nearly as much as that was known in the infancy of the world. When we seek to probe more intimately into the nature of menstruation we are still baffled, not merely as regards its cause, but even as regards its precise mechanism. "The primary cause of menstruation remains unexplained"; "the cause of menstruation remains as obscure as ever"; so conclude two of the most thorough and cautious investigators into this subject.² It is, however, widely accepted that the main cause of

menstruation is a rhythmic contraction of the uterus,—the result of a disappointed preparation for impregnation,—a kind of miniature childbirth. This seems to be the most reasonable view of menstruation; i.e., as an abortion of a decidua. Burdach (according to Beard) was the first who described menstruation as an abortive parturition. "The hypothesis," Marshall and Jolly conclude, "that the entire pro-estrous process is of the nature of a preparation for the lodgment of the ovum is in accordance with the facts."1 Fortunately, since we are here primarily concerned with its psychological aspects, the precise biological cause and physiological nature of menstruation do not greatly concern us.

There is, however, one point which of late years has been definitely determined, and which should not be passed without mention: the relation of menstruation to ovulation. It was once supposed that the maturation of an ovule in the ovaries was the necessary accompaniment, and even cause, of menstruation. We now know that ovulation proceeds throughout the whole of life, even before birth, and during gestation,2 and that removal of the ovaries by no means necessarily involves a cessation of menstruation. It has been shown that regular and even excessive menstruation may take place in the congenital absence of a trace of ovaries or Fallopian tubes.3 On the other hand, a rudimentary state of the uterus, and a complete absence of menstruation, may exist with well-developed ovaries and

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1 T. Bryce and J. Teacher (Contributions to the Study of the Early Development of the Human Ovum, 1908), putting the matter somewhat differently, regard menstruation as a cyclical process, providing for the maintenance of the endometrium in a suitable condition of immaturity for the production of the decidua of pregnancy, which they believe may take place at any time of the month, though most favorably shortly before or after a menstrual period which has been accompanied by ovulation.

2 Robinson, American Gynecological and Obstetrical Journal, August, 1905.

normal ovulation.\textsuperscript{1} We must regard the uterus as to some extent an independent organ, and menstruation as a process which arose, no doubt, with the object, teleologically speaking, of cooperating more effectively with ovulation, but has become largely independent.\textsuperscript{2}

It is sometimes stated that menstruation may be entirely absent in perfect health. Few cases of this condition have, however, been recorded with the detail necessary to prove the assertion. One such case was investigated by Dr. H. W. Mitchell, and described in a paper read to the New York County Medical Society, February 22, 1892 (to be found in Medical Reprints, June, 1892). The subject was a young, unmarried woman, 24 years of age. She was born in Ireland, and, until her emigration, lived quietly at home with her parents. Being then twenty years of age, she left home and came to New York. Up to that time no signs of menstruation had appeared, and she had never heard that such a function existed. Soon after her arrival in New York, she obtained a situation as a waiting-maid, and it was noticed, after a time, that she was not unwell at each month. Friends filled her ears with wild stories about the dreadful effects likely to follow the absence of menstruation. This worried her greatly, and as a consequence she became pale and anaemic, with loss of flesh, appetite, and sleep, and a long train of imaginary nervous symptoms. She presented herself for treatment, and insisted upon a uterine examination. This revealed no

\textsuperscript{1} Beuttner, \textit{Centralblatt für Gynäkologie}, No. 49, 1893; summarized in \textit{British Medical Journal}, December, 1893. Many cases show that pregnancy may occur in the absence of menstruation. See, \textit{e.g.}, \textit{Nouvelles Archives d'Obstétrique et de Gynécologie}, 25 Janvier, 1894, supplement, p. 9.

\textsuperscript{2} It is still possible, and even probable, that the primordial cause of both phenomena is the same. Heape (\textit{Transactions Obstetrical Society of London}, 1898, vol. xi, p. 161) argues that both menstruation and ovulation are closely connected with and influenced by congestion, and that in the primitive condition they are largely due to the same cause. This primary cause he is inclined to regard as a ferment, due to a change in the constitution of the blood brought about by climatic influences and food, which he proposes to call gonadin. (W. Heape, \textit{Proceedings of Royal Society}, 1905, vol. B. 76, p. 266.) Marshall, who has found that in the ferret and other animals, ovulation may be dependent upon copulation, also considers that ovulation and menstruation, though connected and able to react on each other, may both be dependent upon a common cause; he finds that in bitches and rats heat can be produced by injection of extract from ovaries in the oestrous state (F. H. A. Marshall, \textit{Philosophical Transactions}, 1903, vol. B. 196; also Marshall and Jolly, \textit{id.}, 1905, B. 198). Cf. C. J. Bond, "An Inquiry Into Some Points in Uterine and Ovarian Physiology and Pathology in Rabbits," \textit{British Medical Journal}, July 21, 1906.
pathological condition of her uterus. She was assured that she would not die, or become insane, nor a chronic invalid. In consequence she soon forgot that she differed in any way from other girls. A course of chalybeate tonics, generous diet, and proper care of her general health, soon restored her to her normal condition. After close observation for several years, she submitted to a thorough examination, although entirely free from any abnormal symptoms. The examination revealed the following physical condition: Weight, 105 pounds (her weight before leaving Ireland was 130); girth of chest, twenty-nine and a half inches; girth of abdomen, twenty-five inches; girth of pelvis, thirty-four and a half inches; girth of thigh, upper third, twenty inches; heart healthy, sounds and rhythm perfectly normal; pulse, 76; lungs healthy; respiratory murmur clear and distinct over every part; respiration, easy and twenty per minute; the mammae are well developed, firm, and round; nipples, small, no areola; her skin is soft, smooth, and healthy; figure erect, plump, and symmetrical; her bowels are regular; kidneys, healthy. She has a good appetite, sleeps well, and in no particular shows any sign of ill health. The uterine examination reveals a short vagina, and a small, round cervix uteri, rather less in size than the average, and projecting very slightly into the vaginal canal. Depth of uterus from os to fundus, two and a quarter inches, is very nearly normal. No external sign of abnormal ovaries. She is a well-developed, healthy young woman, performing all her physiological functions naturally and regularly, except the single function of menstruation. No vicarious menstruation takes the place of the natural function, though she has been watched very closely during the past two years, nor the least periodical excitement. It is added that, though the clitoris is normal, the mons veneris is almost destitute of hair, and the labia rather undeveloped, while, "as far as is known," sexual instincts and desire are entirely absent. These latter facts, I may add, would seem to suggest that, in spite of the health of the subject, there is yet some concealed lack of development of the sexual system, of congenital character. In a case recorded by Plant (Centralblatt für Gynäkologie, No. 9, 1890, summarized in the British Medical Journal, April 4, 1890), in which the internal sexual organs were almost wholly undeveloped, and menstruation absent, the labia were similarly undeveloped, and the pubic hair scanty, while the axillary hair was wholly absent, though that of the head was long and strong.

We may now regard as purely academic the discussion formerly carried on as to whether menstruation is to be regarded as analogous to heat in female animals. For many centuries at least the resemblance has been sufficiently obvious. Raciborski
and Pouchet, who first established the regular periodicity of ovulation in mammals, identified heat and menstruation.\textsuperscript{1} During the past century there was, notwithstanding, an occasional tendency to deny any real connection. No satisfactory grounds for this denial have, however, been brought forward. Lawson Tait, indeed, and more recently Beard, have stated that menstruation cannot be the period of heat, because women have a disinclination to the approach of the male at that time.\textsuperscript{2} But, as we shall see later, this statement is unfounded. An argument which might, indeed, be brought forward is the very remarkable fact that, while in animals the period of heat is the only period for sexual intercourse, among all human races, from the very lowest, the period of menstruation is the one period during which sexual intercourse is strictly prohibited, sometimes under severe penalties, even life itself. This, however, is a social, not a physiological, fact.

Ploss and Bartels call attention to the curious contrast, in this respect, between heat and menstruation. The same authors also mention that in the Middle Ages, however, preachers found it necessary to warn their hearers against the sin of intercourse during the menstrual period. It may be added that Aquinas and many other early theologians held, not only that such intercourse was a deadly sin, but that it engendered leprous and monstrous children. Some later theologians, however, like Sanchez, argued that the Mosaic enactments (such as Leviticus, Ch. XX, v. 18) no longer hold good. Modern theologians—in part influenced by the tolerant traditions of Liguori, and, in part, like Debreyne (Moechialogie, pp. 275 et seq.) informed by medical science—no longer prohibit intercourse during menstruation, or regard it as only a venial sin.

We have here a remarkable, but not an isolated, example of the tendency of the human mind in its development to rebel against the claims of primitive nature. The whole of religion is a similar remolding of nature, a repression of natural impulses,

\textsuperscript{1} Pouchet, \textit{Théorie de l'Ovulation Spontanée}, 1847. As Blair Bell and Pontland Hiek remark ("Menstruation," \textit{British Medical Journal}, March 6, 1909), the repeated oestrus of unimpregnated animals (once a fortnight in rabbits) is surely comparable to menstruation.

\textsuperscript{2} Tait, \textit{Provincial Medical Journal}, May, 1891; J. Beard, \textit{The Span of Gestation}, 1897, p. 69. Lawson Tait is reduced to the assertion that ovulation and menstruation are identical.
an effort to turn them into new channels. Prohibition of intercourse during menstruation is a fundamental element of savage ritual, an element which is universal merely because the conditions which caused it are universal, and because—as is now beginning to be generally recognized—the causes of human psychic evolution are everywhere the same. A strictly analogous phenomenon, in the sexual sphere itself, is the opposed attitude in barbarism and civilization toward the sexual organs. Under barbaric conditions and among savages, when no magico-religious ideas intervene, the sexual organs are beautiful and pleasurable objects. Under modern conditions this is not so. This difference of attitude is reflected in sculpture: In savage and barbaric carvings of human beings, the sexual organs of both sexes are often enormously exaggerated. This is true of the archaic European figures on which Salomon Reinach has thrown so much light, but in modern sculpture, from the time when it reached its perfection in Greece onward, the sexual regions in both men and women are systematically minimized.\(^1\)

With advancing culture—as again we shall see later—there is a conflict of claims, and certain considerations are regarded as "higher" and more potent than merely "natural" claims. Nakedness is more natural than clothing, and on many grounds more desirable under the average circumstances of life, yet, everywhere, under the stress of what are regarded as higher considerations, there is a tendency for all races to add more and more to the burden of clothes. In the same way it happens that the tendency of the female to sexual intercourse during menstruation\(^2\) has everywhere been overlaid by the ideas of a cult-

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1 As Moll points out, even the secondary sexual characters have undergone a somewhat similar change. The beard was once an important sexual attraction, but men can now afford to dispense with it without fear of loss in attractiveness. (Libido Sexuallis, Band I, p. 387.) These points are discussed at greater length in the fourth volume of these Studies, "Sexual Selection in Man."

2 It is not absolutely established that in menstruating animals the period of menstruation is always a period of sexual congress; probably not, the influence of menstruation being diminished by the more fundamental influence of breeding seasons, which affect the male also; monkeys have a breeding season, though they menstruate regularly all the year round.
ure which has insisted on regarding menstruation as a supernatural phenomenon which, for the protection of everybody, must be strictly tabooed.\(^1\) This tendency is reinforced, and in high civilization replaced, by the claims of an aesthetic regard for concealment and reserve during this period. Such facts are significant for the early history of culture, but they must not blind us to the real analogy between heat and menstruation, an analogy or even identity which may be said to be accepted now by most careful investigators.\(^2\)

If it is, perhaps, somewhat excessive to declare, with Johnston, that "woman is the only animal in which rut is omnipresent," we must admit that the two groups of phenomena merge into or replace each other, that their object is identical, that they involve similar psychic conditions. Here, also, we see a striking example of the way in which women preserve a primitive phenomenon which earlier in the zoological series was common to both sexes, but which man has now lost. Heat and menstruation, with whatever difference of detail, are practically the same phenomenon. We cannot understand menstruation unless we bear this in mind.

On the psychic side the chief normal and primitive characteristic of the menstrual state is the more predominant presence of the sexual impulse. There are other mental and emotional signs of irritability and instability which tend to slightly impair complete mental integrity, and to render, in some unbalanced individuals explosions of anger or depression, in rarer cases crime, more common;\(^3\) but the heightening of the sexual impulse, languor, shyness, and caprice are the more human manifestations of an emotional state which in some of the lower female animals during heat may produce a state of fury.

The actual period of the menstrual flow, at all events the first two or three days, does not, among European women, usually appear to show any heightening of sexual emotion.\(^4\) This height-

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1 See Appendix A.
3 See H. Ellis, *Man and Woman*, Chapter XI.
4 This is by no means true of European women only. Thus, we read in an Arabic book, *The Perfumed Garden*, that women have an aver-
eniging occurs usually a few days before, and especially during, the latter part of the flow, and immediately after it ceases.\footnote{The actual period of the menstrual flow corresponds, in Heape's terminology, to the congestive stage, or pro-ovum, in female animals; the ovum, or period of sexual desire, immediately follows the pro-ovum, and is the direct result of it. See Heape, "The 'Sexual Season' of Mammals," Quarterly Journal of Microscopical Science, 1900, vol. xlv, Part I.} I have, however, convinced myself by inquiry that this absence of sexual feeling during the height of the flow is, in large part, apparent only. No doubt, the onset of the flow, often producing a general depression of vitality, may tend directly to depress the emotions, which are heightened by the general emotional state and local congestion of the days immediately preceding; but among some women, at all events, who are normal and in good health, I find that the period of menstruation itself is covered by the period of the climax of sexual feeling. Thus, a married lady writes: "My feelings are always very strong, not only just before and after, but during the period; very unfortunately, as, of course, they cannot then be gratified"; while a refined girl of 19, living a chaste life, without either coitus or masturbation, which she has never practiced, habitually feels very strong sexual excitement about the time of menstruation, and more especially during the period; this desire torments her life, prevents her from sleeping at these times, and she looks upon it as a kind of illness.\footnote{It may be noted that (as Barnes, Oliver, and others have pointed out) there is heightened blood-pressure during menstruation. Haig remarks that he has found a tendency for high pressure to be accompanied by increased sexual appetite (Uric Acid, 6th edition, p. 155).} I could quote many other similar and equally emphatic statements, and the fact that so cardinal a relationship of the sexual life of women should be ignored or denied by most writers on this matter, is a curious proof of the prevailing ignorance.\footnote{Sir W. F. Wade, however, remarked, some years ago, in his Ingleby Lectures (Lancet, June 5, 1886): "It is far from exceptional to find that there is an extreme enhancement of concupiscence in the immediate precatamenial period," and adds, "I am satisfied that evidence is obtainable that in some instances, ardor is at its maximum during the actual period, and suspect that cases occur in which it is almost, if not entirely, limited to that time." Long ago, however, the genius of Haller had noted}
This ignorance has been fostered by the fact that women often disguise even to themselves the real state of their feelings. One lady remarks that while she would be very ready for coitus during menstruation, the thought that it is impossible during that time makes her put the idea of it out of her mind. I have reason to think that this statement may be taken to represent the real feelings of very many women. The aversion to coitus is real, but it is often due, not to failure of sexual desire, but to the inhibitory action of powerful extraneous causes. The absence of active sexual desire in women during the height of the flow may thus be regarded as, in part, a physiological fact, following from the correspondence of the actual menstrual flow to the period of pro-oestrum, and in part, a psychological fact due to the aesthetic repugnance to union when in such a condition, and to the unquestioned acceptance of the general belief that at such a period intercourse is out of the question. Some of the strongest factors of modesty, especially the fear of causing disgust and the sense of the demands of ceremonial ritual, would thus help to hold in check the sexual emotions during this period, and when, under the influence of insanity, these motives are in abeyance, the coincidence of sexual desire with the menstrual flow often becomes more obvious.  

the same fact. More recently, Icard (La Femme, Chapter VI and elsewhere, e.g., p. 125) has brought forward much evidence in confirmation of this view. It may be added that there is considerable significance in the fact that the erotic hallucinations, which are not infrequently experienced by women under the influence of nitrous oxide gas, are more likely to appear at the monthly period than at any other time. (D. W. Buxton, Anaesthetics, 1892, p. 61.)

1 Gehring considers that in healthy young girls amorous sensations are normal during menstruation, and in some women persist, during this period; throughout life. More usually, however, as menstrual period after menstrual period recurs, without the natural interruption of pregnancy, the feeling abates, and gives place to sensations of discomfort or pain. He ascribes this to the vital tissues being sapped of more blood than can be replaced in the intervals. "The vital powers, being thus kept in abeyance, the amative sensations are either not developed, or destroyed. This, superadded by the usual moral and religious teachings, is amply sufficient, by degrees, to extinguish or prevent such feelings with the great majority. The sequestration as 'unclean,' of women during their catamenial period, as practiced in olden times, had the same tendency." (E. C. Gehring, "The Status of Menstruation," Transactions American Gynecology Society, 1901, p. 48.)
It must be added that, especially among the lower social classes, the primitive belief of the savage that coitus during menstruation is bad for the man still persists. Ploss and Bartels mention that among the peasants in some parts of Germany, where it is believed that impregnation is impossible during menstruation, coitus at that time would be frequent were it not thought dangerous for the man.\(^1\) It has also been a common belief both in ancient and modern times that coitus during menstruation engenders monsters.\(^2\)

Notwithstanding all the obstacles that are thus placed in the way of coitus during menstruation, there is nevertheless good reason to believe that the first coitus very frequently takes place at this point of least psychic resistance. When still a student I was struck by the occurrence of cases in which seduction took place during the menstrual flow, though at that time they seemed to me inexplicable, except as evidencing brutality on the part of the seducer. Négrier,\(^3\) in the lying-in wards of the Hôtel-Dieu at Angers, constantly found that the women from the country who came there pregnant as the result of a single coitus had been impregnated at or near the menstrual epoch, more especially when the period coincided with a feast-day, as St. John’s Day or Christmas.

Whatever doubt may exist as to the most frequent state of the sexual emotions during the period of menstruation, there can be no doubt whatever that immediately before and immediately after, very commonly at both times,—this varying slightly in different women,—there is usually a marked heightening of actual desire. It is at this period (and sometimes during the menstrual flow) that masturbation may take place

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\(^1\) It is possible there may be an element of truth in this belief. Diday, of Lyons, found that chronic urethorrhœa is an occasional result of intercourse during menstruation. Raciborski (Traité de la Menstruation, 1868, p. 12), who also paid attention to this point, while confirming Diday, came to the conclusion that some special conditions must be present on one or both sides.


\(^3\) As quoted by Ieard, La Femme, etc., p. 194. I have not been able to see Négrier’s work.
in women who at other times have no strong auto-erotic impulse. The only women who do not show this heightening of sexual emotion seem to be those in whom sexual feelings have not yet been definitely called into consciousness, or the small minority, usually suffering from some disorder of sexual or general health, in whom there is a high degree of sexual anaesthesia.¹

The majority of authorities admit a heightening of sexual emotion before or after the menstrual crisis. See e.g., Krafft-Ebing, who places it at the post-menstrual period (Psychopathia Sexualis, Eng. translation of tenth edition, p. 27). Adler states that sexual feeling is increased before, during and after menstruation (Die Mangelhafte Geschlechtsempfindung des Weibes, 1904, p. 88). Kossmann (Senator and Kaminer, Health and Disease in Relation to Marriage, I, 249), advises intercourse just after menstruation, or even during the latter days of the flow, as the period when it is most needed. Guyot says that the eight days after menstruation are the period of sexual desire in women (Bréviaire de l'Amour Expérimentale, p. 144). Harry Campbell investigated the periodicity of sexual desire in healthy women of the working classes, in a series of cases, by inquiries made of their husbands who were patients at a London hospital. People of this class are not always skilful in observation, and the method adopted would permit many facts to pass unrecorded; it is, therefore, noteworthy that only in one-third of the cases had no connection between menstruation and sexual feeling been observed; in the other two-thirds, sexual feeling was increased, either before, after, or during the flow, or at all of these times; the proportion of cases in which sexual feeling was increased before the flow, to those in which it was increased after, was as three to two. (H. Campbell, Nervous Organization of Men and Women, p. 203.)

Even this elementary fact of the sexual life has, however, been denied, and, strange to say, by two women doctors. Dr. Mary Putnam Jacobi, of New York, who furnished valuable contributions to the physiology of menstruation, wrote some years ago, in a paper on "The Theory of Menstruation," in reference to the question of the connection between oestrus and menstruation: "Neither can any such rhythmical alternation of sexual instinct be demonstrated in women as would lead to the inference that the menstrual crisis was an expression of this," i.e., of oestrus. Dr. Elizabeth Blackwell, again, in her book on The Human Element in Sex, asserts that the menstrual flow itself affords

¹ I deal with the question of sexual anaesthesia in women in the third volume of these Studies: "The Sexual Impulse in Women."
complete relief for the sexual feelings in women (like sexual emissions during sleep in men), and thus practically denies the prevalence of sexual desire in the immediately post-menstrual period, when, on such a theory, sexual feeling should be at its minimum. It is fair to add that Dr. Blackwell's opinion is merely the survival of a view which was widely held a century ago, when various writers (Bordeu, Roussel, Duffieux, J. Arnauld, etc.), as Icard has pointed out, regarded menstruation as a device of Providence for safeguarding the virginity of women.
II.

The Question of a Monthly Sexual Cycle in Men—The Earliest Suggestions of a General Physiological Cycle in Men—Periodicity in Disease—Insanity, Heart Disease, etc.—The Alleged Twenty-three Days' Cycle—The Physiological Periodicity of Seminal Emissions during Sleep—Original Observations—Fortnightly and Weekly Rhythms.

For some centuries, at least, inquisitive observers here and there have thought they found reason to believe that men, as well as women, present various signs of a menstrual physiological cycle. It would be possible to collect a number of opinions in favor of such a monthly physiological periodicity in men. Precise evidence, however, is, for the most part, lacking. Men have expended infinite ingenuity in establishing the remote rhythms of the solar system and the periodicity of comets. They have disdained to trouble about the simpler task of proving or disproving the cycles of their own organisms.¹ It is over half a century since Laycock wrote that “the scientific observation and treatment of disease are impossible without a knowledge of the mysterious revolutions continually taking place in the system”; yet the task of summarizing the whole of our knowledge regarding these “mysterious revolutions” is even to-day no heavy one. As to the existence of a monthly cycle in the sexual instincts of men, with a single exception, I am not aware that any attempt has been made to bring forward definite evidence.² A certain interest and novelty attaches, therefore, to the evidence I am able to produce, although that evidence will not suffice to settle the question finally.

The great Italian physician, Sanctorius, who was in so many ways the precursor of our modern methods of physiological re-

¹ Even counting the pulse is a comparatively recent method of physiological examination. It was not until 1450 that Nicolas of Cusa advocated counting the pulse-beats. (Binz, Deutsche medizinische Wochenschrift, October 6, 1898.)

² I leave this statement as it stands, though since the first publication of this book it has ceased to be strictly accurate.

(106)
search by the means of instruments of precision, was the first, so far as I am aware, to suggest a monthly cycle of the organism in men. He had carefully studied the weight of the body with reference to the amount of excretions, and believed that a monthly increase in weight to the amount of one or two pounds occurred in men, followed by a critical discharge of urine, this crisis being preceded by feelings of heaviness and lassitude.\(^1\) Gall, another great initiator of modern views, likewise asserted a monthly cycle in men. He insisted that there is a monthly critical period, more marked in nervous people than in others, and that at this time the complexion becomes dull, the breath stronger, digestion more laborious, while there is sometimes disturbance of the urine, together with general malaise, in which the temper takes part; ideas are formed with more difficulty, and there is a tendency to melancholy, with unusual irascibility and mental inertia, lasting a few days. More recently Stephenson, who established the cyclical wave-theory of menstruation, argued that it exists in men also, and is really "a general law of vital energy."\(^2\)

Sanctorius does not appear to have published the data on which his belief was founded. Keill, an English follower of Sanctorius, in his *Medicina Statica Britannica* (1718), published a series of daily (morning and evening) body-weights for the year, without referring to the question of a monthly cycle. A period of maximum weight is shown usually, by Keill's figures, to occur about once a month, but it is generally irregular, and cannot usually be shown to occur at definite intervals. Monthly discharges of blood from the sexual organs and other parts of the body in men have been recorded in ancient and modern times, and were treated of by the older medical writers as an affection peculiar to men with a feminine system. (Laycock, *Nervous Diseases of Women*, p. 79.) A summary of such cases will be found in Gould and Pyle (*Anomalies and Curiosities of Medicine*, 1897, pp. 27-28). Laycock (Lancet, 1842-43, vols. i and ii) brought forward cases of monthly and fortnightly cycles in disease, and asserted "the general principle that there are greater and less cycles of movements going on in the system, involving each other, and closely connected with the organization of the individual." He was inclined to accept lunar influ-


ence, and believed that the physiological cycle is made up of definite fractions and multiples of a period of seven days, especially a unit of three and a half days. Albrecht, a somewhat erratic zoologist, put forth the view a few years ago that there are menstrual periods in men, giving the following reasons: (1) males are rudimentary females, (2) in all males of mammals, a rudimentary masculine uterus (Müller's ducts) still persists, (3) totally hypospadic male individuals menstruate; and believed that he had shown that in man there is a rudimentary menstruation consisting in an almost monthly periodic appearance, lasting for three or four days, of white corpuscles in the urine (Anamalo, February, 1890). Dr. Campbell Clark, some years since, made observations on asylum attendants in regard to the temperature, during five weeks, which tended to show that the normal male temperature varies considerably within certain limits, and that “so far as I have been able to observe, there is one marked and prolonged rise every month or five weeks, averaging three days, occasional lesser rises appearing irregularly and of shorter duration. These observations are only made in three cases, and I have no proof that they refer to the sexual appetite” (Campbell Clark, “The Sexual Reproductive Functions,” Psychological Section, British Medical Association, Glasgow, 1888; also, private letters). Hammond (Treatise on Insanity, p. 114) says: “I have certainly noted in some of my friends, the tendency to some monthly periodic abnormal manifestations. This may be in the form of a headache, or a nasal hæmorrhage, or diarrhœa, or abundant discharge of uric acid, or some other unusual occurrence. I think,” he adds, “this is much more common than is ordinarily supposed, and a careful examination or inquiry will generally, if not invariably, establish the existence of a periodicity of the character referred to.”

Dr. Harry Campbell, in his book on Differences in the Nervous Organization of Men and Women, deals fully with the monthly rhythm (pp. 270 et seq.), and devotes a short chapter to the question, “Is the Menstrual Rhythm peculiar to the Femal Sex?” He brings forward a few pathological cases indicating such a rhythm, but although he had written a letter to the Lancet, asking medical men to supply him with evidence bearing on this question, it can scarcely be said that he has brought forward much evidence of a convincing kind, and such as he has brought forward is purely pathological. He believes, however, that we may accept a monthly cycle in men. “We may,” he concludes, “regard the human being—both male and female—as the subject of a monthly pulsation which begins with the beginning of life, and continues till death,” menstruation being regarded as a function accidentally in-grafted upon this primordial rhythm.

It is not unreasonable to argue that the possibility of such a menstrual cycle is increased, if we can believe that in women, also, the
menstrual cycle persists even when its outward manifestations no longer occur. Aëtius said that menstrual changes take place during gestation; in more modern times, Buffon was of the same opinion. Laycock also maintained that menstrual changes take place during pregnancy (Nervous Diseases of Women, p. 47). Fliess considers that it is certainly incorrect to assert that the menstrual process is arrested during pregnancy, and he refers to the frequency of monthly epistaxis and other nasal symptoms throughout this period (W. Fliess, Beziehungen zwischen Nase und Geschlechts-Organen, pp. 44 et seq.). Beard, who attaches importance to the persistence of a cyclical period in gestation, calls it the muffled striking of the clock. Harry Campbell (Causation of Disease, p. 54) has found post-climacteric menstrual rhythm in a fair sprinkling of cases up to the age of sixty.

It is somewhat remarkable that, so far as I have observed, none of these authors refer to the possibility of any heightening of the sexual appetite at the monthly crisis which they believe to exist in men. This omission indicates that, as is suggested by the absence of definite statements on the matter of increase of sexual desire at menstruation, it was an ignored or unknown fact. Of recent years, however, many writers, especially alienists, have stated their conviction that sexual desire in men tends to be heightened at approximately monthly intervals, though they have not always been able to give definite evidence in support of their statements.

Clouston, for instance, has frequently asserted this monthly periodic sexual heightening in men. In the article, "Developmental Insanity," in Tuke’s Psychological Dictionary, he refers to the periodic physiological heightening of the reproductive nisus; and, again, in an article on "Alternation, Periodicity, and Relapse in Mental Diseases" (Edinburgh Medical Journal, July, 1882), he records the case of "an insane gentleman, aged 49, who, for the past twenty-six years, has been subject to the most regularly occurring brain-exaltation every four weeks, almost to a day. It sometimes passes off without becoming acutely maniacal, or even showing itself in outward acts; at other times it becomes so, and lasts for periods of from one to four weeks. It is always preceded by an uncomfortable feeling in the head, and pain in the back, mental hebetude, and slight depression. The nisus generativus is greatly increased, and he says that, if in that condition, he has full and free seminal emissions during sleep, the excitement passes off; if not, it goes on. A full dose of bromide or iodide of potassium often, but not always, has the effect of stopping the excitement, and a very long walk some-
times does the same. When the excitement gets to a height, it is always followed by about a week of stupid depression.” In the same article Clouston remarks: “I have for a long time been impressed with the relationship of the mental and bodily alternations and periodicities in insanity to the great physiological alternations and periodicities, and I have generally been led to the conclusion that they are the same in all essential respects, and only differ in degree of intensity or duration. By far the majority of the cases in women follow the law of the menstrual and sexual periodicity; the majority of the cases in men follow the law of the more irregular periodicities of the *nisus generativus* in that sex. Many of the cases in both sexes follow the seasonal periodicity which perhaps in man is merely a reversion to the seasonal generative activities of the majority of the lower animals.” He found that among 338 cases of insanity, chiefly mania and melancholia, 46 per cent. of females and 40 per cent. of males showed periodicity.—diurnal, monthly, seasonal, or annual, and more marked in women than in men, and in mania than in melancholia,—and adds: “I found that the younger the patient, the greater is the tendency to periodic remission and relapse. The phenomenon finds its acme in the cases of pubescent and adolescent insanity.”

Conolly Norman, in the article “Mania, Hysterical” (Tuke’s *Psychological Dictionary*), states that “the activity of the sexual organs is probably in both sexes fundamentally periodic.”

Krafft-Ebing records the case of a neurasthenic Russian, aged 24, who experienced sexual desires of urologinie character, with fair regularity, every four weeks (*Psychopathia Sexualis*), and Nüeke mentions the case of a man who had nocturnal emissions at intervals of four weeks (*Archiv für Kriminalanthropologie*, 1908, p. 363), while Moll (*Libido Sexualis*, Bd. I, pp. 621-623) recorded the case of a man, otherwise normal, who had attacks of homosexual feeling every four weeks, and Rohleder (*Zeitschrift für Sexualwissenschaft*, Nov., 1908) gives the case of an unmarried slightly neuropathic physician who for several days every three to five weeks has attacks of almost satyriacal sexual excitement.

Fére, whose attention was called to this point, from time to time noted the existence of sexual periodicity. Thus, in a case of general paralysis, attacks of continuous sexual excitement, with sleeplessness, occurred every twenty-eight days; at other times, the patient, a man of 42, in the stage of dementia, slept well, and showed no signs of sexual excitation (*Société de Biologia*, October 6, 1900). In another case, of a man of sound heredity and good health till middle life, periodic sexual manifestations began from puberty, with localized genital congestion, erotic ideas, and copious urination, lasting for two or three days. These manifestations became menstrual, with a period of internomenstrual excitement appearing regularly, but never became intense. Between the
age of 36 and 42, the intermenstrual crises gradually ceased; at about 45, the menstrual crises ceased; the periodic crises continued, however, with the sole manifestation of increased frequency of urination (Société de Biologie, July 23, 1904). In a third case, of sexual neurasthenia, Férec found that from puberty, onwards to middle life, there appeared, every twenty-five to twenty-eight days, tenderness and swelling below the nipple, accompanied by slight sexual excitation and erotic dreams, lasting for one or two days (Revue de Médecine, March, 1905).

It is in the domain of disease that the most strenuous and, on the whole, the most successful efforts have been made to discover a menstrual cycle in men. Such a field seems promising at the outset, for many morbid exaggerations or defects of the nervous system might be expected to emphasize, or to free from inhibition, fundamental rhythmical processes of the organism which in health, and under the varying conditions of social existence, are overlaid by the higher mental activities and the pressure of external stimuli. In the eighteenth century Erasmus Darwin wrote a remarkable and interesting chapter on “The Periods of Disease,” dealing with solar and lunar influence on biological processes.1 Since then, many writers have brought forward evidence, especially in the domain of nervous and mental disease, which seems to justify a belief that, under pathological conditions, a tendency to a male menstrual rhythm may be clearly laid bare.

We should expect an organ so primitive in character as the heart, and with so powerful a rhythm already stamped upon its nervous organization, to be peculiarly apt to display a menstrual rhythm under the stress of abnormal conditions. This expectation might be strengthened by the menstrual rhythm which Mr. Perry-Coste has found reason to suspect in pulse-frequency during health. I am able to present a case in which such a periodicity seems to be indicated. It is that of a gentleman who suffered severely for some years before his death from valvular disease of the heart, with a tendency to pulmonary congestion, and attacks of “cardiac asthma.” His wife, a lady of great

1 Zoönomia, Section XXXVI.
intelligence, kept notes of her husband’s condition,¹ and at last observed that there was a certain periodicity in the occurrence of the exacerbations. The periods were not quite regular, but show a curious tendency to recur at about thirty days’ interval, a few days before the end of every month; it was during one of these attacks that he finally died. There was also a tendency to minor attacks about ten days after the major attacks. It is noteworthy that the subject showed a tendency to periodicity when in health, and once remarked laughingly before his illness: "I am just like a woman, always most excitable at a particular time of the month."

Periodicity has been noted in various disorders of nervous character. Periodic insanity has long been known and studied (see, e.g., Plicer, Die periodischen Geistesstörungen, 1901); it is much commoner in women than in men. Periodicity has been observed in stammering (a six-weekly period in one case), and notably in hemicrania or migraine, by Harry Campbell, Osler, etc. (The periodicity of a case of hemicrania has been studied in detail by D. Fraser Harris, Edinburgh Medical Journal, July, 1902.) But the cycle in these cases is not always, or even usually, of a menstrual type.

It is now possible to turn to an investigation which, although of very limited extent, serves to place the question of a male menstrual cycle for the first time on a sound basis. If there is such a cycle analogous to menstruation in women, it must be a recurring period of nervous erethism, and it must be demonstrably accompanied by greater sexual activity. In the American Journal of Psychology for 1888, Mr. Julius Nelson, afterward Professor of Biology at the Rutgers College of Agriculture, New Brunswick, published a study of dreams in which he recorded the results of detailed observations of his dreams, and also of seminal emissions during sleep (by him termed "gonekbole" or "ecbole"), during a period of something over two years. Mr. Nelson found that both dreams and ecboles fell into a physiological cycle of 28 days. The climax of maximum dreaming (as determined by the number of words in the dream record) and the climax of

¹ I reproduced these notes in full in earlier editions of this volume.
maximum ecbole fell at the same point of the cycle, the ecbolic climax being more distinctly marked than the dream climax.

The question of cyclic physiological changes is considerably complicated by our uncertainty regarding the precise length of the cycle we may expect to find. Nelson finds a 28-day cycle satisfactory. Perry-Coste, as we shall see, accepts a strictly lunar cycle of 29½ days. Fliess has argued that in both women and men, many physiological facts fall into a cycle of 23 days, which he calls male, the 28-day cycle being female. (W. Fliess, *Die Beziehungen zwischen Nase und weiblichen Geschlechts-Organen*, 1897, pp. 113 et seq.) Although Fliess brings forward a number of minutely-observed cases, I cannot say that I am yet convinced of the reality of this 23-day cycle. It is somewhat curious, however, that at the same time as Fliess, though in apparent independence, and from a different point of view, another worker also suggested that there is a 23-day physiological cycle (John Beard, *The Span of Gestation and the Cause of Birth*, Jena, 1897). Beard approaches the question from the embryological standpoint, and argues that there is what he terms an “ovulation unit” of about 23½ days, in the interval from the end of one menstruation to the beginning of the next. Two “ovulation units” make up one “critical unit,” and the length of pregnancy, according to Beard, is always a multiple of the “critical unit;” in man, the gestation period amounts to six critical units. These attempts to prove a new physiological cycle deserve careful study and further investigation. The possibility of such a cycle should be borne in mind, but at present we are scarcely entitled to accept it.

So far as I am aware, Professor Nelson’s very interesting series of observations, which, for the first time, placed the question of a menstrual rhythm in men on a sound and workable basis, have not directly led to any further observations. I am, however, in possession of a much more extended series of ecbolic observations completed before Nelson’s paper was published, although the results have only been calculated at a comparatively recent date. I now propose to present a summary of these observations, and consider how far they confirm Nelson’s conclusions. These observations cover no less a period than twelve years, between the ages of 17 and 29, the subject, W. K., being a student, and afterward schoolmaster, leading, on the whole, a chaste life. The records were faithfully made throughout the whole of this long period. Here, if anywhere, should be material
for the construction of a menstrual rhythm on an ecbolic basis. While the results are in many respects instructive, it can scarcely, perhaps, be said that they absolutely demonstrate a monthly cycle. When summated in a somewhat similar manner to that adopted by Nelson in his ecbolic observations, it is not difficult to regard the maximum, which is reached on the 19th to 21st days of the summated physiological month, as a real menstrual ecbolic climax, for no other three consecutive days at all approach these in number of ecboles, while there is a marked depression occurring four days earlier, on the 16th day of the month. If, however, we split up the curve by dividing the period of twelve years into two nearly equal periods, the earlier of about seven years and the latter of about four years, and summate these separately, the two curves do not present any parallel as regards the menstrual cycle. It scarcely seems to me, therefore, that these curves present any convincing evidence in this case of a monthly ecbolic cycle (and, therefore, I refrain from reproducing them), although they seem to suggest such a cycle. Nor is there any reason to suppose that by adopting a different cycle of thirty days, or of twenty-three days, any more conclusive results would be obtained.

It seems, however, when we look at these curves more closely, that they are not wholly without significance. If I am justified in concluding that they scarcely demonstrate a monthly cycle, it may certainly be added that they show a rudimentary tendency for the ecboles to fall into a fortnightly rhythm, and a very marked and unmistakable tendency to a weekly rhythm. The fortnightly rhythm is shown in the curve for the earlier period, but is somewhat disguised in the curve for the total period, because the first climax is spread over two days, the 7th and 8th of the month. If we readjust the curve for the total period by presenting the days in pairs, the fortnightly tendency is more clearly brought out (Chart 1).

A more pronounced tendency still is traceable to a weekly rhythm. This is, indeed, the most unquestionable fact brought out by these curves. All the maxima occur on Saturday or Sunday, with the minima on Tuesday, Wednesday, Thursday, or Friday. This very pronounced weekly rhythm will serve to
swamp more or less completely any monthly rhythm on a 28-day basis. Although here probably seen in an exaggerated form, it is almost certainly a characteristic of the ebolotic curve generally.\(^1\) I have been told by several young men and women, especially those who work hard during the week, that Saturday, and especially Sunday afternoon, are periods when the thoughts spontaneously go in an erotic direction, and at this time there is a special tendency to masturbation or to spontaneous sexual excitement. It is on Friday, Saturday, Sunday, and Monday, according to Guerry’s tables,\(^2\) that the fewest suicides are committed, Tuesday, Wednesday, and Thursday, with, however, a partial fall on Wednesday, those on which most suicides are committed, so that there would appear to be an antagonism between sexual activity and the desire to throw off life. It also appears (in the reports of the Bavarian factory inspectors) that accidents in factories have a tendency to occur chiefly at the beginning of the week, and toward the end rather than in the middle.\(^3\) Even growth, as Fleischmann has shown in the case of children, tends to fall into weekly cycles. It is evident that the nervous system is profoundly affected by the social influences resulting from the weekly cycle.

The analysis of this series of ebolotic curves may thus be said to recall the suggestion of Laycock, that the menstrual cycle is really made up of four weekly cycles, the periodic unit, according to Laycock, being three and one-half days. I think it would, however, be more correct to say that the menstrual cycle, perhaps originally formed with reference to the influence of the moon on the sexual and social habits of men and other animals, tends to break up by a process of segmentation into fortnightly and weekly cycles. If we are justified in assuming that there is a male menstrual cycle, we must conclude that in such a case as

\(^1\) Moll refers to the case of a man whose erotic dreams occurred every fortnight, and always on Friday night (Libido Sexualis, Band I, p. 136). One is inclined to suspect an element of autosuggestion in such a case; still, the coincidence is noteworthy.

\(^2\) See Durkheim, Le Suicide, p. 101.

\(^3\) We must, of course, see here the results of the disorganization produced by holidays, and the exhaustion produced by the week’s labor; but such influences are still the social effects of the cosmic week.
that just analyzed, the weekly rhythm has become so marked as almost entirely to obliterate the larger monthly rhythm.

However constituted, there seems little doubt that a physiological weekly cycle really exists. This was, indeed, very clearly indicated many years ago by the observations of Edward Smith, who showed that there are weekly rhythms in pulse, respiration, temperature, carbonic acid evolution, urea, and body-weight, Sunday being the great day of repair and increase of weight.\(^1\)

In an appendix to this volume I am able to present the results of another long series of observations of nocturnal ecbolic manifestations carried out by Mr. Perry-Coste, who has elaborately calculated the results, and has convinced himself that on the basis of a strictly lunar month, thus abolishing the disturbing influence of the weekly rhythm, which in his case also appears, a real menstrual rhythm may be traced.\(^2\)

It does not appear to me, however, even yet, that a final answer to the question whether a menstrual sexual rhythm occurs in men can be decisively given in the affirmative. That such a cycle will be proved in many cases seems to me highly probable, but before this can be decisively affirmed it is necessary that a much larger number of persons should be induced to carry out on themselves the simple, but protracted, series of observations that are required.

Since the first edition of this volume appeared, numerous series of ecbolic records have reached me from different parts of the world. The most notable of these series comes from a professional man, of scientific training, who has for the past six years lived in different parts of India, where the record was kept. Though the record extends over nearly six years, there are two breaks in it, due to a visit to England, and to loss of interest. Both involuntary and voluntary discharges are included in the record. The involuntary discharges occurred during sleep, usually with an erotic dream, in which the subject invariably awaked and frequently made an effort to check the emission. The voluntary discharges in most cases commenced during sleep, or

\(^1\) E. Smith, *Health and Disease*, Chapter III. I may remark that, according to Kemsoes (*Deutsche medizinische Wochenschrift*, January 20, 1908, and *British Medical Journal*, January 29, 1898), school-children work best on Monday and Tuesday.

\(^2\) See Appendix B.
in the half-waking state; deliberate masturbation, when fully awake, was comparatively rare. The proportion of involuntary to more or less voluntary ecboles was about 3 to 1. A third kind of sexual manifestation (of frequency intermediate between the other two forms) is also included, in which a high degree of erethism is induced during the half waking state, culminating in an orgasm in which the power of preventing discharge has been artificially acquired. The subject, E. M., was 32 years of age when the record began. He belongs to a healthy family, and is himself physically sound, 5 feet 6 inches in height, but weight low, due to rickets in infancy. In early life he stammered badly; his temperament is emotional and self-conscious, while his work is unusually exacting, and he lives for most of the year in a very trying climate. As a boy he was very religious, and has always felt obliged to resist sexual vice to the utmost, though there have been occasional lapses.

As regards lunar periodicity, E. M., has summated his results in a curve, after the same manner as Mr. Perry-Coste, beginning with the new moon. The periods covered include 54 lunar months, and the total number of discharges is 176; the average frequency is about 3 per month of twenty-eight days. The curve, for the most part, zigzags between a frequency of 4 and 9, but on the twenty-fourth day it falls to 1, and then rises uninterruptedly to a height of 11 on the twenty-seventh day, falling to 2 on the next day. Whether a really menstrual rhythm is thus indicated I do not undertake to decide, but I am inclined to agree with E. M. himself that there is no definite evidence of it. "It looks to me," he writes, "as if the only real rhythm (putting aside the annual cycle) will be found to be the average period between the ecboles, varying in different persons, but in my case, about nine and one-eighth days. May not the ecbolic period in men be compared to the menstrual period in women, and be an example of the greater katabolic activity of men? There is the period of tumescence, and the ecbole constituting the detumescence. The week-end holiday would hasten the detumescence, but about every third week-end there would tend to be delay to enable the system to get back into its regulation nine or ten days' stride. This might possibly be the explanation of the curves. The recent emissions were nearly all involuntary during sleep. Age may have something to do with the change in character."

E. M.'s curves frequently show the influence of weekly periodicity, in the tendency to ecbole on Sunday, or sometimes on Saturday or Monday. In recent years there has been some tendency for this climax to be thrown towards the middle of the week, but, on the whole, Wednesday is the point of lowest frequency.

In another case, the subject, A. N., who has spent nearly all his
life in the State of Indiana, has kept a record of sexual manifestations between the ages of 30 and 34. The data, which cover four years, have not been sent to me in a form which enables the possibility of a monthly curve to be estimated, but A. N., who has himself arranged the data on a lunar monthly basis, considers that a monthly curve is thus revealed. "My memoranda, he writes, "show that discharges occur most frequently on the first, second, and third days after new moon. There is also another period on the fourteenth and fifteenth, which might indicate a semi-lunar rhythm. The days of minimum discharge are the seventh, eighth, twenty-second, and twenty-third." It may be added that the yearly average of ebolic manifestations, varying between 50 and 55, comes out as 52, or exactly one per week.

A weekly periodicity is very definitely shown by A. N.'s data. Sunday once more stands at the head of the week as regards frequency, in this case very decisively. The figures are as follows:—

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In another case which has reached me from the United States, the data are slighter, but deserve note, as the subject is a trained psychologist, and I quote the case in his own words. Here, it will be seen, there appears to be a tendency for the ebolic cycle to cover a period of about six weeks. In this case, also, there is a tendency for the climax to occur about Saturday or Sunday. "X. is 38 years old, unmarried, fair health, pretty good heredity; university trained, and engaged in academic pursuits. He thinks he may have completed puberty at about 13, though he has no proof that he was in the full possession of his sex-powers until he was 15 years 3 months old (when he had his first emission). His sex life has been normal. He masturbated somewhat when he slept with other boys (or men) during early manhood, but not to excess.

"During the autumn of 1889 (when 28 years of age) he observed that at certain times he had an itching feeling about the testicles; that he felt slightly irritable; that the penis erected with the slightest provocation, and that this peculiar feeling usually passed away with a nightly emission. Indeed, so regular was the matter that he usually wore a loin garment at these times, to prevent the semen getting on the bedding. This peculiar feeling ordinarily continued for two or three days. He recalls at these times that he felt that he would like to wrestle with some one, for there seemed to be a muscular tension. These states returned with apparent regularity, and the intervals seemed to be about six weeks, though no effort was made to measure the periods until 1893. The following notes are taken from the diaries of X.:
Thursday, December 20, 1892. The peculiar feeling.
(This is the only entry.)

Thursday, February 9, 1893. The peculiar feeling.
(The diary notes that X. awoke nights to find erections, and that the feeling continued until Sunday night following, when there was an emission.)

Friday, March 27, 1893. The peculiar feeling.
(The diary notes that there was an emission the next night, and that the feeling disappeared.)

Wednesday, May 3, 1893. The peculiar feeling.
(The diary notes that it continued until Saturday night, when X. had sexual relations, and that it then disappeared.)

Wednesday, June 14, 1893. The peculiar feeling.
(The diary states that the next night X. had an emission, and the disappearance of the feeling.)

Thursday, July 27, 1893. The peculiar feeling.
(The diary notes that it was apparent at about 3 o'clock that afternoon. That night at 10 o'clock, X. had sexual intercourse, and the feeling was not noted the next day.)

Friday, September 8, 1893. The peculiar feeling.
(Continued until Tuesday, the 11th, and then disappeared. No sexual intercourse, and no nightly emission.)

Wednesday, October 25, 1893. The peculiar feeling.
(Continued until Saturday night, when there was a nightly emission.)

Saturday, December 9, 1893. The peculiar feeling.
(Continued until Monday night, when there was sexual relations.)

It will be noted that the intervals observed were of about six weeks' duration, excepting one, that from September to October, when it was nearly seven weeks.

"These observations were not recorded after 1893. X. thinks that in 1894 the intervals were longer, an opinion which is based on the fact that for a period of six months he had no sexual intercourse and no nightly emissions. The times during this six months when he had the 'peculiar feeling' the sensation was so slight as to be scarcely noted. In 1895, the feeling seemed more pronounced than ever before, and X. thinks that it may have recurred as often as once a month. In 1896, 1897, and 1898, the intervals, he thinks, lengthened—at times, he thought, wholly disappeared. During 1899, while they did not recur often, when they did come the sensation was pronounced, although
the emission was less common. There was a peculiar 'heavy' feeling about the testicles, and a marked tendency towards erection of the penis, especially at night-time (while sleeping). X. often awoke to find a tense erection. Moreover, these feelings usually continued a week.

"1. In general, X. is of the opinion that as he grows older these intervals lengthen, though this inference is not based on recorded data.

"2. He notes that a discharge (through sexual intercourse or in sleep) invariably brings the peculiar feeling to a close for the time being.

3. He notes that sexual intercourse at the time stops it; but, when there has been sexual intercourse within a week or ten days of the time (based upon the observations of 1893), that it had no tendency to check the feeling."

In another case, that of F. C., an Irish farmer, born in Waterford, the data are still more meagre, though the periodicity is stated to be very pronounced. He is chaste, steady, with occasional lapses from strict sobriety, healthy and mentally normal, living a regular open-air life, far from the artificial stimuli of towns. The observations refer to a period when he was from 20 to 27 years of age. During this period, nocturnal emissions occurred at regular intervals of exactly a month. They were ushered in by fits of irritability and depression, and usually occurred in dreamless sleep. The discharges were abundant and physically weakening, but they relieved the psychic symptoms, though they occasioned mental distress, since F. C. is scrupulous in a religious sense, and also apprehensive of bad constitutional effects, the result of reading alarmist quack pamphlets.

In another case known to me, a young man leading a chaste life, experienced crises of sexual excitement every ten to fourteen days, the crisis lasting for several days.

Finally, an interesting contribution to this subject, suggested by this Study, has been made and published (in the proceedings of the Amsterdam International Congress of Psychology, in 1907) by the well-known Amsterdam neurologist and psychologist, Dr. L. S. A. M. Von Römer under the title, "Über das Verhältniss zwischen Mondalter und Sexualität." Von Römer's data are made up not of nocturnal involuntary emissions, but of the voluntary acts of sexual intercourse of an unmarried man, during a period of four years. Von Römer believes that these, to a much greater extent than those of a married man, would be liable to periodic influence, if such exist. On making a curve of exact lunar length (similarly to Perry-Coste), he finds that there are, every month, two maxima and two minima, in a way that approximately resembles Perry-Coste's curve. The main point in Von Römer's results is, however, the correspondence that he finds with the actual lunar
phases; the chief maximum occurs at the time of the full moon, and the secondary maximum at the time of the new moon, the minima being at the first and fourth quarters. He hazards no theory in explanation of this coincidence, but insists on the need for further observations. It will be seen that A. N.'s results (ante p. 117) seem in the main to correspond to Von Römer's.
III.


That there are annual seasonal changes in the human organism, especially connected with the sexual function, is a statement that has been made by physiologists and others from time to time, and the statement has even reached the poets, who have frequently declared that spring is the season of love.

Thus, sixty years ago, Laycock, an acute pioneer in the investigation of the working of the human organism, brought together (in a chapter on "The Periodic Movements in the Reproductive Organs of Woman," in his Nervous Diseases of Women, 1840, pp. 61-70) much interesting evidence to show that the system undergoes changes about the vernal and autumnal equinoxes, and that these changes are largely sexual.

Edward Smith, also a notable pioneer in this field of human periodicity, and, indeed, the first to make definite observations on a number of points bearing on it, sums up, in his remarkable book, Health and Disease as Influenced by Daily, Seasonal, and Other Cyclical Changes in the Human System (1861), to the effect that season is a more powerful influence on the system than temperature or atmospheric pressure; "in the early and middle parts of spring every function of the body is in its highest degree of efficiency," while autumn is "essentially a period of change from the minimum toward the maximum of vital conditions." He found that in April and May most carbonic acid is evolved, there being then a progressive diminution to September, and then a progressive increase; the respiratory rate also fell from a maximum in April to a minimum maintained at exactly the same level throughout August, Sep-
tember, October, and November; spring was found to be the season of maximum, autumn of minimum, muscular power; sensibility to tactile and temperature impressions was also greater in spring.

Kulischer, studying the sexual customs of various human races, concluded that in primitive times, only at two special seasons—at spring and in harvest-time—did pairing take place; and that, when pairing ceased to be strictly confined to these periods, its symbolical representation was still so confined, even among the civilized nations of Europe. He further argued that the physiological impulse was only felt at these periods. (Kulischer, "Die geschlechtliche Zuchtwahl bei den Menschen in der Urzeit," Zeitschrift für Ethnologie, 1876, pp. 152 and 157.) Cohnstein ("Über Prädispositionszeiten bei Schwangerschaft," Archiv für Gynäkologie, 1879) also suggested that women sometimes only conceive at certain periods of the year.

Wiltshire, who made various interesting observations regarding the physiology of menstruation, wrote: "Many years ago, I concluded that every woman had a law peculiar to herself, which governed the times of her bringing forth (and conceiving); that she was more prone to bring forth at certain epochs than at others; and subsequent researches have established the accuracy of the forecast." He further stated his belief in a "primordial seasonal aptitude for procreation, the impress of which still remains, and, to some extent, governs the breeding-times of humanity." (A. Wiltshire, "Lectures on the Comparative Physiology of Menstruation," British Medical Journal, March, 1883, pp. 502, etc.)

Westermarck, in a chapter of his History of Human Marriage, dealing with the question of "A Human Pairing Season in Primitive Times," brings forward evidence showing that spring, or, rather, early summer, is the time for increase of the sexual instinct, and argues that this is a survival of an ancient pairing season; spring, he points out, is a season of want, rather than abundance, for a frugivorous species, but when men took to herbs, roots, and animal food, spring became a time of abundance, and suitable for the birth of children. He thus considers that in man, as in lower animals, the times of conception are governed by the times most suitable for birth.

Rosenstadt, as we shall see later, also believes that men to-day have inherited a physiological custom of procreating at a certain epoch, and he thus accounts for the seasonal changes in the birthrate.

Heape, who also believes that "at one period of its existence the human species had a special breeding season," follows Wiltshire in suggesting that "there is some reason to believe that the human female is not always in a condition to breed." (W. Heape, "Menstruation and Ovulation of Macacus rhesus," Philosophical Transactions, 1897; id. "The Sexual Season of Mammals," Quarterly Journal Microscopical Science, 1900.)
Except, however, in one important respect, with which we shall presently have to deal, few attempts have been made to demonstrate any annual organic sexual rhythm. The supposition of such annual cycle is usually little more than a deduction from the existence of the well-marked seasonal sexual rhythm in animals. Most of the higher animals breed only once or twice a year, and at such a period that the young are born when food is most plentiful. At other periods the female is incapable of breeding, and without sexual desires, while the male is either in the same condition or in a condition of latent sexuality. Under the influence of domestication, animals tend to lose the strict periodicity of the wild condition, and become apt for breeding at more frequent intervals. Thus among dogs in the wild state the bitch only experiences heat once a year, in the spring. Among domesticated dogs, there is not only the spring period of heat, early in the year, but also an autumn period, about six months later; the primitive period, however, remains the most important one, and the best litters of pups are said to be produced in the spring. The mare is in season in spring and summer; sheep take the ram in autumn.¹ Many of the menstruating monkeys also, whether or not sexual desire is present throughout the year, only conceive in spring and in autumn. Almost any time of the year may be an animal’s pairing season, this season being apparently in part determined by the economic conditions which will prevail at birth. While it is essential that animals should be born during the season of greatest abundance, it is equally essential that pairing, which involves great expenditure of energy, should also take place at a season of maximum physical vigor.

As an example of the sexual history of an animal through the year, I may quote the following description, by Dr. A. W. Johnstone, of the habits of the American deer: “Our common American deer, in winter-time, is half-starved for lack of vegetation in the woods; the low temperature, snow, and ice, make his conditions of life harder for lack of the proper amount of food, whereby he becomes an easier prey to carnivorous animals. He has difficulty even in preserving life. In spring he sheds his winter coat, and is provided with a suit of lighter hair, and

¹ F. Smith, Veterinary Physiology; Dalziel, The Colt.
while this is going on the male grows antlers for defence. The female about this time is far along in pregnancy, and when the antlers are fully grown she drops the fawn. When the fawns are dropped vegetation is plentiful and lactation sets in. During this time the male is kept fully employed in getting food and guarding his more or less helpless family. As the season advances the vegetation increases and the fawn begins to eat grass. When the summer heat commences the little streams begin to dry up, and the animal once more has difficulty in supporting life because of the enervating heat, the effect of drought on the vegetation, and the distance which has to be traveled to get water; therefore, fully ten months in each year the deer has all he can do to live without extra exertion incident to rutting. Soon after the autumn rains commence vegetation becomes more luxurious, the antlers of the male and new suits of hair for both are fully grown, heat of the summer is gone, food and drink are plentiful everywhere, the fawns are weaned, and both sexes are in the very finest condition. Then, and then only, in the whole year, comes the rut, which, to them as to most other animals, means an unwonted amount of physical exercise besides the everyday runs for life from their natural enemies, and an unusual amount of energy is used up. If a doe dislikes the attention of a special buck, miles of racing result. If jealous males meet, furious battles take place. The strain on both sexes could not possibly be endured at any other season of the year. With approach of cold weather, climatic deprivations and winter dangers commence and rut closes. In all wild animals, rut occurs only when the climatic and other conditions favor the highest physical development. This law holds good in all wild birds, for it is then only that they can stand the strain incident to love-making. The common American crow is a very good study. In the winter he travels around the ricefields of the South, leading a tramp's existence in a country foreign to him, and to which he goes only to escape the rigors of the northern climate. For several weeks in the spring he goes about the fields, gathering up the worms and grubs. After his long flight from the South he experiences several weeks of an almost ideal existence, his food is plentiful, he becomes strong and hearty, and then he turns to thoughts of love. In the pairing season he does more work than at any other time in the year: fantastic dances, racing and chasing after the females, and savage fights with rivals. He endures more than would be possible in his ordinary physical state. Then come the care of the young and the long flights for water and food during the drought of the summer. After the molt, autumn finds him once more in flock, and with the first frosts he is off again to the South. In the wild state, rut is the capstone of perfect physical condition.” (A. W. Johnstone, “The Relation of Menstruation to the other Reproductive Functions,” American Journal of Obstetrics, vol. xxxii, 1895.)
Wiltshire ("Lectures on the Comparative Physiology of Menstruation," British Medical Journal, March, 1888) and Westermarck (History of Human Marriage, Chapter II) enumerate the pairing season of a number of different animals.

With regard to the breeding seasons of monkeys, little seems to be positively known. Heape made special inquiries with reference to the two species whose sexual life he investigated. He was informed that Semnopithecus entellus breeds twice a year, in April and in October. He accepts Aitcheson's statement that the Macacus rhesus, in Simla, copulates in October, and adds that in the very different climate of the plains it appears to copulate in May. He concludes that the breeding season varies greatly in dependence on climate, but believes that the breeding season is always preserved, and that it affects the sexual aptitude of the male. He could not make his monkeys copulate during February or March, but is unable to say whether or not sexual intercourse is generally admitted outside the breeding season. He quotes the observation of Breschot that monkeys copulate during pregnancy.

In primitive human races we very frequently trace precisely the same influence of the seasonal impulse as may be witnessed in the higher animals, although among human races it does not always result that the children are born at the time of the greatest plenty, and on account of the development of human skill such a result is not necessary. Thus Dr. Cook found among the Eskimo that during the long winter nights the secretions are diminished, muscular power is weak, and the passions are depressed. Soon after the sun appears a kind of rut affects the young population. They tremble with the intensity of sexual passion, and for several weeks much of the time is taken up with courtship and love. Hence, the majority of the children are born nine months later, when the four months of perpetual night are beginning. A marked seasonal periodicity of this kind is not confined to the Arctic regions. We may also find it in the tropics. In Cambodia, Mondière has found that twice a year, in April and September, men seem to experience a "veritable rut," and will sometimes even kill women who resist them.¹

These two periods, spring and autumn—the season for greeting the appearance of life and the season for reveling in its final

fruition—seem to be everywhere throughout the world the most usual seasons for erotic festivals. In classical Greece and Rome, in India, among the Indians of North and South America, spring is the most usual season, while in Africa the yam harvest of autumn is the season chiefly selected. There are, of course, numerous exceptions to this rule, and it is common to find both seasons observed. Taking, indeed, a broad view of festivals throughout the world, we may say that there are four seasons when they are held: the winter solstice, when the days begin to lengthen and primitive man rejoices in the lengthening and seeks to assist it; the vernal equinox, the period of germination and the return of life; the summer solstice, when the sun reaches its height; and autumn, the period of fruition, of thankfulness, and of repose. But it is rarely that we find a people seriously celebrating more than two of these festival seasons.

In Australia, according to Müller as quoted by Ploss and Bartels, marriage and conception take place during the warm season, when there is greatest abundance of food, and to some extent is even confined to that period. Oldfield and others state that the Australian erotic festivals take place only in spring. Among some tribes, Müller adds, such as the Watschandis, conception is inaugurated by a festival called kaaro, which takes place in the warm season at the first new moon after the yams are ripe. The leading feature of this festival is a moonlight dance, representing the sexual act symbolically. With their spears, regarded as the symbols of the male organ, the men attack bushes, which

1 This primitive aspect of the festival is well shown by the human sacrifices which the ancient Mexicans offered at this time, in order to enable the sun to recuperate his strength. The custom survives in a symbolical form among the Mokis, who observe the festivals of the winter solstice and the vernal equinox. (“Aspects of Sun-worship among the Moki Indians,” Nature, July 28, 1898.) The Walpi, a Tusayan people, hold a similar great sun-festival at the winter solstice, and December is with them a sacred month, in which there is no work and little play. This festival, in which there is a dance dramatizing the fructification of the earth and the imparting of virility to the seeds of corn, is fully described by J. Walter Fewkes (American Anthropologist, March, 1898). That these solemn annual dances and festivals of North America frequently merge into “a lecherous saturnalia,” when “all is joy and happiness,” is stated by H. H. Bancroft (Native Races of Pacific States, vol. i, p. 352).
represent the female organs. They thus work themselves up to a state of extreme sexual excitement.\(^1\) Among the Papuans of New Guinea, also, according to Miklucho-Macleay, conceptions chiefly occur at the end of harvest, and Guise describes the great annual festival of the year which takes place at the time of the yam and banana harvest, when the girls undergo a ceremony of initiation and marriages are effected.\(^2\) In Central Africa, says Sir H. H. Johnston, in his *Central Africa*, sexual orgies are seriously entered into at certain seasons of the year, but he neglects to mention what these seasons are. The people of New Britain, according to Weisser (as quoted by Ploss and Bartels), carefully guard their young girls from the young men. At certain times, however, a loud trumpet is blown in the evening, and the girls are then allowed to go away into the bush to mix freely with the young men. In ancient Peru (according to an account derived from a pastoral letter of Archbishop Villagomez of Lima), in December, when the fruit of the *paltay* is ripe, a festival was held, preceded by a five days' fast. During the festival, which lasted six days and six nights, men and women met together in a state of complete nudity at a certain spot among the gardens, and all raced toward a certain hill. Every man who caught up with a woman in the race was bound at once to have intercourse with her.

Very instructive, from our present point of view, is the account given by Dalton, of the festivals of the various Bengal races. Thus the Hos (a Kolarian tribe), of Bengal, are a purely agricultural people, and the chief festival of the year with them is the *mágh parah*. It is held in the month of January, "when the granaries are full of grain, and the people, to use their own

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1 As regards the northern tribes of Central Australia, Spencer and Gillen state that, during the performance of certain ceremonies which bring together a large number of natives from different parts, the ordinary marital rules are more or less set aside (*Northern Tribes of Central Australia*, p. 136). Just in the same way, among the Siberian Yakuts, according to Sieroshevski, during weddings and at the great festivals of the year, the usual oversight of maidens is largely removed. (*Journal of the Anthropological Institute*, Jan.-June, 1901, p. 96.)

expression, full of devilry." It is the festival of the harvest-home, the termination of the year's toil, and is always held at full moon. The festival is a *saturnalia*, when all rules of duty and decorum are forgotten, and the utmost liberty is allowed to women and girls, who become like bacchantes. The people believe that at this time both men and women become overcharged with vitality, and that a safety valve is absolutely necessary. The festival begins with a religious sacrifice made by the village priest or elders, and with prayers for the departed and for the vouchsafing of seasonable rain and good crops. The religious ceremonies over, the people give themselves up to feasting and to drinking the home-made beer, the preparation of which from fermented rice is one of a girl's chief accomplishments. "The Ho population," wrote Dalton, "are at other seasons quiet and reserved in manner, and in their demeanor toward women gentle and decorous; even in their flirtations they never transcend the bounds of decency. The girls, though full of spirits and somewhat saucy, have innate notions of propriety that make them modest in demeanor, though devoid of all prudery, and of the obscene abuse, so frequently heard from the lips of common women in Bengal, they appear to have no knowledge. They are delicately sensitive under harsh language of any kind, and never use it to others; and since their adoption of clothing they are careful to drape themselves decently, as well as gracefully; but they throw all this aside during the *mágh* feast. Their nature appears to undergo a temporary change. Sons and daughters revile their parents in gross language, and parents their children; men and women become almost like animals in the indulgence of their amorous propensities. They enact all that was ever portrayed by prurient artists in a bacchanalian festival or pandean orgy; and as the light of the sun they adore, and the presence of numerous spectators, seems to be no restraint on their indulgence, it cannot be expected that chastity is preserved when the shades of night fall on such a scene of licentiousness and debauchery." While, however, thus representing the festival as a mere debauch, Dalton adds that relationships formed at this time generally end in marriage. There is also a flower festival in April and May,
of religious nature, but the dances at this festival are quieter in character.\footnote{1}

In Burmah the great festival of the year is the full moon of October, following the Buddhist Lent season (which is also the wet season), during which there is no sexual intercourse. The other great festival is the New Year in March.\footnote{2}

In classical times the great festivals were held at the same time as in northern and modern Europe. The \textit{brumalia} took place in midwinter, when the days were shortest, and the \textit{rosalia}, according to early custom in May or June, and at a later time about Easter. After the establishment of Christianity the Church made constant efforts to suppress this latter festival, and it was referred to by an eighth century council as “a wicked and reprehensible holiday-making.” These festivals appear to be intimately associated with Dionysus worship, and the flower-festival of Dionysus, as well as the Roman Liberales in honor of Bacchus, was celebrated in March with worship of Priapus. The festivals of the Delian Apollo and of Artemis, both took place during the first week in May and the Roman Bacchanales in October.\footnote{3}

The mediæval Feast of Fools was to a large extent a seasonal orgy licensed by the Church. It may be traced directly back through the barbarities of the lower empire to the Roman \textit{saturnalia}, and at Sens, the ancient ecclesiastical metropolis of France, it was held at about the same time as the \textit{saturnalia}, on

\footnote{1}{Dalton, \textit{Ethnology of Bengal}, pp. 196 \textit{et seq}. W. Crooke (\textit{Journal of the Anthropological Institute}, p. 243, 1899) also refers to the annual harvest-tree dance and \textit{saturnalia}, and its association with the seasonal period for marriage. We find a similar phenomenon in the Malay Peninsula: “In former days, at harvest-time, the Jakuns kept an annual festival, at which, the entire settlement having been called together, fermented liquor, brewed from jungle fruits, was drunk; and to the accompaniments of strains of their rude and indcodite music, both sexes, crowning themselves with fragrant leaves and flowers, indulged in bouts of singing and dancing, which grew gradually wilder throughout the night, and terminated in a strange kind of sexual orgie.” (W. W. Skeat. “The Wild Tribes of the Malay Peninsula,” \textit{Journal of the Anthropological Institute}, 1902, p. 133.)}

\footnote{2}{Fielding Hall, \textit{The Soul of a People}, 1898, Chapter XIII.}

\footnote{3}{See \textit{e.g.}, L. Dyer, \textit{Studies of the Gods in Greece}, 1891, pp. 86-89, 375, etc.}
the Feast of the Circumcision, i.e., New Year's Day. It was not, however, always held at this time; thus at Evreux it took place on the 1st of May.¹

The Easter bonfires of northern-central Europe, the Midsummer (St. John's Eve) fires of southern-central Europe, still bear witness to the ancient festivals.² There is certainly a connection between these bonfires and erotic festivals; it is noteworthy that they occur chiefly at the period of spring and early summer, which, on other grounds, is widely regarded as the time for the increase of the sexual instinct, while the less frequent period for the bonfires is that of the minor sexual climax. Mannhardt was perhaps the first to show how intimately these spring and early summer festivals—held with bonfires and dances and the music of violin—have been associated with love-making and the choice of a mate.³ In spring, the first Monday in Lent (Quadragesima) and Easter Eve were frequent days for such bonfires. In May, among the Franks of the Main, the unmarried women, naked and adorned with flowers, danced on the Blocksberg before the men, as described by Herbels in the tenth century.⁴ In the central highlands of Scotland the Beltane fires were kindled on the 1st of May. Bonfires sometimes took place on

¹ For a popular account of the Feast of Fools, see Lolićé, "La Fête des Fous," Revue des Revues, May 15, 1898; also, J. G. Bourke, Scatologic Rites of all Nations, pp. 11-23.

² J. Grimm (Teutonic Mythology, p. 615) points out that the observance of the spring or Easter bonfires marks off the Saxon from the Franconian peoples. The Easter bonfires are held in Lower Saxony, Westphalia, Lower Hesse, Geldern, IJolland, Friesland, Jutland, and Zealand. The Midsummer bonfires are held on the Rhine, in Franconia, Thuringia, Swabia, Bavaria, Austria, and Silesia. Schwartz (Zeitschrift für Ethnologie, 1896, p. 151) shows that at Lauterberg, in the Harz Mountains, the line of demarcation between these two primitive districts may still be clearly traced.

³ Wald und Feldkulte, 1875, vol. i, pp. 422 et seq. He also mentions (p. 458) that St. Valentine's Day (14th of February),—or Ember Day, or the last day of February,—when the pairing of birds was supposed to take place, was associated, especially in England, with love-making and the choice of a mate. In Lorraine, it may be added, on the 1st of May, the young girls chose young men as their valentines, a custom known by this name to Rabelais.

⁴ Rochholz, Drei gaugöttinnen, p. 37.
Halloween (October 31st) and Christmas. But the great season all over Europe for these bonfires, then often held with erotic ceremonial, is the summer solstice, the 23d of June, the eve of Midsummer, or St. John's Day.¹

The Bohemians and other Slavonic races formerly had meetings with sexual license. This was so up to the beginning of the sixteenth century on the banks of rivers near Novgorod. The meetings took place, as a rule, the day before the Festival of John the Baptist, which, in pagan times, was that of a divinity known by the name of Jarilo (equivalent to Priapus). Half a century later, a new ecclesiastical code sought to abolish every vestige of the early festivals held on Christmas Day, on the Day of the Baptism of Our Lord, and on John the Baptist's Day. A general feature of all these festivals (says Kowalewsky) was the prevalence of the promiscuous intercourse of the sexes. Among the Estonians, at the end of the eighteenth century, thousands of persons would gather around an old ruined church (in the Fellinschen) on the Eve of St. John, light a bonfire, and throw sacrificial gifts into it. Sterile women danced naked among the ruins; much eating and drinking went on, while the young men and maidens disappeared into the woods to do what they would. Festivals of this character still take place at the end of June in

¹Mannhardt, *ibid.*, pp. 466 et seq. Also J. G. Frazer, *Golden Bough*, vol ii, Chapter IV. For further facts and references, see K. Pearson (*The Chances of Death*, 1897, vol. ii, “Woman as Witch,” “Kindred Group-marriage,” and Appendix on “The ‘Mailcharn’ and ‘Kilfgang,’”) who incidentally brings together some of the evidence concerning primitive sex-festivals in Europe. Also, E. Hahn, *Demeter und Baubo*, 1896, pp. 38-40; and for some modern survivals, see Deniker, * Races of Man*, 1900, Chapter III. On a lofty tumulus near the megalithic remains at Carnac, in Brittany, the custom still prevails of lighting a large bonfire at the time of the summer solstice; it is called Tan Heol, or Tan St. Jean. In Ireland, the bonfires also take place on St. John’s Eve, and a correspondent, who has often witnessed them in County Waterford, writes that “women, with garments raised, jump through these fires, and conduct which, on ordinary occasions would be reprobated, is regarded as excusable and harmless.” Outside Europe, the Berbers of Morocco still maintain this midsummer festival, and in the Rif they light bonfires; here the fires seem to be now regarded as mainly purificatory, but they are associated with eating ceremonies which are still regarded as multiplicative. (Westermarck, “Midsummer Customs in Morocco, *Folk-Lore*, March, 1905.)
some districts. Young unmarried couples jump barefoot over large fires, usually near rivers or ponds. Licentiousness is rare.\(^1\) But in many parts of Russia the peasants still attach little value to virginity, and even prefer women who have been mothers. The population of the Grisons in the sixteenth century held regular meetings not less licentious than those of the Cossacks. These were abolished by law. Kowalewsky regards all such customs as a survival of early forms of promiscuity.\(^2\)

Frazer (Golden Bough, 2d ed., 1900, vol. iii, pp. 236-350) fully describes and discusses the dances, bonfires and festivals of spring and summer, of Halloween (October 31), and Christmas. He also explains the sexual character of these festivals. "There are clear indications," he observes (p. 305), "that even human fecundity is supposed to be promoted by the genial heat of the fires. It is an Irish belief that a girl who jumps thrice over the midsummer bonfire will soon marry and become the mother of many children; and in various parts of France they think that if a girl dances round nine fires she will be sure to marry within a year. On the other hand, in Lechrain, people say that if a young man and woman, leaping over the midsummer fire together, escape unsmirched, the young woman will not become a mother within twelve months—the flames have not touched and fertilized her. The rule observed in some parts of France and Belgium, that the bonfires on the first Sunday in Lent should be kindled by the person who was last married, seems to belong to the same class of ideas, whether it be that such a person is supposed to receive from, or impart to, the fire a generative and fertilizing influence. The common practice of lovers leaping over the fires hand-in-hand may very well have originated in a notion that thereby their marriage would be more likely to be blessed with offspring. And the scenes of profligacy which appear to have marked the midsummer celebration among the Esthonians, as they once marked the celebration of May Day among ourselves, may

\(^1\) Mannhardt (op. cit., p. 469) quotes a description of an Estonian festival in the Island of Moon, when the girls dance in a circle round the fire, and one of them,—to the envy of the rest, and the pride of her own family,—is chosen by the young men, borne away so violently that her clothes are often torn, and thrown down by a youth, who places one leg over her body in a kind of symbolic coitus, and lies quietly by her side till morning. The spring festivals of the young people of Ukrainia, in which, also, there is singing, dancing, and sleeping together, are described in "Folk-Lore de l’Ukraine." Кривідка, vol. v, pp. 2-6, and vol. viii, pp. 303 et seq.

\(^2\) M. Kowalewsky, "Marriage Among the Early Slavs," Folk-Lore, December, 1890.
have sprung, not from the mere license of holiday-makers, but from a crude notion that such orgies were justified, if not required, by some mysterious bond which linked the life of man to the courses of the heavens at the turning-point of the year."

As regards these primitive festivals, although the evidence is scattered and sometimes obscure, certain main conclusions clearly emerge. In early Europe there were, according to Grimm, only two seasons, sometimes regarded as spring and winter, sometimes as spring and autumn, and for mythical purposes these seasons were alone available.¹ The appearance of each of these two seasons was inaugurated by festivals which were religious and often erotic in character. The Slavonic year began in March, at which time there was formerly, it is believed, a great festival, not only in Slavonic but also in Teutonic countries. In Northern Germany there were Easter bonfires always associated with mountains or hills. The Celtic bonfires were held at the beginning of May, while the Teutonic May-day, or Walpurgisnacht, is a very ancient sacred festival, associated with erotic ceremonial, and regarded by Grimm as having a common origin with the Roman floralia and the Greek dionysia. Thus, in Europe, Grimm concludes: "there are four different ways of welcoming summer. In Sweden and Gothland a battle of winter and summer, a triumphal entry of the latter. In Schonen, Denmark, Lower Saxony, and England, simply May-riding, or fetching of the May-wagon. On the Rhine merely a battle of winter and summer, without immersion, without the pomp of an entry. In Franconia, Thuringia, Meissen, Silesia, and Bohemia only the carrying out of wintry death; no battle, no formal introduction of summer. Of these festivals the first and second fall in May, the third and fourth in March. In the first two, the whole population take part with unabated enthusiasm; in the last two only the lower poorer class. . . . Everything goes to prove that the approach of summer was to our forefathers a holy tide, welcomed

¹A. Tille, however (Yule and Christmas, 1899), while admitting that the general Aryan division of the year was dual, follows Tacitus in asserting that the Germanic division of the year (like the Egyptian) was tripartite: winter, spring, and summer.
by sacrifice, feast, and dance, and largely governing and bright-
ening the people's life."1 The early spring festival of March, the
festival of Ostara, the goddess of spring, has become identified
with the Christian festival of Resurrection (just as the summer
solstice festival has been placed beneath the patronage of St.
John the Baptist); but there has been only an amalgamation of
closely-allied rites, for the Christian festival also may be traced
back to a similar origin. Among the early Arabians the great
ragab feast, identified by Ewald and Robertson Smith with the
Jewish paschal feast, fell in the spring or early summer, when
the camels and other domestic animals brought forth their young
and the shepherds offered their sacrifices.2 Babylonia, the
supreme early centre of religious and cosmological culture, pre-
sents a more decisive example of the sex festival. The festival
of Tammuz is precisely analogous to the European festival of St.
John's Day. Tammuz was the solar god of spring vegetation,
and closely associated with Ishtar, also an agricultural deity of
fertility. The Tammuz festival was, in the earliest times, held
toward the summer solstice, at the time of the first wheat and
barley harvest. In Babylonia, as in primitive Europe, there
were only two seasons; the festival of Tammuz, coming at the
end of winter and the beginning of summer, was a fast followed
by a feast, a time of mourning for winter, of rejoicing for sum-
mer. It is part of the primitive function of sacred ritual to be
symbolical of natural processes, a mysterious representation of
natural processes with the object of bringing them about.3 The
Tammuz festival was an appeal to the powers of Nature to ex-
hibit their generative functions; its erotic character is indicated
not only by the well-known fact that the priestesses of Ishtar
(the Kadištu, or "holy ones") were prostitutes, but by the state-
ments in Babylonian legends concerning the state of the earth
during Ishtar's winter absence, when the bull, the ass, and man

1 Grimm, Teutonic Mythology (English translation by Stally-
brass), pp. 612-630, 779, 788.
2 Wellhausen, Reste Arabischen Heidentums, 1897, p. 98.
3 See, e.g., the chapter on ritual in Gérard-Varet's interesting book,
L'Ignorance et l'Inreflexion, 1899, for a popular account of this and
allied primitive conceptions.
ceased to reproduce. It is evident that the return of spring, coincident with the Tammuz festival, was regarded as the period for the return of the reproductive instinct even in man.\textsuperscript{1} So that along this line also we are led back to a great procreative festival.

Thus the great spring festivals were held between March and June, frequently culminating in a great orgy on Midsummer’s Eve. The next great season of festivals in Europe was in autumn. The beginning of August was a great festival in Celtic lands, and the echoes of it, Rhys remarks, have not yet died out in Wales.\textsuperscript{2} The beginning of November, both in Celtic and Teutonic countries, was a period of bonfires.\textsuperscript{3} In Germanic countries especially there was a great festival at the time. The Germanic year began at Martinmas (November 11th), and the great festival of the year was then held. It is the oldest Germanic festival on record, and retained its importance even in the Middle Ages. There was feasting all night, and the cattle that were to be killed were devoted to the gods; the goose was associated with this festival.\textsuperscript{4} These autumn festivals culminated in the great festival of the winter solstice which we have perpetuated.

\textsuperscript{1}Jastrow, \textit{Religion of Babylonia}, especially pp. 485, 571; regarding the priestesses, Jastrow remarks: “Among many nations, the mysterious aspects of woman’s fertility lead to rites that, by a perversion of their original import, appear to be obscene. The prostitutes were priestesses attached to the Ishtar cult, and who took part in ceremonies intended to symbolize fertility.” Whether there is any significance in the fact that the first two months of the Babylonian year (roughly corresponding to our March and April), when we should expect births to be at a maximum, were dedicated to Ea and Bel, who, according to varying legends, were the creators of man, and that New Year’s Day was the festival of Bau, regarded as the mother of mankind, I cannot say, but the suggestion may be put forward.

\textsuperscript{2}Celtic Heathendom, p. 421.

\textsuperscript{3}Grimm, \textit{Teutonic Mythology}, p. 1465. In England, the November, bonfires have become merged into the Guy Fawkes celebrations. In the East, the great primitive autumn festivals seem to have fallen somewhat earlier. In Babylonia, the seventh month (roughly corresponding to September) was specially sacred, though nothing is known of its festivals, and this also was the sacred festival month of the Hebrews, and originally of the Arabs. In Europe, among the southern Slavs, the Reigen, or Kolo—wild dances by girls, adorned with flowers, and with skirts girt high, followed by sexual intercourse—take place in autumn, during the nights following harvest time.

\textsuperscript{4}A. Tille, \textit{Yule and Christmas}, p. 21, etc.
in the celebrations of Christmas and New Year. Thus, while the two great primitive culminating festivals of spring and autumn correspond exactly (as we shall see) with the seasons of maximum fecundation, even in the Europe of to-day, the earlier spring (March) and—though less closely—autumn (November) festivals correspond with the periods of maximum spontaneous sexual disturbance, as far as I have been able to obtain precise evidence of such disturbance. That the maximum of physiological sexual excitement should tend to appear earlier than the maximum of fecundation is a result that might be expected.

The considerations so far brought forward clearly indicate that among primitive races there are frequently one or two seasons in the year—especially spring and autumn—during which sexual intercourse is chiefly or even exclusively carried on, and they further indicate that these primitive customs persist to some extent even in Europe to-day. It would still remain to determine whether any such influence affects the whole mass of the civilized population and determines the times at which intercourse, or fecundation, most frequently takes place.

This question can be most conveniently answered by studying the seasonal variation in the birthrate, calculating back to the time of conception. Wargentin, in Sweden, first called attention to the periodicity of the birthrate in 1767. The matter seems to have attracted little further attention until Quetelet, who instinctively scented unclaimed fields of statistical investigation, showed that in Belgium and Holland there is a maximum of births in February, and, consequently, of conceptions in May, and a minimum of births about July, with consequent minimum of conceptions in October. Quetelet considered that the spring maximum of conceptions corresponded to an increase of vitality after the winter cold. He pointed out that this sexual climax was better marked in the country than in towns, and accounted

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1 Long before Wargentin, however, Rabelais had shown some interest in this question, and had found that there were most christenings in October and November, this showing, he pointed out, that the early warmth of spring influenced the number of conceptions (Pantagruel, liv. v, Ch. XXIX). The spring maximum of conceptions is not now so early in France.
for this by the consideration that in the country the winter cold is more keenly felt. Later, Wappäius investigated the matter in various parts of northern and southern Europe as well as in Chile, and found that there was a maximum of conceptions in May and June attributable to season, and in Catholic countries strengthened by customs connected with ecclesiastical seasons. This maximum was, he found, followed by a minimum in September, October, and November, due to gradually increasing exhaustion, and the influence of epidemic diseases, as well as the strain of harvest-work. The minimum is reached in the south earlier than in the north. About November conceptions again become more frequent, and reach the second maximum at about Christmas and New Year. This second maximum is very slightly marked in southern countries, but strongly marked in northern countries (in Sweden the absolute maximum of conceptions is reached in December), and is due, in the opinion of Wappäius, solely to social causes. Villermé reached somewhat similar results. Founding his study on 17,000,000 births, he showed that in France it was in April, May, and June, or from the spring equinox to the summer solstice, and nearer to the solstice than the equinox, that the maximum of fecundations takes place; while the minimum of births is normally in July, but is retarded by a wet and cold summer in such a manner that in August there are scarcely more births than in July, and, on the other hand, a very hot summer, accelerating the minimum of births, causes it to fall in June instead of in July.¹ He also showed that in Buenos Ayres, where the seasons are reversed, the conception-rate follows the reversed seasons, and is also raised by epochs of repose, of plentiful food, and of increased social life. Sormani studied the periodicity of conception in Italy, and found that the spring maximum in the southern provinces occurs in May, and gradually falls later as one proceeds northward, until, in the extreme north of the peninsula, it occurs in July. In southern Italy there is only one maximum and one minimum; in the north there are two. The minimum which follows the spring or sum-

mer maximum increases as we approach the south, while the minimum associated with the winter cold increases as we approach the north.\textsuperscript{1} Beukemann, who studied the matter in various parts of Germany, found that seasonal influence was specially marked in the case of illegitimate births. The maximum of conceptions of illegitimate children takes place in the spring and summer of Europe generally; in Russia it takes place in the autumn and winter, when the harvest-working months for the population are over, and the period of rest, and also of minimum deathrate (September, October, and November), comes round. In Russia the general conception-rate has been studied by various investigators. Here the maximum number of conceptions is in winter, the minimum varying among different elements of the population. Looked at more closely, there are maxima of conceptions in Russia in January and in April. (In Russian towns, however, the maximum number of conceptions occurs in the autumn.) The special characteristics of the Russian conception-rate are held to be due to the prevalence of marriages in autumn and winter,\textsuperscript{2} to the severely observed fasts of spring, and to the exhausting harvest-work of summer.

It is instructive to compare the conception-rate of Europe with that of a non-European country. Such a comparison has been made by S. A. Hill for the Northwest Provinces of India. Here the Holi and other erotic festivals take place in spring; but spring is not the period when conceptions chiefly take place; indeed, the prevalence of erotic festivals in spring appears to Hill an argument in favor of those festivals having originated in a colder climate. The conceptions show a rise through October and November to a maximum in December and January, followed by a steady and prolonged fall to a minimum in September. This curve can be accounted for by climatic and economic conditions. September is near the end of the long and depressing hot season,

\textsuperscript{1} Sormani, \textit{Giornale di Medicina Militare}, 1870.

\textsuperscript{2} Throughout Europe, it may be said, marriages tend to take place either in spring or autumn (Oettinger \textit{Moralstatistik}, p. 181, gives details). That is to say, that there is a tendency for marriages to take place at the season of the great public festivals, during which sexual intercourse was prevalent in more primitive times.
when malarial influences are rapidly increasing to a maximum, the food-supply is nearly exhausted, and there is the greatest tendency to suicide. With October it forms the period of greatest mortality. December, on the other hand, is the month when food is most abundant, and it is also a very healthy month.¹

For a summary of the chief researches into this question, see Ploss and Bartels, *Das Weib*; also, Rosenstadt, "Zur Frage nach den Ursachen welche die Zahl der Conceptionen, etc," *Mittheilungen aus den embryologischen Institute Universität Wien*, second series, fasc. 4, 1890. Rosenstadt concludes that man has inherited from animal ancestors a "physiological custom" which has probably been further favored by climatic and social conditions. "Primitive man," he proceeds, "had inherited from his ancestors the faculty of only reproducing himself at determined epochs. On the arrival of this period of rut, fecundation took place on a large scale, this being very easy, thanks to the promiscuity in which primitive man lived. With the development of civilization, men give themselves up to sexual relations all the year round, but the 'physiological custom' of procreating at a certain epoch has not completely disappeared; it remains as a survival of the animal condition, and manifests itself in the recrudescence of the number of conceptions during certain months of the year." O. Rosenbach ("Bemerkungen über das Problem einer Brunstzeit beim Menschen," *Archiv für Rassen und Gesellschafts-Biologie*, Bd. III, Heft 5) has also argued in favor of a chief sexual period in the year in man, with secondary and even tertiary climaxes, in March, August, and December. He finds that in some families, for several generations, birthdays tend to fall in the same months, but his paper is, on the whole, inconclusive.

Some years ago, Prof. J. B. Haycraft argued, on the basis of data furnished by Scotland, that the conception-rate corresponds to the temperature-curve (Haycraft, "Physiological Results of Temperature Variation, Transactions of the Royal Society of Edinburgh*, vol. xxix, 1880). "Temperature," he concluded, "is the main factor regulating the variations in the number of conceptions which occur during the year. It increases their number with its elevation, and this on an average of 0.5 per cent. for an elevation of 1° F." Whether or not this theory may fit the facts as regards Scotland, it is certainly altogether untenable when we take a broader view of the phenomena.

Recently Dr. Paul Gaedeken of Copenhagen has argued in a detailed statistical study ("La Réaction de l'Organisme sous l'Influence Physico-Chimiques des Agents Météorologiques," *Archives d'Anthropologie*

Criminelle, Feb., 1909) that the conception-rate, as well as the periodicity of suicide and allied phenomena, is due to the action of the chemical rays on the unpigmented skin in early spring, this action being physiologically similar to that of alcohol. He seeks thus to account for the marked and early occurrence of such periodic phenomena in Greenland and other northern countries where there is much chemical action (owing to the clear air) in early spring, but little heat. This explanation would not cover an autumnal climax, the existence of which Gaedeken denies.

In order to obtain a fairly typical conception-curve for Europe, and to allow the variations of local habit and custom to some extent to annihilate each other, I have summated the figures given by Mayr for about a quarter of a million births in Germany, France, and Italy, obtaining a curve (Chart 2) of the conception-rate which may be said roughly to be that of Europe generally. If we begin at September as the lowest point, we find an autumn rise culminating in the lesser maximum of Christmas, followed by a minor depression in January and February. Then comes the great spring rise, culminating in May, and followed after June by a rapid descent to the minimum.

In Canada (see e.g., Report of the Registrar General of the Province of Ontario for 1904), the maximum and minimum of conceptions alike fall later than in Europe; the months of maximum conception are June, July, and August; of minimum conception, January, February, and March. June is the favorite month for marriage.

It would be of some interest to know the conception-curve for the well-to-do classes, who are largely free from the industrial and social influences which evidently, to a great extent, control the conception-rate. It seems probable that the seasonal influence would here be specially well shown. The only attempt I have made in this direction is to examine a well-filled birthday-book. The entries show a very high and equally maintained maximum of conceptions throughout April, May and June, followed by a marked minimum during the next three months, and an autumn rise very strongly marked, in November. There is no December rise. As will be seen, there is here a fairly exact resemblance to the yearly ebolic curve of people of the same class. The inquiry needs, however, to be extended to a very much larger number of cases.

1 G. Mayr, Die Gesetzmässigkeit im Gesellschaftsleben, 1877, p. 240.
Mr. John Douglass Brown, of Philadelphia, has kindly prepared and sent me, since the above was written, a series of curves showing the annual periodicity of births among the educated classes in the State of Pennsylvania, using the statistics as to 4,066 births contained in the Biographical Catalogue of Matriculates of the College of the University of Pennsylvania. Mr. Brown prepared four curves: the first, covering the earliest period, 1757-1850; the second, the period 1860-1870; the third, 1877-1883; while the fourth presented the summated results for the whole period. (The dates named are those of the entry to classes, and not of actual occurrence of birth.) A very definite and well-marked curve is shown, and the average number of births (not conceptions) per day, for the whole period, is as follows:—

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There is thus a well-marked minimum of conceptions (a depression appearing here in each of the three periods, separately) about the month of July. (In the second period, however, which contains the smallest number of births, the minimum occurs in September.) From that low minimum there is steady and unbroken rise up to the chief maximum in November. (In the first period, however, the maximum is delayed till January, and in the second period it is somewhat diffused.) There is a tendency to a minor maximum in February, specially well marked in the third and most important period, and in the first period delayed until March.

A very curious and perhaps not accidental coincidence might be briefly pointed out before we leave this part of the subject. It is found by taking 3000 cases of children dying under one year that, among the general population, children born in February and September (and therefore conceived in May and December) appear to possess the greatest vitality, and those born in June, and, therefore, conceived in September, the least vitality. As we have seen, May and December are precisely the periods

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1 Edward Smith (Health and Disease), who attributes this to the lessened vitality of offspring at that season. Beukemann also states that children born in September have most vitality.

2 Westermanck has even suggested that the December maximum of conceptions may be due to better chance of survival for September offspring (Human Marriage, Chapter II). It may be noted that though the maximum of conceptions is in May, relatively the smallest proportion of boys is conceived at that time. (Rauber, Der Uberschuss an Knabengeburten, p. 39.)
when conceptions in Europe generally are at a maximum, and September is precisely the period when they are at a minimum, so that, if this coincidence is not accidental, the strongest children are conceived when there is the strongest tendency to procreate, and the feeblest children when that tendency is feeblest.

Nelson, in his study of dreams and their relation to seasonal ebolic manifestations, does not present any yearly ebolic curve, as the two years and a half over which his observations extend scarcely supply a sufficient basis. On examining his figures, however, I find there is a certain amount of evidence of a yearly rhythm. There are spring and autumn climaxes throughout (in February and in November); there is no December rise. During one year there is a marked minimum from May to September, though it is but slightly traceable in the succeeding year. These figures are too uncertain to prove anything, but, as far as they go, they are in fair agreement with the much more extensive record, that of W. K. (ante p. 113), which I have already made use of in discussing the question of a monthly rhythm. This record, covering nearly twelve years, shows a general tendency, when the year is divided into four periods (November-January, February-April, May-July, August-October) and the results summated, to rise steadily throughout, from the minimum in the winter period to the maximum in the autumn period. This steady upward progress is not seen in each year taken separately. In three years there is a fall in passing from the November-January to the February-April quarter (always followed by a rise in the subsequent quarter); in three cases there is a fall in passing from the second to the third quarter (again always followed by a rise in the following quarter), and in two successive years there is a fall in passing from the third to the fourth quarter. If, however, beginning at the second year, we summate the results for each year with those for all previous years, a steady rise from season to season is seen throughout. If we analyze the data according to the months of the year, still more precise and interesting results (as shown in the curve, Chart 3) are obtained; two maximum points are seen, one in spring (March), one in autumn (October, or, rather, August-
October), and each of these maximum points is followed by a
steep and sudden descent to the minimum points in April and in
December. If we compare this result with Perry-Coste's, also
extending over a long series of years, we find a marked simi-
larity. In both alike there are spring and autumn maxima, in both
the autumn maximum is the highest, and in both also there is an
intervening fall. In both cases, again, the maxima are followed
by steep descents, but while in both the spring maximum occurs
in March, in Perry-Coste's case the second maximum, though of
precisely similar shape, occurs earlier, in June-September instead
of August-October. In Perry-Coste's case, also, there is an
apparently abnormal tendency, only shown in the more recent
years of the record, to an additional maximum in January. The
records certainly show far more points of agreement than of dis-
crepancy, and by their harmony, as well with each other as with
themselves, when the years are taken separately, certainly go
far to prove that there is a very marked annual rhythm in the
phenomena of seminal emissions during sleep, or, as Nelson has
termed it, the ebollic curve. We see, also, that the great yearly
organic climax of sexual effervescence corresponds with the period
following harvest, which, throughout the primitive world, has
been a season of sexual erethism and orgy; though those customs
have died out of our waking lives, they are still imprinted on our
nervous texture, and become manifest during sleep.

The fresh records that have reached me since the first edition
of this book was published show well-marked annual curves, though
each curve always has some slight personal peculiarities of its own.
The most interesting and significant is that of E. M. (see ante p. 116),
covering four years. It is indicated by the following monthly frequen-
cies, summated for the four years:—

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E. M. lives in India. April, May, and June, are hot months, but not
unhealthy, and during this season, moreover, he lives in the hills, under
favorable conditions, getting plenty of outdoor exercise. July, August,
and September, are nearly as hot, but much damper, and more trying;
during these months, E. M. is living in the city, and his work is then,
also, more exacting than at other times, September is the worst month of all; he has a short holiday at the end of it. During December, January, and February, the climate is very fine, and E. M.’s work is easier. It will be seen that his ebolic curve corresponds to his circumstances and environment, although until he analyzed the record he had no idea that any such relationship existed. Unfavorable climatic conditions and hard work, favorable conditions and lighter work, happen to coincide in his life, and the former depress the frequency of seminal emissions; the latter increase their frequency. At the same time, the curve is not out of harmony with the northern curves. There is what corresponds to a late spring (April) climax, and another still higher, late autumn (December) climax. A very interesting point is the general resemblance of the ebolic curves to the Indian conception-curves as set forth by Hill (ante p. 140). The conception-curve is at its lowest point in September, and at its highest point in December-January, and this ebolic curve follows it, except that both the minimum and the maximum are reached a little earlier. When compared with the English annual ebolic curves (W. K. and Perry-Coste), both spring and autumn maxima fall rather later, but all agree in representing the autumn rise as the chief climax.

The annual curve of A. N. (ante p. 117), who lives in Indiana, U. S. A., also covers four years. It presents the usual spring (May-June, in this case) and autumn (September-October) climaxes. The exact monthly results, summated for the four years, are given below; in order to allow for the irregular lengths of the months, I have reduced them to daily averages, for convenience treating the four years as one year:

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In his book on Adolescence, Stanley Hall refers to three ebolic records in his possession, all made by men who were doctors of philosophy, and all considering themselves normal. The best of these records made by “a virtuous, active and able man,” covered nearly eight years. Stanley Hall thus summarizes the records, which are not presented in detail: “The best of these records averages about three and a half such experiences per month, the most frequent being 5.14 for July, and the least frequent 2.28, for September, for all the years taken together. There appears also a slight rise in April, and another in November, with a fall in December.” The frequency varies in the different individuals. There was no tendency to a monthly cycle. In the best case, the minimum number for the year was thirty-seven, and the maximum, fifty. Fifty-nine per cent. of all were at an interval of a week or less;
forty per cent. at an interval of from one to four days; thirty-four per cent. at an interval of from eight to seventeen days, the longest being forty-two days. Poor condition, overwork, and undersleep, led to infrequency. Early morning was the most common time. Normally there was a sense of distinct relief, but in low conditions, or with over-frequency, depression. (G. S. Hall, Adolescence, vol. i, p. 453.) I may add that an anonymous article on "Nocturnal Emissions" (American Journal of Psychology, Jan., 1904) is evidently a fuller presentation of the first of Stanley Hall's three cases. It is the history of a healthy, unmarried, chaste man, who kept a record of his nocturnal emissions (and their accompanying dreams) from the age of thirty to thirty-eight. In what American State he lived is not mentioned. He was ignorant of the existence of any previous records. The yearly average was 37 to 50, remaining fairly constant; the monthly average was 3.43. I reproduce the total results summated for the months, separately, and I have worked out the daily average for each month, for convenience counting the summated eight years as one year:—

27 27 27 31 29 28 36 25 18 27 30 24
.87 .94 .87 1.03 .93 .93 1.16 .81 .60 .87 1.00 .77

Here, as in all the other curves we have been able to consider, we may see the usual two points of climax in spring and in autumn; the major climax covers April, May, June, and July, the minor autumnal climax is confined to November. In the light of the evidence which has thus accumulated, we may conclude that the existence of an annual ebolic curve, with its spring and autumn climaxes, as described in the first edition of this book, is now definitely established.

If we are to believe, as these records tend to show, that the nocturnal and involuntary voice of the sexual impulse usually speaks at least as loudly in autumn as in spring, we are confronted by a certain divergence of the sleeping sexual impulse from the waking sexual instinct, as witnessed by the conception-curve, and also, it may be added, by the general voice of tradition, and, indeed, of individual feeling, which concur, on the whole, in placing the chief epoch of sexual activity in spring and early summer, more especially as regards women.\footnote{Krieger found that the great majority of German women investigated by him menstruated for the first time in September, October, or November. In America, Bowditch states that the first menstruation of country girls more often occurs in spring than at any other season.} It is not impossible to reconcile the contradiction, assuming it to be real, but I will
refrain here from suggesting the various explanations which arise. We need a broader basis of facts.

There are many facts to show that early spring and, to a certain extent, autumn are periods of visible excitement, mainly sexual in character. We have already seen that among the Eskimo menstruation and sexual desire occur chiefly in spring, but cases are known of healthy women in temperate climes who only menstruate twice a year, and in such cases the menstrual epochs appear to be usually in spring and autumn. Such, at all events, was the case in a girl of 20, whose history has been recorded by Dr. Mary Wenck, of Philadelphia. She menstruated first when 15 years old. Six months later the flow again appeared for the second time, and lasted three weeks, without cessation. Since then, for five years, she menstruated during March and September only, each time for three weeks, the flow being profuse, but not exhaustingly so, without pain or systemic disturbance. Examination revealed perfectly normal uterus and ovarian organs. Treatment, accompanied by sitz-baths during the time of month the flow should appear, accomplished nothing. The semi-annual flow continued and the girl seemed in excellent health.

It is a remarkable fact that, as noted by Dr. Hamilton Wey at Elmira, sexual outbursts among prisoners appear to occur at about March and October. "Beginning with the middle of February," writes Dr. Wey in a private letter, "and continuing for about two months, is a season of ascending sexual wave; also the latter half of September and the month of October. We are now (March 30th) in the midst of a wave."

According to Chinese medicine, it is the spring which awakens human passions. In early Greek tradition, spring and summer were noted as the time of greatest wantonness. "In the season of toilsome summer," says Hesiod (Works and Days, xi, 560-90), "the goats are fattest, wine is best, women most wanton, and men weakest." It was so, also, in the experience of the Romans. Pliny (Natural History, Bk. XII, Ch. XLIII) states that when the asparagus blooms and the cicada sings loudest, is the season when women are most amorous, but

1 Women's Medical Journal, 1894.
men least inclined to pleasure. Paulus Ægineta said that hysteria specially abounds during spring and autumn in lascivious girls and sterile women, while more recent observers have believed that hysteria is particularly difficult to treat in autumn. Oribasius (Synopsis, lib. i, cap. 6) quotes from Rufus to the effect that sexual feeling is most strong in spring, and least so in summer. Rabelais said that it was in March that the sexual impulse is strongest, referring this to the early warmth of spring. and that August is the month least favorable to sexual activity (Pantagruel, liv. v, Ch. XXIX). Nipho, in his book on love dedicated to Joan of Aragon, discussed the reasons why "women are more lustful and amorous in summer, and men in winter." Venette, in his Génératton de l'homme, harmonized somewhat conflicting statements with the observation that spring is the season of love for both men and women; in summer, women are more amorous than men; in autumn, men revive to some extent, but are still oppressed by the heat, which, sexually, has a less depressing effect on women. There is probably a real element of truth in this view, and both extremes of heat and cold may be regarded as unfavorable to masculine virility. It is highly probable that the well-recognized tendency of piles to become troublesome in spring and in autumn, is due to increased sexual activity. Piles are favored by congestion, and sexual excitement is the most powerful cause of sudden congestion in the genito-anal region. Erasmus Darwin called attention to the tendency of piles to recur about the equinoxes (Zoönomia, Section XXXVI), and since his days Gant, Bonavia, and Cullimore have correlated this periodicity with sexual activity.

Laycock, quoting the opinions of some earlier authorities as to the prevalence of sexual feeling in spring, stated that that popular opinion "appears to be founded on fact" (Nervous Diseases of Women, p. 69). I find that many people, and perhaps especially women, confirm from their own experience, the statement that sexual feeling is strongest in spring and summer. Wichmann states that pollutions are most common in spring (being perhaps the first to make that statement), and also nymphomania. (In the eighteenth century, Schurig recorded a case of extreme and life-long sexual desire in a woman whose salacity was always at its height towards the festival of St. John, Gynécologia, p. 16.) A correspondent in the Argentine Republic writes to me that "on big estancias, where we have a good many shepherds, nearly always married, or, rather, I should say, living with some woman (for our standard of morality is not very high in these parts), we always look out for trouble in springtime, as it is a very common thing at this season for wives to leave their husbands and go and live with some other man." A corresponding tendency has been noted even among children. Thus, Sanford Bell ("The Emotion of Love Between the Sexes," American Journal Psychology, July, 1902) remarks: "The season of the year
seems to have its effect upon the intensity of the emotion of sex-love among children. One teacher, from Texas, who furnished me with seventy-six cases, said that he had noticed that in the matter of love children seemed ‘fairly to break out in the springtime.’ Many of the others who reported, incidentally mentioned the love affairs as beginning in the spring. This also agrees with my own observations.”

Crichton-Browne remarks that children in springtime exhibit restlessness, excitability, perversity, and indisposition to exertion that are not displayed at other times. This condition, sometimes known as “spring fever,” has been studied in over a hundred cases, both children and adults, by Kline. The majority of these report a feeling of tiredness, languor, lassitude, sometimes restlessness, sometimes drowsiness. There is often a feeling of suffocation, and a longing for Nature and fresh air and daydreams, while work seems distasteful and unsatisfactory. Change is felt to be necessary at all costs, and sometimes there is a desire to begin some new plan of life.¹ In both sexes there is frequently a wave of sexual emotion, a longing for love. Kline also found by examination of a very large number of cases that between the ages of four and seventeen it is in spring that running away from home most often occurs. He suggests that this whole group of phenomena may be due to the shifting of the metabolic processes from the ordinary grooves into reproductive channels, and seeks to bring it into connection with the migrations of animals for reproductive purposes.²

It has long been known that the occurrence of insanity follows an annual curve,³ and though our knowledge of this curve, being founded on the date of admissions to asylums, cannot be said to be quite precise, it fairly corresponds to the outbreaks of

¹ It is, perhaps, worth while noting that the wisdom of the mediæval Church found an outlet for this “spring fever” in pilgrimages to remote shrines. As Chaucer wrote, in the Canterbury Tales:—

“Whanè that Aprille with his showers sote
The droughts of March hath pierced to the root,
Thañ longen folk to gon on pilgrimage,s,
And palmeres for to seeken strangè stronds.”


³ Mania comes to a crisis in spring, said the old physician, Aretæus (Bk. I, Ch. V).
acute insanity. The curve presented in Chart 4 shows the admissions to the London County Council Lunatic Asylums during the years 1893 to 1897 inclusive; I have arranged it in two-month periods, to neutralize unimportant oscillations. In order to show that this curve is not due to local or accidental circumstances, we may turn to France and take a special and chronic form of mental disease: Garnier, in his *Folie à Paris*, presents an almost exactly similar curve of the admissions of cases of general paralysis to the Infirmerie Spéciale at Paris during the years 1886-88 (Chart 5). Both curves alike show a major climax in spring and a minor climax in autumn.

Crime in general in temperate climates tends to reach its maximum at the beginning of the hot season, usually in June. Thus, in Belgium, the minimum is in February; the maximum in June, thence gradually diminishing (Lentz, *Bulletin Société Médecine Mentale Belgique*, March, 1901). In France, Lacassagne has summated the data extending over more than 40 years, and finds that for all crimes June is the maximum month, the minimum being reached in November. He also gives the figures for each class of crime separately, and every crime is found to have its own yearly curve. Poisonings show a chief maximum in May, with slow fall and a minor climax in December; assassinations have a February and a November climax. Parricides culminate in May-June, and in October (Lacassagne's tables are given by Laurent, *Les Habitudes des Prisons de Paris*, Ch. I).

Notwithstanding the general tendency for crime to reach its maximum in the first hot month (a tendency not necessarily due to the direct influence of heat), we also find, when we consider the statistics of crime generally (including sexual crime), that there is another tendency for minor climaxes in spring and autumn. Thus, in Italy, Penta, taking the statistics of nearly four thousand crimes (murder, highway robbery, and sexual offences), found the maximum in the first summer months, but there were also minor climaxes in spring and in August and September (Penta, *Rivista Mensile di Psichiatria*, 1899). In nearly all Europe (as is shown by a diagram given by Lombroso and Laschi, at the end of the first volume of *Le Crime Politique*), while the chief climaxes occur about July, there is, in most countries, a distinct tendency to spring (usually about March) and autumn (September and November) climaxes, though they rarely rise as high as the July climax.

If we consider the separate periodicity of sexual offences, we find that they follow the rule for crimes generally, and usually show a
chief maximum in early summer. Aschaffenburg finds that the annual periodicity of the sexual impulse appears more strongly marked the more abnormal its manifestations, which he places in the following order of increasing periodicity: conceptions in marriage, conceptions out of marriage, offences against decency, rape, assaults on children (Centralblatt für Nervenheilkunde, January, 1903). In France, rapes and offences against modesty are most numerous in May, June, and July, as Villermé, Lacassagne, and others have shown. Villermé, investigating 1,000 such cases, found a gradual ascent in frequency (only slightly broken in March) to a maximum in June (oscillating between May and July, when the years are considered separately), and then a gradual descent to a minimum in December. Leblanc gives, for the 159 cases he had investigated, a table showing a small February-March climax, and a large June-August maximum, the minimum being reached in November-January. (Leblanc, Attentats aux Mœurs, 1866, p. 16.) In Germany, Aschaffenburg finds that sexual offences begin to increase in March and April, reach a maximum in June or July, and fall to a minimum in winter (Monatschrift für Psychiatrie, 1903, Heft 2).

In Italy, Penta shows that sexual offences reach a minor climax in May (corresponding, in his experience, with the maximum for crimes generally, as well as with the maximum for conceptions), and a more marked climax in August-September (Penta, I Pervertimenti Sessuali, 1893, p. 115; id. Rivista Mensile di Psychiatria, 1899).

Corre, in his Crime en Pays Créro, presents charts of the seasonal distribution of crime in Guadeloupe, with relation to temperature, which show that while, in a mild temperature like that of France and England, crime attains its maximum in the hot season, it is not so in a more tropical climate; in July, when in Guadeloupe the heat attains its maximum degree, crime of all kinds falls suddenly to a very low minimum. Even in the United States, where the summer heat is often excessive, it tends to produce a diminution of crime.

Dexter, in an elaborate study of the relationship of conduct to the weather, shows that in the United States assaults present the maximum of frequency in April and October, with a decrease during the summer and the winter. "The unusual and interesting fact demonstrated here with a certainty that cannot be doubted is," he concludes, "that the unseasonably hot days of spring and autumn are the pugnacious ones, even though the actual heat be much less than for summer. We might infer from this that conditions of heat, up to a certain extent, are vitalizing, while, at the same time, irritating, but above that limit, heat is so devitalizing in its effects as to leave hardly energy enough to carry on a fight." (E. G. Dexter, Conduct and the Weather, 1899, pp. 63 et seq.)
It is not impossible that the phenomena of seasonal periodicity in crimes may possess a real significance in relation to sexual periodicity. If, as is possible, the occurrence of spring and autumn climaxes of criminal activity is due less to any special exciting causes at these seasons than to the depressing influences of heat and cold in summer and winter, it may appear reasonable to ask whether the spring and autumn climaxes of sexual activity are not really also largely due to a like depressing influence of extreme temperatures at the other two seasons.

Not only is there periodicity in criminal conduct, but even within the normal range of good and bad conduct seasonal periodicity may still be traced. In his *Physical and Industrial Training of Criminals*, H. D. Wey gives charts of the conduct of seven prisoners during several years, as shown by the marks received. These charts show that there is a very decided tendency to good behavior during summer and winter, while in spring (February, March, and April) and in autumn (August, September and October) there are very marked falls to bad conduct, each individual tending to adhere to a conduct-curve of his own. Wey does not himself appear to have noticed this seasonal periodicity. Marro, however, has investigated this question in Turin on a large scale and reaches results not very dissimilar from those shown by Wey’s figures in New York. He noted the months in which over 4,000 punishments were inflicted on prisoners for assaults, insults, threatening language, etc., and shows the annual curve in Tavola VI of his *Caratteri dei Delinquenti*. There is a marked and isolated climax in May; a still more sudden rise leads to the chief maximum of punishment in August; and from the minimum in October there is rapid ascent during the two following months to a climax much inferior to that of May.

The seasonal periodicity of bad conduct in prisons is of interest as showing that we cannot account for psychic periodicity by invoking exclusively social causes. This theory of psychic periodicity has been seriously put forward, but has been investigated and dismissed, so far as crime in Holland is concerned, by J. R. B. de Roos, in the Transactions of the sixth Congress of Criminal Anthropology, at Turin, in 1906 (*Archivio di Psichiatria* fasc. 3, 1906).
The general statistics of suicides in Continental Europe show a very regular and unbroken curve, attaining a maximum in June and a minimum in December, the curve rising steadily through the first six months, sinking steadily through the last six months, but always reaching a somewhat greater height in May than in July.\(^1\) Morselli shows that in various European countries there is always a rise in spring and in autumn (October or November).\(^2\) Morselli attributes these spring and autumn rises to the influence of the strain of the early heat and the early cold.\(^3\) In England, also, if we take a very large number of statistics, for instance, the figures for London during the twenty years between 1865 and 1884, as given by Ogle (in a paper read before the Statistical Society in 1886), we find that, although the general curve has the same maximum and minimum points, it is interrupted by a break on each side of the maximum, and these two breaks occur precisely at about March and October.\(^4\) This is shown in the curve in Chart 6, which presents the daily average for the different months.

The growth of children follows an annual rhythm. Wahl, the director of an educational establishment for homeless girls in Denmark, who investigated this question, found that the increase of weight for all the ages investigated was constantly about 33 per cent. greater in the summer half-year than in the winter half-year. It was noteworthy that even the children who had

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1 This is, at all events, the case in France, Prussia, and Italy. See, for instance, Durkheim's discussion of the cosmic factors of suicide, *Le Suicide*, 1897, Chapter III. In Spain, as Bernaldo de Quirós shows (*Criminologia*, p. 69), there is a slight irregular rise in December, but otherwise the curve is perfectly regular, with maximum in June, and minimum in January.

2 This holds good of a south European country, taken separately. A chart of the annual incidence of suicide by hanging, in Roumania, presented by Minovici (*Archives d'Anthropologie Criminelle*, 1905, p. 587), shows climaxes of equal height in May and September.


4 Ogle himself was inclined to think that these breaks were accidental, being unaware of the allied phenomena with which they may be brought into line. It is true that (as Gaedeken objects to me) the autumnal break is very slight, but it is probably real when we are dealing with so large a mass of data.
not reached school-age, and therefore could not be influenced by school-life, showed a similar, though slighter, difference in the same direction. It is, however, Malling-Hansen, the director of an institution for deaf-mutes in Copenhagen, who has most thoroughly investigated this matter over a great many years. He finds that there are three periods of growth throughout the year, marked off in a fairly sharp manner, and that during each of these periods the growth in weight and height shows constant characteristics. From about the end of November up to about the end of March is a period when growth, both in height and weight, proceeds at a medium rate, reaching neither a maximum nor a minimum; increase in weight is slight, the increase in height, although trifling, preponderating. After this follows a period during which the children show a marked increase in height, while increase in weight is reduced to a minimum. The children constantly lose in weight during this period of growth in height almost as much as they gain in the preceding period. This period lasts from March and April to July and August. Then follows the third period, which continues until November and December. During this period increase in height is very slight, being at its early minimum; increase in weight, on the other hand, at the beginning of the period (in September and October), is rapid and to the middle of December very considerable, daily increase in weight being three times as great as during the winter months. Thus it may be said that the spring sexual climax corresponds, roughly, with growth in height and arrest of growth in weight, while the autumn climax corresponds roughly with a period of growth in weight and arrest of growth in height. Malling-Hansen found that slight variations in the growth of the children were often dependent on changes in temperature, in such a way that a rise of temperature, even lasting for only a few days, caused an increase of growth, and a fall of temperature a decrease in growth. At Halle, Schmid-Monnard found that nearly all growth in weight took place in the second half of the year, and that the holidays made little difference. In America, Peckham has shown that increase of growth is chiefly from the 1st of May
to the 1st of September. Among young girls in St. Petersburg, Jenjko found that increase in weight takes place in summer. Goepel found that increase in height takes place mostly during the first eight months of the year, reaching a maximum in August, declining during the autumn and winter, in February being nil, while in March there is sometimes loss in weight even in healthy children.

In the course of a study as to the consumption of bread in Normal schools during each month of the year, as illustrating the relationship between intellectual work and nutrition, Binet presents a number of curves which bring out results to which he makes no allusion, as they are outside his own investigation. Almost without exception, these curves show that there is an increase in the consumption of bread in spring and in autumn, the spring rise being in February, March, and April; the autumn rise in October or November. There are, however, certain fallacies in dealing with institutions like Normal schools, where the conditions are not perfectly regular throughout the year, owing to vacations, etc. It is, therefore, instructive to find that under the monotonous conditions of prison-life precisely the same spring and autumn rises are found. Binet takes the consumption of bread in the women's prison at Clermont, where some four hundred prisoners, chiefly between the ages of thirty and forty, are confined, and he presents two curves for the years 1895 and 1896. The curves for these two years show certain marked disagreements with each other, but both unite in presenting a distinct rise in April, preceded and followed by a fall, and both present a still more marked autumn rise, in one case in September and November, in the other case in October.

Some years ago, Sir J. Crichton-Browne stated that a manifestation of the sexual stimulus of spring is to be found in the large number of novels read during the month of March ("Address in Psychology" at the annual meeting of the British Medical Association, Leeds, 1889; Pedagogical Seminary, June, 1891, p. 298. For a very full summary and bibliography of investigations regarding growth, see F. Burk, "Growth of Children in Height and Weight," American Journal of Psychology, April, 1898. L'Année Psychologique, 1898.
The Lancet, August 14, 1889). The statement was supported by figures furnished by lending libraries, and has since been widely copied. It would certainly be interesting if we could so simply show the connection between love and season, by proving that when the birds began to sing their notes, the young person's fancy naturally turns to brood over the pictures of mating in novels. I accordingly applied to Mr. Capel Shaw, Chief Librarian of the Birmingham Free Libraries (specially referred to by Sir J. Crichton-Browne), who furnished me with the Reports for 1896 and 1897-98 (this latter report is carried on to the end of March, 1898).

The readers who use the Birmingham Free Lending Libraries are about 30,000 in number; they consist very largely of young people between the ages of 14 and 25; somewhat less than half are women. Certainly we seem to have here a good field for the determination of this question. The monthly figures for each of the ten Birmingham libraries are given separately, and it is clear at a glance that without exception the maximum number of readers of prose-fiction at all the libraries during 1897-98 is found in the month of March. (I have chiefly taken into consideration the figures for 1897-98; the figures for 1896 are somewhat abnormal and irregular, probably owing to a decrease in readers, attributed to increased activity in trade, and partly to a disturbing influence caused by the opening of a large new library in the course of the year, suddenly increasing the number of readers, and drafting off borrowers from some of the other libraries.) Not only so, but there is a second, or autumnal climax, almost equaling the spring climax, and occurring with equal certainty, appearing during 1897-98 either in October or November, and during 1896, constantly in October. Thus, the periodicity of the rate of consumption of prose-fiction corresponds with the periodicity which is found to occur in the conception-rate and in sexual ebolic manifestations.

It is necessary, however, to examine somewhat more closely the tables presented in these reports, and to compare the rate of the consumption of novels with that of other classes of literature. In the first place, if, instead of merely considering the consumption of novels per month, we make allowance for the varying length of the months, and consider the average daily consumption per month, the supremacy of March at once vanishes. February is really the month during which most novels were read during the first quarter of 1898, except at two libraries, where February and March are equal. The result is similar if we ascertain the daily averages for the first quarter in 1897, while, in 1896 (which, however, as I have already remarked, is a rather abnormal year), the daily average for March in many of the libraries falls below that for January, as well as for February. Again, when we turn to the other classes of books, we find that this predominance which February
possesses, and to some extent shares with March and January, by no means exclusively applies to novels. It is not only shared by both music and poetry,—which would fit in well with the assumption of a sexual nisius,—but the department of "history, biography, voyages, and travels" shares it also with considerable regularity; so, also, does that of "arts, sciences, and natural history," and it is quite well marked in "theology, moral philosophy, etc.," and in "juvenile literature." We even have to admit that the promptings of the sexual instinct bring an increased body of visitors to the reference library (where there are no novels), for here, also, both the spring and autumnal climaxes are quite distinct. Certainly this theory carries us a little too far.

The main factor in producing this very marked annual periodicity seems to me to be wholly unconnected with the sexual impulse. The winter half of the year (from the beginning of October to the end of March), when outdoor life has lost its attractions, and much time must be spent in the house, is naturally the season for reading. But during the two central months of winter, December and January, the attraction of reading meets with a powerful counter-attraction in the excitement produced by the approach of Christmas, and the increased activity of social life which accompanies and for several weeks follows Christmas. In this way the other four winter months—October and November at the autumnal end, and February and March at the spring end—must inevitably present the two chief reading climaxes of the year; and so the reports of lending libraries present us with figures which show a striking, but fallacious, resemblance to the curves which are probably produced by more organic causes.

I am far from wishing to deny that the impulse which draws young men and women to imaginative literature is unconnected with the obscure promptings of the sexual instinct. But, until the disturbing influence I have just pointed out is eliminated, I see no evidence here for any true seasonal periodicity. Possibly in prisons—the value of which, as laboratories of experimental psychology we have scarcely yet begun to realize—more reliable evidence might be obtained; and those French and other prisons where novels are freely allowed to the prisoners might yield evidence as regards the consumption of fiction as instructive as that yielded at Clermont concerning the consumption of bread.

Certain diseases show a very regular annual curve. This is notably the case with scarlet fever. Caiger found in a London fever hospital a marked seasonal prevalence: there was a minor climax in May (repeated in July), and a great autumnal climax in October, falling to a minimum in December and January.
This curve corresponds closely to that usually observed in London. It is not peculiar to London, or to urban districts, for in rural districts we find nearly the same spring minor maximum and major autumnal maximum. In Russia it is precisely the same. Many other epidemic diseases show very similar curves.

An annual curve may be found in the expulsive force of the bladder as measured by the distance to which the urinary stream can be projected. This curve, as ascertained for one case, is interesting on account of the close relationship between sexual and vesical activity. After a minimum point in autumn there is a rise through the early part of the year to a height maintained through spring and summer, and reaching its maximum in August. This may be said to correspond with the general tendency found in some cases of nocturnal seminal emissions from a winter minimum to an autumn maximum.

There is an annual curve in voluntary muscle strength. Thus in Antwerp, where the scientific study of children is systematically carried out by a Pedological Bureau, Schuytten found that, measured by the dynamometer, both at the ages of 8 and 9, both boys and girls showed a gradual increase of strength from October to January, a fall from January to March and a rise to June or July. March was the weakest month, June and July the strongest.

Schuytten also found an annual curve for mental ability, as tested by power of attention, which for much of the year corresponded to the curve of muscular strength, being high during the cold winter months. Lobsien, at Kiel, seeking to test Schuytten's results and adopting a different method so as to gauge memory as well as attention, came to conclusions which confirmed those of Schuytten. He found a very marked increase of ability in December and January, with a fall in April; April and May were

1 *Lancet*, June 6, 1891. Edward Smith had pointed out many years earlier that scarlet fever is most fatal in periods of increasing vitality.


3 See, e.g., summary in *Internationales Centrallatt für Anthropologie*, 1902, Heft 4, p. 207.
THE PHENOMENA OF SEXUAL PERIODICITY.

the minimum months, while July and October also stood low.¹ The inquiries of Schuyten and Lobsien thus seem to indicate that the voluntary aptitudes of muscular and mental force in children reach their maximum at a time of the year when most of the more or less involuntary activities we have been considering show a minimum of energy. If this conclusion should be confirmed by more extended investigations, it would scarcely be matter for surprise and would involve no true contradiction. It would, indeed, be natural to suppose that the voluntary and regulated activities of the nervous system should work most efficiently at those periods when they are least exposed to organic and emotional disturbance.

So persistent a disturbing element in spring and autumn suggests that some physiological conditions underlie it, and that there is a real metabolic disturbance at these times of the year. So few continuous observations have yet been made on the metabolic processes of the body that it is not easy to verify such a surmise with absolute precision. Edward Smith's investigations, so far as they go, support it, and Perry-Costé's long-continued observations of pulse-frequency seem to show with fair regularity a maximum in early spring and another maximum in late autumn.² I may also note that Haig, who has devoted many years of observations to the phenomena of uric-acid excretion, finds that uric acid tends to be highest in the spring months, (March, April, May) and lowest at the first onset of cold in October.³

Thus, while the sexual climaxes of spring and autumn are rooted in animal procreative cycles which in man have found expression in primitive festivals—these, again, perhaps, strengthening and developing the sexual rhythm—they yet have a wider significance. They constitute one among many manifestations of spring and autumn physiological disturbance corresponding with

¹ Summarized in Zeitschrift für Psychologie der Sinnesorgane, 1903, p. 135.
² Camerer found that from September to November is the period of greatest metabolic activity.
fair precision to the vernal and autumnal equinoxes. They resemble those periods of atmospheric tension, of storm and wind, which accompany the spring and autumn phases in the earth's rhythm, and they may fairly be regarded as ultimately a physiological reaction to those cosmic influences.