Irwin (J. A.)

WITH AUTHOR'S COMPLIMENTS

THE

INFLUENCE OF SEA-VOYAGING

UPON THE

GENITO-URETINE FUNCTIONS

BY

J. A. IRWIN

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Member of the Royal College of Surgeons, Eng.; Licenciate in Midwifery of King and Queen's College of Physicians, and the Rotunda Hospital, Dublin; Fellow of the London Obstetrical Society; Member of the Dublin Obstetrical Society, etc.

FORMERLY

House-Surgeon, Royal Free Hospital, London; Assistant Medical Officer Salop and Montgomeryshire Counties Asylum; and Physician to the Manchester Southern Hospital for Women and Children

(*Read before the* NEW YORK COUNTY MEDICAL SOCIETY, *April* 27, 1885)

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THE INFLUENCE OF SEA-VOYAGING UPON THE GENITO-UTERINE FUNCTIONS.

The monograph which I have the honor of presenting to the Society is, in many respects, incomplete and defective. It has, however, a quality which alone would suffice to commend it to your indulgence. It labors in a field almost entirely unoccupied; and although it may scarce pass the gate, its way is free from the wearisome, often unconscious, repetition which mars so much of our now plethoric medical literature.

It has long been observed that serious disturbances of the genito-uterine functions are apt to occur both during and subsequent to a sea voyage; yet nothing definite is known upon the subject, and no effort has been made to investigate the cause, nature, or extent of these disturbances, or to ascertain the class of cases most liable to them.

This oversight is the more surprising when we consider the general interest and importance of the matter—the extent and increasing frequency of transatlantic travel; the necessarily large proportion of woman's existence which is subservient to what has been termed "the genital sphere," or the normal processes of menstruation, utero-gestation, parturition, and lactation; and, lastly, the amount

of intelligent study which has of late years been devoted to the special phenomena of female life.

When, six years ago, I temporarily retired from active practice in order to devote a period to travel "by sea and by land," I set myself the task of investigating this subject; and incidentally the other conditions of medical interest connected with sea-voyaging and tropical climates. During the three or four summer months of 1879, 1881, and 1882, I served as medical officer on crowded transatlantic steamers, and at other times I have made voyages either as surgeon in charge, or as a passenger, to India, Africa, Madeira, Brazil, Chili, and other distant places.

In fact my opportunities of observation have been considerable, embracing the medical care of not less than fifteen thousand persons at sea; but even this experience upon a subject so complex, and unguided by previous research, is manifestly insufficient whereon to formulate final conclusions. It has, however, led me to opinions, which, if confirmed by future investigation, will unquestionably prove of value to those engaged in the practice of gynecology or general medicine.

While on ship-board I formed a record of 104 pregnancies, 11 parturitions, 3 miscarriages, and 451 menstruations or missed periods occurring among women in whom the function was usually normal and regular. I have also, whenever possible, and always under circumstances of exceptional difficulty, watched and treated various forms of uterine and ovarian disease, while subject to the sea influences, and contrasted the results with those ordinarily obtained when dealing with similar conditions on land.

I shall first consider the effect of sea-voyaging upon the menstrual function; but before elaborating my statistics upon this part of our subject, and in order that their value may not be overrated, I am bound to explain the manner

of their collection. In view of the difficulty of obtaining direct information from any but the limited number of women, who from some cause had sought my professional service, I determined upon enlisting the assistance of the stewardess in charge of the female steerage passengers. On the day previous to disembarkation it was my custom to send her among the women to catechise those who seemed most intelligent and willing to give information. The results were recorded upon a paper of simple questions which had been prepared for the purpose; and in this way were obtained 288 of my total 451 menstrual observations. These, for obvious reasons, I keep apart from my own figures, at the same time I may say that I regard them as being fairly reliable. No effort was spared to insure this end. The inquiry was limited within the narrowest compass; and of ten voyages, during which it was conducted, only six returns have been retained; four similar ones have been discarded altogether, owing to some circumstance which led me to suspect their accuracy.

Of the 288 women included in these returns, all of whom were supposed to be non-pregnant and to have menstruated normally previous to the voyage, 21 passed the period while on board without menstruating; 43 menstruated before the period; and 224 menstruated at the proper period, of whom 23 complained of unwonted pain, and in a few instances, not accurately recorded, of increased or diminished flow; while 201 noticed absolutely nothing unusual which could be attributed to the voyage.

Turning now to my own 163 observations in women, also believed to be non-pregnant, the results are as follows: 13 passed the period on board without menstruating, of whom 11 experienced more or less molimen; 51 menstruated before the period; and 99 menstruated on board at the proper period, but of these 47 complained of unusual discomfort, accompanied in 37 instances with increased

and unusually prolonged flow, and in 2 with diminished discharge. Of the 13 who passed the period, 3 were still on board during the following one; of whom 1 menstruated almost normally at the second period, I believe as the result of treatment; 1 came under observation only at the second period, and was afterward lost sight of; while the third, a healthy married lady, had come on board on the second day of menstruation, and found the process both increased in quantity and prolonged in duration, but at the next period, and two subsequent ones after landing in India, experienced complete amenorrhœa.

Thus it will be seen that while of the 288 women questioned by the stewardess, 201 or 69.7 per cent. declared that they had noticed nothing unusual in their menstruation during the voyage; of the 163 who came under my direct observation, only 52, or 31.9 per cent. performed the function normally, as was usual on land.

This difference in results is easily explained. The former cases were taken at hap-hazard from among women travelling in the steerage, who were not especially complaining at the time questioned, and who were, as a rule, of the working classes, accustomed to active habits, of high muscular development, and least nervous susceptibility, in fact, the class who suffer least under ordinary circumstances. My table, on the other hand, was formed among women who were, with scarcely an exception, suffering in some way at the time I found opportunity to investigate this matter, and who were for the most part of a socially higher and more delicate class. The primary cause of their coming under observation I find noted as follows: sea-sickness, 118; menstrual aberrations or dysmenorrhœa, 22; and various or not recorded, 23. Again, it should be remembered how often unreliable are the first statements of even educated women regarding the type of their menstruation, and how difficult it sometimes proves even for

one accustomed to question closely upon these matters to obtain an accurate knowledge upon a first interview. As, however, the usual tendency under such circumstances is to represent past menstruations as not having taken place at all, or else having been nearer to the normal standard than they really were, I am inclined to believe that more skilled interrogation of the stewardess' cases would reduce the proportion of amenorrhœa, and also of those who reported nothing unusual in their sickness while on board.

Since resuming ordinary practice I have, of course, missed no opportunity of obtaining further information upon this subject, both from ladies who had crossed the ocean, and by inquiry among the surgeons in medical charge of the large steamers.

To enter in detail upon each of the interesting facts thus acquired would lead me beyond the scope of this paper. I will, however, mention a single case which is particularly instructive, and of the others, I may say generally that they tend in the same direction.

A lady resident in this city has kept a careful register of her menstruations, extending over a period of fourteen years, during twelve of which she has been a widow. With the exception of four periods, the only ones which occurred at sea, and another which might be otherwise accounted for, it shows perfect regularity—the constant interval between the appearances of the menses being twenty-seven days. In each of the four menstruations which happened on ship-board there was some departure from this normal standard.

Assuming that for the present, at least, sufficient evidence has been adduced to establish my first postulate—that disturbances of the menstrual function are of frequent occurrence at sea—I shall now essay the more difficult task of explaining the facts observed, and deducing from them principles applicable to practice.

So accurate is our knowledge of the main functions upon which depend the well-being of the body that it is seldom difficult to understand the *rationale* of whatever conditions are noticed to exercise an influence upon them. Unfortunately for the present inquiry, the physiology of menstruation is singularly obscure.

Theories there are without number, but when we seek even a primal cause of this important function, or a reason for its periodicity or varying degree, or when we endeavor to establish a defined relation between the various organs engaged in the succession of phenomena which constitute the process, or of these organs collectively to the nervous and circulatory systems, we are met with such bewildering difference of opinion that we are almost forced to gauge the reliability of our teachers by their reticence upon those elementary points of normal menstruation, a perfect knowledge of which seems indispensable whereon to speculate concerning extraneous influences.[1] This much at least is universally conceded: however widely varying may be the types of menstruation which experience proves to be consistent with the highest health, even in women of similar physique, constitution, and mode of life, any deviation from the established habit of each individual, which cannot be explained by natural causes, indicates an abnormal condition likely to react injuriously upon the general health. Hence the importance of investigating this mysterious power of the sea, and, I trust, a sufficient excuse for my adding yet another quota to the already superabundant menstrual hypotheses.

The special conditions of an ocean voyage which might be supposed to exercise an influence upon female habit, may be classed under three headings: *psychical*, depend-

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[1] "The very conception of disordered action implies a preconception of well-ordered action."—Herbert Spencer: Data of Ethics.

ent upon the novelty of the situation and the apprehension of danger; *aërial*, in some special quality of the sea atmosphere; and *motional*, as a direct result of the unaccustomed movement of the vessel.

There can be no question as to the effect of strong mental impressions upon the performance of menstruation. Duparque [1] declares that powerful emotions, such as joy, fear, or anger, induce spasmodic contractions of the os uteri; but whatever the pathology, it is certain that psychical impressions may abrogate uterine functions as easily as those of the stomach, intestines, bladder, or secretive glands.

It seems, therefore, a tenable supposition that mental influences occasionally play some part in the disturbances we are considering, especially in the cases, by no means frequent, of a sudden arrest of the flow in women who had embarked while actually menstruating. They cannot, however, be regarded as a principal cause, since women who suffer much at these times have not a particle of fear, and would thoroughly enjoy the sea-life but for its unpleasant power in this direction.

However acquired—whether through its chemical composition, hypersaturation, or barometric pressure—sea-air has some extraordinary hygienic potency, which has been recognized in every age of medicine, and been the subject of much speculation and many excentric theses. It held a distinguished rank among the great remedies of antiquity, and by early writers—Celsus,[2] Cœlius Aurelianus,[3] Oribasius,[4] Aretæi Cappadocis,[5] Ætius,[6] Avicenna,[7] Ram-

[1] Maladies de la Matrice, t. i., p. 6.
[2] Lib. ii., Cap. 15; Lib. iii., Cap. 23; Lib. iv., Cap. 4–5.
[3] Morb. Chron., Lib. i., Cap. i.; Lib. ii., Cap. 14.
[4] Medicin. Collect., Lib. iv., Cap. 23.
[5] De curat. morb. diut., De phthise.
[6] Tetrab. i., Serm. iii., Cap. 162.
[7] Lib. i., Sen. i., Doc. ii.

azini,[1] Forestus,[2] the Plinys,[3] and a host of copyists, it is credited as a panacea for all the ills to which flesh is heir. More recently by Boerhaave,[4] and for the first time in its special bearing upon the health of women by Russel,[5] it is accorded similarly unqualified praise. In our own time its value in many conditions of disease is by no means so assured, and among the few writers who touch upon its influence in connection with female complaints we find as wide difference of opinion as among those who with equal confidence recommend or discourage a voyage or a visit to the seaside, in the treatment of phthisis.

It is well known that irregularities of the menses are a common occurrence during a summer residence at the seaside. It is true that the same not unfrequently happens when the move is to the mountains or elsewhere; and in most instances might be more correctly attributed to other influences—such as general change of habit, imprudence in dress or diet, remaining too long in cold water, or bathing at improper times—than to any special quality of the air. Tilt[6] believes that as a rule sea-air is beneficial in female diseases, yet he mentions a case of uterine fibroid in which a visit to the coast invariably caused a return of the flooding.

The more diligently we study the miscellaneous effects upon the human body of the motion of a ship at sea, the more apparent is wisdom even in the comprehensive vagueness of the single reference to this subject by the

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[1] De Morbis Artificium.

[2] Observationes Med., Lib. xvi.

[3] Hist. Nat., Lib. 28, Cap. iv., Lib. 31, Cap. vi.; and Epist. 29, Lib. v.–x.

[4] Van Swieten, Comment. in Hermanni Boerh. Aph. 1752. Vol. i., p. 34.

[5] De usu aquæ marinæ.

[6] Uterine Therapeutics.

great "father of our profession,"[1] *ναυτιλίη δηλοῖ ὅτι κινησις ταράσσει τὰ σωματα.* Whether manifesting itself in sea-sickness, drowsiness, constipation, menstrual aberration, or even in increased vitality, it is clear that sea-motion disturbs in some way the established habits of the economy.

The credit of having demonstrated the true pathology of seasickness, or more correctly, motion-sickness, or *kinetia*,[2] if I may coin an easy term, is now pretty generally accorded to my paper upon that subject published in 1881.[3] I may be pardoned the egotism of this allusion, since the theory of the causation of sea-sickness, and of other functional disturbances incidental to life at sea, is more or less prefatory to what appears to be the best explanation of the menstrual irregularities we are considering.

It may be summarized as follows: The ordinary form of sea-sickness, that is, the form caused by the easy gyrations of a large ocean steamer, is essentially *a disturbance of equilibration.* The initial lesion takes place within the semicircular canals of the internal ear, where the endolymph and otoliths, following the irregular movement of the vessel, convey to the sensorium erroneous impressions of the position of the head in space; this soon results in dizziness, which is followed in due course by nausea and vomiting; and even when later, as is usual in tedious cases, other parts of the organization become involved, an hyperæmia of the parts concerned in equilibration remains a main factor in the general syneresis of nervous and functional derangement.

In fact, for practical purposes, sea-sickness may be re-

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[1] Hippocrates, Sec. iv., Aph. xiv.

[2] Κίνεω, to set a-going.

[3] Lancet, November 25, 1881.

garded as a mild transitory semi-physiological prototype of the non-cochlear part of Ménière's disease.

But even more instructive in the present connection are some of the other phenomena which, although not necessarily associated with sea-sickness, ordinarily accompany a voyage. Most prominent among them is the drowsiness and persistent sluggishness of mind so usual on ship-board. This condition is evidence of the influence of motion upon the cerebral circulation—and that it is caused by the movement of the vessel, and not by the qualities of the air or otherwise, may be inferred from the fact that a like effect is produced by similar motions under circumstances precluding the possibility of other cause. This was demonstrated long ago by Erasmus Darwin's[1] machine, intended for the cure of madness, and by the similar experiment of Ried,[2] who constructed an elaborate apparatus for swinging sleepless patients; more familiarly, by the use of the cradle and the soothing influence of the rocking-chair.

The general recognition of this effect forms, no doubt, the basis of the ancient belief that a sea voyage was beneficial to lunatics, and also of the popular, but untenable theory that sea-sickness is caused by anæmia of the brain.

Holland[3] accredits sea-sickness to a combination of cerebral anæmia with pulmonary congestion; and worse than *non-sequitur* as may be his reasoning, I am satisfied that his observation of facts is substantially correct, and that the effect of sea-motion upon both brain and lungs is in the directions indicated.

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[1] Zoönomia, 1794.

[2] An essay on Phthisis Pulmonalis, 1798.

[3] An Experimental Inquiry into the Laws which Regulate Organic Life. 1829, c. 14.

The constipation, often troublesome at sea, and various minor effects of a voyage might also be cited to prove that the movements of a ship exercise some peculiar influence upon the ganglionic centres and sympathetic system, by which is altered the production of nerve-force, and the volume of visceral circulation.

But by far the most striking of these effects is that which forms the subject of this essay; and here I would state my conviction that menstrual disturbances on ship-board are almost entirely attributable to *the motion of the vessel*—very little to coincident psychical impressions, and less still to any inherent quality of sea-air; and that the constant tendency of this motion is to determine an increased blood-supply to the pelvic organs. The result differs in degree from a slight, and sometimes beneficial, circulatory stimulus, to a positive and dangerous engorgement; *but under all circumstances the primary influence is unquestionably congestive.*

In the present state of our knowledge the precise relationship between cause and consequence is by no means obvious. It seems probable, however, that the first impression is upon the solar plexus, or some minor ganglia presiding over the ovario-uterine functions, and is transmitted from thence to the sympathetic system, either directly by filaments of connection, or through some more circuitous route of brain and spinal nerves. It may even be found by future investigators that these abdominal ganglia possess some special function connected with the equilibration of the body as a whole, or of the viscera whose nerve-supply they control, and that this sense is deranged by certain unaccustomed translations, just as is the similar one whose seat lies within the cranium. The idea will, of course, appear far-fetched, yet why may it not be so, if the Pacinian corpuscles found in the mesentery of cats, and other members of the family *Felidæ*,

really possess the equilibrating function recently attributed to them by distinguished physiologists?[1]

Dr. Noeggerath informs me that on one occasion he has positively discovered Pacinian bodies beneath the epithelium of a recently removed ovary.[2]

That the sympathetic system is at some time affected is unmistakably evidenced by the facts observed. The irregularities in the advent, term, and quantity of the catamenia, the frequent dysmenorrhœa, and the usual intensification of the symptoms of local diseases are all such as should theoretically result from an unwonted vascular supply, and consequent hyper-congestion of the uterus and its appendages.

When dealing with its effects upon utero-gestation I shall have occasion to consider the mechanical possibilities of sea-sickness.

In the present connection I have little knowledge worth imparting. Kinetia often accompanies menstrual derangements at sea, and always aggravates them, as may be explained by a suggestion made me by Dr. Emmet, that such vomiting would cause, or increase, a pelvic congestion by retarding the return of venous blood. It cannot, however, be charged with their causation, since these troubles arise, or survive, long after sea-sickness has passed away, and occur in women who entirely escape that first terror of the ocean transit.

From the statistical observations recounted in the earlier part of this essay it will be seen that a sea-voyage may disturb the menstrual habit in almost every conceivable direction: in its periodicity, duration, amount of excretion, and increment of discomfort. The particular character of the effect most prominent in each case is

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[1] Ferrier: Functions of the Brain, p. 63.

[2] Reported: Gynæcological Transactions, 1876.

determined by the constitutional tendencies of the individual, the relation of the last normal period to the date of embarkation, and, lastly, the length of the voyage, and ever fortuitous condition of the weather.

Of disturbances of periodicity, a premature return of the flow *is by far the most frequent.* In his admirable essay "On Sea-sickness," Dr. Fordyce Barker remarks that, "when the voyage is commenced near an approaching period it is brought on two or three days earlier, and the flow is more abundant than ordinary;" and thus far his observation coincides with my own—not unconditionally so, the subsequent part of his rule, that "when the voyage is commenced in the first half of the interval after a period, the next appearance is retarded and sometimes suppressed for one or two months."

A premature return of the sanguineous discharge may occur at any time during the intermenstrual epoch, but at none is it more liable to do so than when the voyage has been commenced during the post-menstrual period, or the first ten days following a normal menstruation on land.

This opinion is the outcome of my own experience, but it also embodies the views of many physicians whom I have consulted upon the matter. Dr. Fourness-Brice, of the steamer *Germanic*, who has seen more of the medical aspects of sea-life than any physician who ever lived, writes to me: "Many ladies have told me that they had waited until the period was over, thinking to have the voyage undisturbed, but to their disgust and annoyance the flow had returned while on board. I learn from some that the same thing happens during the railway journey from New York to San Francisco."

Dr. de Vere Hill, of the *Aurania*, tells me, that so usual is this unexpected reappearance of the menses, and so familiar has he become with its premonitory symptoms,

that he often astonishes his patients by the certainty with which he can foretell the event.

There can be no doubt that when a woman undertakes a voyage soon after the cessation of menstruation she subjects herself to a renewal of the nervous exaltation, and ovario-uterine hyperæmia, which normally accompanied that process. This *invariably tends toward*, and frequently accomplishes a reappearance of the discharge. But even where no visible effect is produced while on board, *a distinct stimulus has been experienced*, which following the well-known law of reaction may lead to a diminution, or complete suppression of the flow at the next regular period. Indeed so susceptible are both nervous and vascular systems to this reflex power that during long voyages, even while still subject to the stimulating influence of sea-motion, the secondary conditions of depressed innervation, and genital anæmia occasionally supervene.

Contrary to a popular opinion, amenorrhœa is a rare condition during the transatlantic passage; and scarcely ever occurs except among the constitutionally hyperplethoric, in whom, under ordinary circumstances, the flow is scanty, and accompanied by pain; and in these the period is usually well marked, and the diminution of discharge bears a direct proportion to the increment of discomfort.

The class of cases supposed by the few authors [1] who incidentally allude to the matter, in which there is simply a non-appearance of the menses, the period passing without prodromata or molimina of any kind, are almost unknown upon the North Atlantic; and even during the longer voyages to India, Australia, or South America, are much

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[1] Handfield Jones: Functional Nervous Disorders, p. 423; Edis: Diseases of Women, p. 433; Tyler Smith: Medical Times and Gazette, February, 1860.

more rare, *as a primary condition*, than is commonly supposed.

On the other hand complete and passive amenorrhœa for one or more periods after landing is a frequent *result* of the Atlantic transit.

It is mentioned, especially, as occurring among emigrants, by Barker,[1] Emmet,[2] and others; and is attributed by Emmet to "the nervous system (being) fully occupied from the first in counteracting the deleterious effects arising from anxiety of mind, a new mode of life, and the privations to which emigrants are too often subjected."

Dr. Emmet's theory is mistaken. The true explanation is that which I have just indicated; and is founded upon a principle, in demonstrating which, in another connection, Dr. Emmet[3] himself has done so much to advance our science: that upon the vascularity of the uterine system reflex action is stronger and more permanent than primary impression.

Of the various effects of sea motion upon menstruation, it is unfortunate that none is more universal or more constant than an aggravation of whatever discomfort is ordinarily associated with that process. Unaccustomed pain marks equally the amenorrhœa or lessened discharge of the plethoric, as the increased and prolonged flow of the anæmic and neuresthenic.

It is a prominent feature in a premature return of the menses, it is usually even more so when the function is discharged at or near the natural period. In some women painful menstruation is experienced for the first time at sea; the habitual dysmenorrhœic may count upon augmented suffering. This is especially marked in the con-

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[1] Op. cit.

[2] Principles and Practice of Gynecology, p. 183.

[3] Ibid., p. 112 et seq.

gestive or inflammatory form, and in those dependent upon obstruction of the circulation or excretion, whether stenotic, the result of flexions, or otherwise; but in my opinion the statement may be accepted as universally true, that in every type of dysmenorrhœa the discomfort habitually experienced will be increased *certainly at the first*, and usually at all subsequent menstruations during a voyage.

If there is any exception to this rule it must be in the form termed "spasmodic" or "neuralgic," and supposed by some to be dependent upon an anæmic state of the system. Assuming this condition to be dominant in the pelvic viscera, it might be hoped that the unwonted local stimulus would modify pain. I am not aware of any such happy result, and I am disposed to doubt its occurrence except in very rare cases, during very long voyages, and always as a consequence of reactionary decreased vascularity. Yet no less an authority than Dr. T. G. Thomas asserts that "a sea-voyage will often accomplish an excellent result in neuralgic dysmenorrhœa by its alterative influence, whatever be the cause of the neuralgic state."[1] And Dr. Tyler Smith has expressed the opinion that a long sea-voyage "relieves dysmenorrhœa, especially of the membranous type."[2]

It is certain that next to sea-sickness, dysmenorrhœa in some form, and often accompanied by considerable intensification of the nervous and systemic phenomena which occasionally mark its advent, is the condition which most frequently appeals to the skill of the ship-surgeon.

A Chilian lady of some prominence, who was frequently obliged to make a coasting-trip of three or four days' duration, told me that so intense was the agony of menstruat-

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[1] Diseases of Women, p. 584.

[2] Discussion at the London Obstetrical Society. 1860.

ing at sea that no earthly consideration could induce her to embark except about the middle of the interval, at which period she usually escaped. I believe her case would have been easily amenable to treatment. And here I would remark, *en passant*, that in neglecting to avail themselves of the high talent commonly at their disposal, upon the better Lines, many ladies condemn themselves to much needless suffering.

Upon a basis of the beliefs heretofore enunciated, in conjunction with the published views of high authorities, the occurrence and frequency of maritime dysmenorrhœa is by no means difficult to explain.

If it be assumed that ordinary menstruation is a condition often upon the limits of pathology;[1] that "every uterus has a point of congestion which cannot be exceeded without overstepping the exhalant power and inducing engorgement;"[2] that "a stasis of blood in the parenchyma of the uterus and ovaries immediately induces symptoms which are foreign to perfectly healthy menstruation;"[3] and finally, that, "when any abnormal influence renders excessive (the active congestion of the menstrual epoch) it naturally produces pain in the nerves intervening between the distended vessels;"[4] then so easy is the inductive reasoning, that these painful menstruations may be looked upon as already explained. The supplementary vascular stimulus consequent upon the sea motion oversteps the limits of physiology, exceeds the exhalant capacity of the uterus, induces a stasis of blood, and ultimately gives rise to pain, which, if more than mere disquiet, is a symptom foreign to healthy menstruation.

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[1] Hirt: Die gewerbeliche Thätigkeit der Frauen; Tyler Smith, and others.

[2] Duparque, op. cit.

[3] Putnam-Jacobi: The Question of Rest for Women.

[4] Thomas, op. cit.

If, on the other hand, we favor the so-called "vaso-motor" theory of dysmenorrhœa: that the increased blood-supply of ordinary menstruation so irritates the vaso-motor filaments of the uterine vessels as to provoke tetanic spasm of the arterial coats, and muscular fibre of the parenchyma, an explanation is no less apparent. But I purposely pass this doctrine, and the often concomitant belief that any vaso-motor irritation—whether of cerebral, spinal, or visceral origin—may give rise to anæmia of the abdominal ganglia, and consequent relaxation and turgescence of the pelvic circulation, because it would be impossible to consider them without applying yet another set of unprofitable theories to the primary etiology of erratic menstruation at sea.

Indeed, the whole subject offers a field so rich in hypotheses, and pertinent reference to recorded work—to the researches of Négrier,[1] Raciborski,[2] Pouchet,[3] Aveling, and others; to the scholarly lectures of Wiltshire,[4] the rejuvenated theory of Loewenthal,[5] and the experiments of Mary Putnam-Jacobi,[6] Berthier,[7] and Henning, recently elaborated by Reinl,[8] of Franzenbad—that unless I would utterly weary your patience I must wander no more from the immediate inquiry in hand.

I will, however, say of the premature return of the menses at sea, which is especially interesting in connection with the yet unsettled question of the correlation of ovaries and uterus in the ordinary process of menstruation, that although

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[1] Recueil de faits pour servir à l'Histoire des ovaires, 1858.
[2] Traité de la Menstruation.
[3] Théorie positive de l'ovulation spontanée, 1847.
[4] British Medical Journal, March, 1883, February, 1884.
[5] Allgemeine Med. Cent. Zeitung, January, 1885.
[6] Op. cit.
[7] Des névroses Menstruelles.
[8] Sammlung klinischer Vorträge, No. 243.

I am satisfied that the ovaries are hyperæmiated as soon as, and probably as much as, the uterus itself, and it is even tenable that the primary stimulus may be ovarian and transmitted from thence to the uterus, yet there are many reasons to doubt the dehiscence of an ovule with each of these supplemental menstruations; and I take it as impossible that "nidation" could be perfected in an interval so short.

Since it has been shown that the sea influence is of a distinctly stimulating character to the ovario-uterine organization, it may fairly be supposed that a voyage soon before the natural advent of puberty would hasten that event. My opportunities of direct observation have been too limited to throw much light upon this matter, as only on two occasions was I certain of first menstruations occurring on ship-board; although at other times I have suspected that such might be the case when circumstances did not favor a positive knowledge.

A careful inquiry among those of wider experience confirms the belief that this incident is by no means infrequent during the transatlantic passage; and it seems probable that the same may happen soon after landing, hastened by the voyage. The point acquires a local interest from the fact that it is during the late spring and early summer that American girls usually cross the ocean for the first time, at which season of the year, according to Emmet[1] and others, the organs of generation are most active, and first menstruations most frequently take place.

Turning to the other extreme of menstrual life, it is easily understood that an unwonted pelvic vascularity should disturb a process which, although normal, is essentially one of decadence of nutrition and degeneration of tissue. I have had under observation, at sea, three wom-

[1] Op. cit.; Wiltshire: British Medical Journal, February 9, 1884.

en at the climacteric epoch. On each occasion a hemorrhage occurred during the voyage, and exceeded anything previously experienced by these patients. Dr. Brice and others have seen many similar instances. Dr. Exham, of the *City of Berlin*, tells me of a remarkable case which occurred in his practice scarce two months since: A lady, aged forty-five, who had not menstruated for over three years, and was free from local disease, became extremely sea-sick soon after embarkation, and on the fourth day of the voyage was attacked by a profuse and obstinate menorrhagia.

As already stated I have failed to establish any necessary connection between kinetia and menstrual disturbances. Cases such as Exham's, however, suggest a reflection, which at an appropriate moment might be worthy of consideration. Many observers of sea-sickness have compared its severer forms to the collapse stage of cholera, during which it has been noticed that a sanguinatious discharge from the uterus is by no means uncommon.[1] Can it be possible that not only does the vomiting of kinetia irritate and congest the uterine organization, but further, by its rapidly exhausting influence, rob the vessels of the tone necessary to resist the increased stress put upon them

Upon both sexes, but more especially upon the female, the aphrodisiac influence of the life afloat may be accepted as a traditionally established fact. To test its universality or estimate its degree would be a manifestly difficult task, nor can it be deemed important, since the introduction of steam has so materially abridged the duration of ocean voyages. It is easily understood how an increased blood-supply to the genito-uterine organs should stimulate sexual instinct; there are,

[1] Tanner: Practice of Medicine, vol. ii., p. 61.

however, on ship-board a variety of coincident circumstances all tending in the same direction: the mentally soothing influence of the sea, the invigorating air, the highly spiced nature of the food, the close and constant proximity of the sexes, the relaxation of social restraints, the indolence of the life, and lastly, a universal idleness—"the mother of mischief." Dr. Brice mentions the case of a lady whose life was exemplary, and who had reached the menopause, but who found herself constantly tormented with amorous dreams every night while at sea.

The distinction of cases likely to be benefited by a voyage, from those in which there would be danger of positive injury, follows almost as corollary upon the views already expressed.

An ocean voyage should be regarded as *a potent emmenagogue*, having, in addition to this special quality, a well-marked tonic, alterative, and sedative influence. With this character it is entitled to head the list of therapeutic agents of similar effect, and should no longer be prescribed empirically, but, as they are, with a definite object in view. There are many cases in which these local and constitutional properties are especially indicated, and in which they may be jointly utilized with excellent results: In the conditions included under the term chloro-anæmia; in amenorrhœa, dependent upon deficient tone, or an undeveloped state of the organs; in retarded sexual maturity; in certain forms of leucorrhœa, uterine asthenia, and sterility; and above all in those delicate, gawky, over-schooled girls in whom abeyance of uterine function is often among the first warnings of approaching phthisis.

Dr. Emmet[1] mentions an interesting case which may be taken as typical of the entire class: A young lady in

[1] Op. cit., p. 182.

whom, as a consequence of over-study, the menses became scanty and irregular, and finally suppressed entirely toward the close of the first year of menstrual life. For three years she travelled about, but with no return of the menstrual flow, except when the period was passed at sea. It was finally arranged, as a part of the treatment, that she should sail a day or two before the period during several successive months, with the effect on each occasion of inducing the natural flow.

The same satisfactory result and concomitant improvement in general health may, I am satisfied, be confidently expected in every similar case.

It will of course be understood that, upon a large majority of the women who cross the ocean, the sea influence is too slight and too transient to be considered of serious import. There are, however, many conditions of the uterine organism which, if not positively interdicting a voyage, at least demand careful prophylaxis, and skilled attention while on board. I have arrived at the somewhat general conclusion, which, however, I express subject to the dictum of future investigation, that almost every form of uterine and ovarian disease becomes worse while at sea. Gynæcologists are aware that the menstrual period is usually a time of retrogression. It has appeared to me that a sea-voyage, and more especially the turbulent Atlantic transit, is an intensification and prolongation of the same unfavorable conditions.

I am certain that cases in which local congestion is a prominent feature, and there are few in which it is not, are aggravated while on board; and I have never seen such reactionary beneficial effect following a voyage, as might be hoped for, or would justify the experiment of sending these cases to sea. Uterine displacements are especially liable to give trouble. Dr. Finucane, of the steamer *Servia*, tells me of a lady who had worn a pessary with comfort

for over four years, except during two transatlantic passages, with an interval of nearly a year between, on each of which occasions it became necessary to remove the instrument.

My own experience affords two similar instances, in one of which—a long-standing retroversion—the accustomed support could not be tolerated for nearly three weeks after landing.

No doubt there may occasionally exist conditions of chronic disease associated with uterine inertia, in which a nervous and circulatory stimulus of this character would prove of immediate benefit. I will briefly mention a case in which some part of the satisfactory result seemed due to this influence. At Calcutta, during the winter of 1880, the wife of a surgeon in H. M. Indian Army was placed under my care for the return voyage to England. Her general condition was lamentable, and represented the worst effects of the enervating climate and surroundings. She had several miscarriages, suffered from profuse and irregular menstruations, and during the intervals from copious leucorrhœa. The os was patulous, and the uterus measured three inches and three-fourths. I determined upon the treatment recommended by Dr. Atthill,[1] which has on several occasions proved satisfactory in my hands. I still further dilated the cervix, and through an extemporized canula swabbed out the entire uterine cavity with fuming nitric acid. The result far exceeded my highest expectations; and within one month following this procedure I had the gratification of handing over this lady in relatively perfect health.

The treatment of uterine troubles during the ocean transit should be conducted upon general principles, and needs no special consideration. Ergot and opium con-

[1] Clinical Lectures on Diseases of Women.

trol menorrhagia, but, unless the loss was excessive, I have not thought it wise to check an irregular return of the menstrual flow. Morphia and atropia, duboisia, cannabis indica, and camphor, all prove useful in dysmenorrhœa, more especially when they can be administered by the hypodermatic method, which is of inestimable value in all departments of maritime practice.

No part of our subject is of more practical importance than that which still remains, and to which we can now afford but brief consideration—an estimate of the influence of sea-voyaging upon the course of utero-gestation.

During my service at sea, I became aware of 104 pregnancies, of which no fewer than 14 were terminated on board. Nine were at about full term, and of these it is probable that in at least two or three instances the voyage had been purposely timed, so that delivery might take place on ship-board, thus saving trouble and expense at home. Two were premature at about the seventh or eighth month, and three were abortions before the fourth.

In June, 1881, I had the peculiar experience of attending at three births during the first sixteen hours of the voyage, while still between Liverpool and Queenstown.

All the labors were easy and rapid. The mothers and infants did well, and were landed in good condition.

Of the miscarriages, one is worthy of special mention. It occurred at about the third month in a lady whose general health was excellent, who had borne three children to full term, had before crossed the ocean when six months pregnant, and had never previously aborted.

If the uterine congestions produced by menstrual periodicity may justly be admitted as a cause of abortion [1] it seems certain that when the period occurs during a voyage this influence will be considerably intensified. At

[1] Cazeau et Tarnier. Am. ed., p. 563.

the same time, I am of opinion that, however active even upon the impregnated uterus may be the ganglionic and sympathetic influences of motion, sea-sickness and the mechanical disturbance of the viscera by violent and prolonged vomiting is the main cause of premature labor and miscarriage at sea. In every delivery which occurred under my own notice, with the exception of a single case in which labor had set in almost as soon as the ship weighed anchor—in all the premature cases, and all the miscarriages—the women were severely sea-sick before the commencement of uterine action.

I am aware that this view is open to the criticism that the vomiting of kinetia should not be provocative of premature labor, since the ordinary vomiting of pregnancy, even when persistent and pernicious, has seldom a marked effect in terminating that condition. The possible utility of sea-sickness in certain conditions of pregnancy might even be considered by those who follow in the belief of Dewees, Bedford, and others,[1] that the so-called physiological vomiting may prove beneficial in warding off abortion, and some of the other more serious neuroses incidental to the state. It should be remembered, however, that the vomiting of severe kinetia is more violent and unremitting than the morning sickness of pregnancy; that it has no claim to the term *physiological* as being a response to some abnormal reflex irritation, directly associated with that condition; and that it is most likely to excite uterine contraction at about the seventh or eighth month, a period of pregnancy at which the other vomiting is seldom troublesome. I have noticed that about this time violent kinetia almost invariably gives

[1] Dewees (Midwifery): "Very sick women rarely miscarry." Bedford (Principles and Practice of Obstetrics): "Females who escape nausea and vomiting during gestation *are exceedingly apt to miscarry.*" Tilt, op. cit.: "Vomiting seldom damages pregnant women." Ramsbotham, Churchill, and others.

rise to spurious labor pains, which if not early checked will usually go on to the expulsion of the uterine contents. It is also extremely hazardous during the early months, and although the middle period is not entirely exempt from danger, when a voyage must be taken, it should, if possible, be arranged for the two months intervening between the conclusion of the fourth to the beginning of the seventh. Sea-sickness invariably perverts or entirely suspends lactation.

In recording these views, and the grave caution which they imply, I am bound to state that other opinions, entitled to the highest respect, differ widely from my own.

Dr. Fordyce Barker, at the date of his essay (1868), had never known a case of abortion from sea-sickness, and implies that such a result is extremely rare. Dr. Fourness-Brice, of the *Germanic*, has observed no very marked effect of the ocean transit upon the course of pregnancy; he believes, however, that many are delivered soon after reaching land, and that if the Atlantic passage was twice as long the midwifery and mortality would both be immensely increased. In which opinions Drs. de Vere Hill, of the *Aurania*, and Finucane, of the *Servia*, generally concur. On the other hand, Dr. O'Loughlin, of the *Britannic*, with an experience of nearly fifteen years, and Dr. Leet, of the *Baltic*, hold views almost identical with my own. They have seen many premature deliveries and abortions, and consider sea-sickness the principal exciting cause. Dr. Exham, of the *City of Berlin*, in over four years' service has seen but one labor and one miscarriage. He has observed, however, the frequency of flying labor pains, commencing in the back and threatening parturition, and he attributes the satisfactory results in his practice to the care with which he has sought out and watched such cases, and to the free use of opium.

Among French writers upon sea-sickness who allude

to this matter, there exists more unanimity; but even from them we get nothing better than an occasional abstract opinion, based upon no stated observation or statistical deduction. With the exception of M. Obet,[1] who served four years in the *Compagnie Générale Transatlantique*, they are all agreed that a voyage seriously imperils the course of utero-gestation;[2] and this, I believe, fairly expresses the consensus of our present knowledge. No one will pretend that every pregnant woman who becomes sea-sick will abort during the voyage; and to cite particular instances of those who suffered severely from that distressing malady without disturbance of the uterine contents, is no more than could be done to prove the impotence of almost every well-known abortifacient. That so many competent observers agree as to this hazardous tendency, proves its existence; that others equally competent have not experienced similar results, only shows that this disturbance is not universally potent in overcoming the ever conservative energy of a natural and necessary process.

Upon a secondary point we can scarcely expect more unanimity: Dr. Barker has known several women who were always sea-sick when non-pregnant, and who were entirely exempt during pregnancy; Le Roy de Méricourt[3] has seen women seasick when pregnant who had not suffered before. My own opinion is most emphatically that pregnancy, more especially during the later months, predisposes to, and always aggravates the most distressing features of kinetia.

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[1] Archives de Méd. Navale, June, 1875.

[2] Fourcaut and Le Coniat: Arch. de Méd. Nav., 1868. Arnaud: Gaz. Méd. de Paris, 1860. Rey: Nouveau Dic. de Méd. et Chir. Pratique, vol. xxi. Fonssagrives: Traité d'hygiene Navale. Guien: Guide de voyageur sur mer. Le Roy de Méricourt: Guide de Méd. prat. de Valliex, fifth edition, vol. i. Bénard: Thèse de Paris, 1879.

[3] Op. cit.

As expressed by Spencer,[1] "not directly, but by successive approximations, do mankind reach correct conclusions." If this paper stimulates those of greater ability and wider opportunity to pursue the line of study, here initiated, to more positive and scientific conclusions, the highest aspiration of its author will be amply realized.

"ARS TOTA IN OBSERVATIONIBUS, SED PERPENDENDÆ SUNT OBSERVATIONES."

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[1] Principles of Biology, vol. i., p. 408.