THESIS

On

FUNCTIONAL PERIODICITY OF COLLEGE WOMEN

Submitted to the

OREGON AGRICULTURAL COLLEGE

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For the Degree of

MASTER OF SCIENCE

In

VOCATIONAL EDUCATION

By

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Chairman of Committee on Graduate Study
The last two generations have seen a great change, particularly among women. Charlotte Perkins Gilman (39) says "Outdoor sports, change in costume from long flowing riding habits to divided skirts, the joy of our girls in ball and tennis, golf, swimming, sailing and even flying -- these have changed first the women and then our ideas about them". This is easily shown by the records of numerous researches made with college women. It helps emphasize Lester F. Ward's statement that, "The female not only typifies the race, but the metaphor aside she is the race"; and shows that she is growing more worthy of her high responsibility.

Hand in hand with this progress has come the knowledge that health is something every woman can have; more than that, it is something every woman should have, -- even must have if she is to meet the increased demands of modern society. This college woman must now be made to realize that health, in the last analysis, is a matter of personal and social obligation. Dr. Lenna Means (82) says "Health is something positive, progressive and dynamic, not merely a vague and negative state of being which remains after active illness has subsided. It stabilizes and enriches life and no effort is too
great, that helps to win it. It is normal and realizable, but it places each on her own responsibility for achieving her own physical best."

Those who work with college women realize the size of their problem and preach and teach mastery of self; mastery of the powers of the physical body; the mental processes, the emotional forces and the spiritual expression. With that in mind no physical director will tolerate any work that falls short of the ideal, any work that will permit a college woman to leave school and take her place among the world's producers. With the idea that because she is a woman she is weaker and entitled to more consideration than the men with whom she may work. She can no longer be incapacitated one week out of every four. The world demands, and rightly so, that if women takes her place beside man, she must be racially and economically efficient every day of the month.

You may say 'that's all well and good, but see how many women are incapacitated at the time of their menstrual periods, as were their mothers, and grandmothers before them'. True enough, but were women always so? Historical and sociological records show that the primitive women were the laborers, gathering food and doing practically all of the heavy work around the camps and nomadic homes. Drudges, you say; perhaps they were, but the records show that they were well developed physically and brought forth many
children without inconvenience to their masters or to their regular work.

The Spartan women are held up as examples of splendidly built women who did the biggest share of the actual producing, and brought forth a race of warriors. The Athenian women, in their strength and physical beauty, gave us a race of athletes, before the fall of the republic, when that heritage seems to have been handed down to the early Romans.

Probably the best examples of strong women were those of the early Teutonic tribes. Health, among these women, was a most important item. Girl babies were exposed, and if strong enough to survive were put through strict training programs to insure strength of body. Tacitus says, of this barbarian woman, that she had a fair skin, ruddy cheeks, bright blue or grey eyes, long fair hair, and grew to be remarkably tall. Indeed, that Roman, Sidonius Appollinaris, after a trip to Gaul declared that it was impossible to address verses of six feet to patrons seven feet tall. The whole course of modern history has been a testimony of how these barbarian women of the north intermingled with the accomplished and decadent Romans and strengthened them.

The period of feudalism, from the ninth to the twelfth centuries, was most favorable to the development of domestic life and to the elevation of women,
from the social and economic viewpoints. It is interesting to note that the men and not the women in the earlier feudalistic period were blamed for vanity and extravagance of manners and dress.

The modern woman can look to feudal times for the founders of her freedom. It was during this period that she who had been a drudge for ages, ruled and ruled despotically, gaining strength out of her weakness. With the growth of chivalry she really did less, she played at love and spent more and more time fashioning frills and furbilows. She became a doll-like creature with artificial manners, and found that she could gain more from the man-ruler than she had ever been able to gain before.

Still it took several centuries for her to lose her remarkable strength and physical activity -- and throughout this period she had one saving grace, that of her work as physician and nurse. One might cite many examples of this work to show how successfully she carried on the administrative work of the castle and displayed exceptional skill and strength in the care of the sick and wounded.

Nicollete, when Aucassin's shoulder was dislocated "handled it with her white hands and labored so much that by God's will it came into its place; and then she took flowers and fresh grass and green leaves and bound them together upon it with the flap of her chemise". (40)
An amusing story is told of the wives of forty knights, who in the absence of their husbands, held a tournament at a castle by the Rhine. Each took the name of her husband, with the exception of one girl who called herself Duke Walrable von Lunberg. She tourneyed with such success that she sent most of the women out of their saddles. (65)

Such was the medieval woman who rode, hunted, hawked and ferreted, as well as she listened to the songs of the jongleurs and the poems of the troubadours. Such was the woman who embroidered and read, but was capable of dropping both immediately to concoct some medicine for the sick or set a broken bone for the injured.

Sad to relate, she with her added power, upon finding that she could gain more by assuming roles of weakness, started her frivolous career, guided and assisted by facitious fashion. Little did she realize where it was leading her, or what misery she was storing up for the coming generations; for here it is that one begins to find traces of woman's periodic incapacity.

She, who had put her whole soul into physical activity, followed the dictates of fashion from one extravagance to another. Dresses were made over steel frames with tight fitting waists, enormous skirts, sleeves that reached the floor. Sometimes
one orgie, sometimes another, but each equally as harmful to physical development. What a contrast to the loose draped gowns worn by the Athenian women, and just such a contrast to their activities. From that time until the last part of the nineteenth century she did become the "weaker vessel", to such an extent that present day writers blame disordered menstrual conditions upon constrictive dress, physical inactivity, and unhealthful habits.

Several years ago Dr. Mosher of Stanford (52,49) compared the styles of 1893-6 with those of 1910-14 showing that there is a definite relationship between the prevailing fashion and the number of women suffering during their menstrual periods. In 1893 the average width of skirts was 13.5 feet, the widest being 15 feet and the narrowest 9 feet. The weight of the outside skirt alone was seven pounds, nearly as much as the weight of all the clothing worn by the girl of 1914. Beside that, it was one of those periods in which women aspired to wasp-like waists, which carried the weight of from three to six petticoats. It is no wonder that the physiologists of the 80's and 90's taught that women breathed costally, while men breathed abdominally. The chances are most of them did, but not because God so regulated Eve's respiratory apparatus, — rather because of the fashion practices started during the Age of Chivalry.
In 1894 Dr. G. W. Fitz of Harvard (28) demonstrated that clothing is the most potent factor in the costal type of breathing in many women. (Jr. Exp. Med. V 1 #4, 1896. A Study of Types of Respiratory Movements)

Our grandmothers were so far removed from those splendid ancestors who worked beside their men and grew so tall, that they could only remember the styles of the last few centuries. They took as a matter of course waists of eighteen inches, so restricted by steel corsets, which inhibited the type of breathing natural to men.

Fashion still dictates, but woman can rejoice in comparative freedom, -- because she has reached a saner era which has outgrown the hour-glass form. Then too, prudery is being replaced by a clean-minded common sense which sanctions lighter, looser clothing, freedom from corsets, sensible shoes and activities that go a long way toward removing causes for pain during menstrual periods.

For so many years menstruation has been termed "sick time", "periodic sickness", "monthly illness", or an "unwell" period that women have cultivated many mistaken ideas and assumed the wrong mental attitudes toward the function. Old writers thought it was due to woman's uncleanness, the old Hebrews (74) thought that it was nature's way of getting rid of noxious
These ideas formed the basis for many superstitions. Some believed that a drop of the menstrual flow would make a flower fade; others that a menstruating woman in a dairy would turn milk sour.

That menstruation is a normal physiologic function cannot be over emphasized since there are girls and women who suffer unnecessarily because of the wrong mental attitude and erroneous ideas about this function.

The age at which menstruation occurs varies with race, climate, heredity and environment. It comes only after the ovaries are capable of producing ripe ova. This process of development, maturation and rupture of the ovum is called ovulation. Ovulation occurs normally every twenty-eight days from puberty to the menopause. The usual menstrual period is every twenty-eight days, though there are regular types varying from twenty to thirty days. There is controversy as to whether ovulation occurs before or after menstruation. Bandler (6) says it comes from four to six days before menstruation as a rule, but may occur at other periods. It is generally believed today that ovulation and menstruation are both results of the secretory function of the ovaries (possible the corpus luteum) and not related as regards cause and effects.

With the menstrual flow there is a discharge of blood, mucus and possibly epithelial cells, from the uterine cavity. The flow usually lasts from four to
five days, but from three to six or seven may be normal. The amount of blood lost is from four to six ounces (120-180 c.c.). The flow is alkaline. This blood usually does not clot unless the amount is excessive, due perhaps to the lack of fibrin ferment, also because the blood is considerably diluted with mucus from the uterine glands. (43)

The activity of these glands is accompanied by emigration of leucocytes which are engaged in excreting calcium compounds. The proportion of blood to mucus increases from the beginning of the period until the discharge reaches its maximum, after which it diminishes until the flow ceases.

There are four stages in the menstrual cycle; the constructive, the destructive, the stage of repair and the stage of quiescence. During the first the stroma undergoes a process of growth, partly by cell division by an increase in intercellular substance and partly by an enlargement of glands and blood vessels. (24)

According to Lipas (43) this stage starts as soon as the process of regeneration (following the preceding menstrual period) is completed, which is about eighteen days after the cessation of the previous flow. Leopold described a growth so considerable that the uterine cavity, prior to the stage of bleeding, becomes almost completely obliterated -- others find the amount of growth very slight. Oliver (60) doubts any growth.
Westphalen (43) says there is no multiplication of nuclei during this stage, the premenstrual swelling being brought about entirely by the serous saturation of the stroma.

At the close of the constructive period the blood leaves the capillaries and becomes extravasated freely in the stroma, but there has been some dispute as to how this process is effected. Christ (German) states that there is a considerable loss of surface epithelium when the flow is profuse -- but in other cases the removal is slight; Lippe says that the amount of destruction is related to the character of the haemorrhage. If congestion is rapid and profuse, the denudation is comparatively extensive, but if the haemorrhage is slight it takes place chiefly by diapedesis and then the loss is practically nothing. He adds that in some cases examined by him enough epithelial cells were found in the discharge to suggest a complete loss of epithelium.

After the flow has ceased, or even a short time before, regeneration of the uterine mucosa begins, and continues throughout the stage of repair.

Williams (61), holding a similar view of the menstrual cycle, gives the average length of the period as twenty-eight days, five days for pre-menstrual swelling, four for menstruation, about seven for the regeneration process, leaving not more than twelve for the period of quiescence.
A painless normal menstruation implies that there is a normal ripening and bursting of a Graafian follicle. This is not a process which takes place in the uterine and ovaries alone, for the premenstrual congestion affects all the organs in the pelvis, as well as the central and peripheral nervous system and the various organs of the body dependent on them for their nerve supply.

Menstrual disorders considered in this study, bearing in mind that we are dealing only with functional disorders, may be classed under the following heads: amenorrhea, absence of flow; dysmenorrhea, painful menstruation; menorrhagia, excessive or prolonged flow; metrorrhagia, bleedings of an irregular inter-menstrual character.

Amenorrhea is probably the result of some alteration of metabolism and in some cases, of functional involvement of some of the ductless glands, particularly the ovaries and thyroid. It may be hereditary, due to sedentary life, or lack of exercise and fresh air, or because of poor food. There are two types; (1) that in which menstruation is not established, (2) that in which the function ceases after being once in evidence.

In a broad sense dysmenorrhea includes all disturbances of a physical and mental nature; but strictly interpreted concerns only those symptoms which play their role in the pelvis. The pain may be either the spasmodic
type, termed uterine or menstrual colic, or the congestive type. The symptoms are a feeling of swelling, resulting from the pre-menstrual swelling and congestion; consciousness of sensitive uterus; sensation of pressure in the genito-urinary tracts; desire for frequent urination, sensation of pressure in the rectum, pain in back, legs, and often head.

Menorrhagia and metorrhagia are typically the same, the distinction being made in the time at which each occurs. The former is excessive or prolonged bleedings which follow more or less the regular four-weekly rhythm of menstruation, while the latter is of the same character but occurs between regular periods.

People have been accustomed to thinking of this functional periodicity in terms of sickness so long that even our modern writers in the field of physical education have accepted those ideas and use them in their instruction. Williams (77) states that menstruation is a natural physiologic function but adds, "This function may become deranged, but the disturbances should be grouped under two headings, (physiologic and pathologic) in which the physiologic disturbances are viewed as normal and natural". Those "normal and natural" derangements which he lists are "the feeling of fatigue, headache, pain in lumbar region for several days before the period," and "on the first day of the flow there is considerable congestion of the uterus with some distress."
Even Dr. McKenzie (45) in his 1923 edition of "Exercise in Medicine", makes this statement, in speaking of Vassar girls, "during their periodic sickness girls are forbidden to take part in any athletic exercises."

Some doctors hold similar views, examples of which are shown in the discussion held at the Medical Society of the State of New York, May 1914. Dr. Martin of Germany (47) says dysmenorrhea is so common it is born by women prudently. Many gynecologists consider pain at the menstrual period normal.

It is noticeable that more men in the medical profession hold the above opinions than do women. Dr. Rosalie Morton (47) at the same meeting reports that patients do well with systematic regulation of diet, sufficient water, proper hours of sleep and graduated outdoor and indoor exercises, with strict attention to minor troubles. Dr. Caroline Finley (26) thinks most of the pain is due to intestinal indigestion and can be relieved by careful attention to constipation. Dr. Mary Rose (66) states that much of the congestion is due to retention in the rectum.

Menstrual pains, according to Novak (58), whether congenital or acquired are of three classes, (1) menstrual colic, possibly a kind of vascular crisis; (2) pains suggesting labor, due to clots or other abnormal contents in the uterus or accumulation of blood with obstruction to evacuation, and (3) the pain from hyperemia or local congestion.
Painful menstruation, observed by Dr. Mosher (48) was in most cases the congestive type and is, she states, produced by: (1) the upright position (Moscati); (2) alteration of the normal type of respiration by disuse of the diaphragm and of the abdominal muscles; (3) the lack of general muscular development; (4) inactivity during the menstrual period; (5) psychic influences. She opposes Dr. Mary Putman Jacobi's (36) theory that menstruation is a "supplemental wave of nutrition," by maintaining that the menstrual flow is the same kind of blood as that used for mental or physical activity and represents potential energy. Therefore menstruation is a waste of potential energy in the form of blood which might be used in productive work when not required for the development of the embryo. She believes that "the menstrual hemorrhage is Nature's effort to relieve the undue congestion of the uterus, which has been induced (1) by the upright position and (2) by interference with the normal physiologic return of the blood to the heart which should be accomplished by the action of the diaphragm and the abdominal muscles. The undue congestion is most frequently the cause of pain at the beginning of the menstrual period, this pain disappearing as soon as the flow is well established, which relieves the undue congestion." (52)

The more one studies the subject the more evidence piles up to prove that many menstrual disorders are due to removable and preventable causes. Statistics
and experiments from numerous colleges bring evidence, which I confirmed by my study with Oregon Agricultural College girls.

The early college women faced much opposition, and especially that of their traditional weakness. In 1870, having overcome early prejudices, there was a significant increase in women's attendance in schools and colleges. In 1879, one white girl in every 916 was in a school of higher learning as compared with one in every 371 in 1915. (37) A survey of one hundred Oberlin College girls in 1899 (1) gave their status of health. Forty-eight reported health since entering college the same as before; forty-three reported a decided improvement; nine were not so well as before; eighty gained in muscular strength, twelve lost; ninety-eight gained in lung capacity, while two lost. Reports from Amherst showed that out of over two hundred girls only 2.75% dropped out of school on account of ill health, as compared with 2.85% of the men. (63)

Dr. Angenette Parry (45) addressed a questionnaire to leading obstetricians, college physicians and directors of physical training. The concensus of opinion was that girls may indulge in physical sports and games to a considerable extent during their menstrual periods, but should refrain from exhausting athletic contests or competitions. With some few exceptions girls accustomed to athletic or gymnastics could exercise
without detriment during menstruation. The majority of cases showed an increased flow. One circus gymnast reported a lessened flow. None of the professional circus performers interviewed desisted from their exercises during their periods.

Observations made on two thousand girls in finishing schools and colleges in America (2) showed that 60% had some rather serious functional disturbance, but that it dated from puberty, rather than from entry into school. However, of those who remained in school for four years and submitted to four yearly examinations, 30% showed marked improvement, 30% were uninfluenced, while 40% were undecided.

Kelly (67) reports 75% of College women as suffering from menstrual pain and recommends postural treatment.

In 1886 John Dewey made a study of 290 girls. (34) Only three percent had any real disturbance in their functional periodicity and many were improved. All but four percent were in better health during their residence in college than they were after graduation.

Dr. Arnold of New Haven Normal School, believes that women especially in the physical education profession cannot do full justice to their school work and be absent from classes every month. Girls in that school are not excused from any class work except swimming, during their menstrual periods. The gain in
efficiency in one year was one-fifth. The reports showed longer intervals between periods of shorter duration, and pain of a milder degree.

Chvastek (43) found three of the thirty women examined by him with livers increased in size during menstruation, probably caused by the internal secretion of ovaries. There were also stomach changes, both in secretion and mobility, the acidity of the gastric juice and free hydrochloric acid increased. Motor functions were below normal throughout the period. He has also found constitutional congestions increasing tendencies to skin affections, increasing tendencies to excitability and irritability, palpitation of heart, change of temperament, with mental unstability, often pronounced melancholy.

Physical examinations from many women's colleges show that emphasis is being placed on discovering disabilities that may prevent exercise or that may be improved by it rather than the estimation of strength and physical efficiency. Especially are questions of sleep, digestion, and general health, -- the history and regularity of the menstrual function carefully inquired into.

There is an indication that woman's physical well being is advancing. Mrs. Gilman (37) attributes it to (1) a reduction in the size of the family and (2) the passing of many of the household arts and crafts. Jacobs, to the wearing of a certain article of clothing
larger and more comfortable and hence more hygienic.

Dr. Mosher (49) to (1) change in fashion, making possible the wearing of clothing which interferes less with the hygiene of women and (2) the increased physical activity, brought about by (a) change in dress; (b) development of physical training and sports in the secondary schools as well as in our colleges and (c) change in the conventional attitude toward these activities for women. (Journal of American Medical Association, August 1923) Jacobs has compiled tables which give comparisons of the change in anthropometric measurements in college women -- covering several decades. (37)

Arithmetical Averages for the Various Physical Measurements of 200 Girls entering Wellesley College in the Years 1881-4, 200 Entering in the Year 1901, 200 Entering in the Year 1915

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Arithmetical Averages of the Various Physical Measurements of 50 Girls Entering Mt. Holyoke College in the Year 1885, 50 Entering in 1890, 50 Entering in 1895, 50 Entering in 1900, 50 Entering in 1905, 50 Entering in 1910, and 50 Entering in 1915

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Arithmetical Averages of the Various Physical Measurements of 200 Girls Entering the University of Nebraska in the Year 1892, 200 Entering in 1903, and 200 Entering in 1915

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Arithmetical Averages of the Physical Measurements of 1,600 Girls Entering Oberlin College During the Period 1886 to 1903, and 1,600 Entering During the Period 1909 to 1915

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<tr>
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Arithmetical Averages of the Foregoing Tables, which includes the Physical Measurements of 300 Freshmen Girls in Wellesly College for a period of 33 years, 350 Freshman Girls in Mt. Holyoke College during a period of 30 years, 300 Freshman Girls in Smith College during a period of 26 years, 600 Freshman Girls in Nebraska University during a period of 23 years, and 3,200 Freshman Girls in Oberlin College during a period of 29 years. All the records were divided into an earlier and later half and these two averaged against each other.

<table>
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<tr>
<th>Colleges</th>
<th>Wellesley</th>
<th>Holyoke</th>
<th>Nebraska</th>
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Same Table - continued

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<tr>
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<td>Smith 2d</td>
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<tr>
<td>----------------</td>
<td>-----------</td>
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<tr>
<td>Weight</td>
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<tr>
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<tr>
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<td>49.8</td>
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</table>

Manufacturers consulted show that women are wearing larger shoes, gloves and corsets. Bachner, Moses, Lewis and Company state that sizes in gloves vary with years and styles, but that "women are now (1920) wearing more comfortably fitting gloves than formerly, is certainly borne out by the facts and we, today, are cutting all our gloves on broader lines than we did twenty years ago." Julius Kayser Company notes the same and gives "7" as the most common size glove sold. The Royal Corset Company gives size 21-23 inches as average in 1914; 25-27 inches as the most common size in 1915. Another corsetiere states that "up to ten years ago the prevailing sizes were 18's, 19's and 20's, with but few above 26 inches in the waist." "Today practically no 18's are sold, few 19's and 20's, the demands being from 22 to 28 inches." Mosher (53) shows how attitudes in regard to the size of waist have changed by a recent incident. A mature shopper inquired of a saleswoman concerning a skirt which she saw in the store. "Oh, that is a small
sized waist; it is only twenty-eight inches", was the reply. The woman, commenting on the change in size of waist from her day said, "By chance a very light corset which I wore in 1902 was found in a trunk in the attic. My nineteen year old daughter tried it on and could not get it together within eight inches. My fourteen year old daughter has a waist nine inches larger than this corset."

From my own study with the local group of girls, I found thirty-four percent who had never worn a corset and of the rest only twelve percent who wear corsets regularly. Most of those wear the elastic girdle type.

The Stanford studies (49) show that women have increased 1.2 inches in height between 1891 and 1921. In 1894 only nineteen percent of these girls did not suffer pain at their menstrual periods. In 1916, sixty-eight percent were free from pain. Bryn Mawr studies (45) show that seventeen percent menstruated before thirteen years of age, five percent before twelve and twenty-three percent suffered menstrual pain. Vassar studies (57) show that twenty-six and one-half percent of the entering students from 1896-1900 had engaged in no form of sports before entering college. From 1916-1920, only six-tenths of one percent reported no sports before entering.

At the beginning of the school year, wishing to make a more complete study of menstrual disorders, and particularly to work along the lines of Dr. Mosher's plan of treatments, I made out a health inventory sheet which was given to three hundred girls. This
group was unselected, the girls being registered in regular gymnasium, corrective, both esthetic and folk dancing, and sport classes, meeting at four different hours during the week. Eighty Sophomores, thirty-six Juniors, thirty Seniors, and twenty-two Specials.

Health Inventory

Name _________________________ Age Yr. ____ Mo. ____
Health--Constant with 1 year ago ______ Wt. ______ Losing____
Same____

Bathing: Cold _____ When taken______ Number________
Warm ______ When taken______ Number________

Diet: Food eaten at typical breakfast____________________

Time____________________

Food eaten at typical noonday meal____________________

Time____________________

Food eaten at typical evening meal____________________

Time____________________

Between meals____________________

Special likes____________________

Special dislikes____________________

Water ___ glasses a day. Milk ___ glasses a day.
Tea ___ cups a day. Coffee ___ cups a day.

Elimination: Frequent urination____ Night________

Dysuria_____. Bowels: Movement a day_______

Constipation______ Diarrhoea ______________________

Regulated by diet ______ Water drinking________

Special exercise__________ Laxative habit____

What _____ How often ______ Ememata____________
Menstruation: Began____years____mo. Regular________
Intervals______duration________________________
Flow: Profuse____ _Moderate____Scanty__________
Clear______Clots______Suffering:Severe____
Some____none______Languid__________
Headache________Backache______________________
Abdominal pain________leg pain______________
At this time is study or mental application
more of an effort?________________________________
At this time do you exercise?______Dance?______
Take long walks?__________At this time do you
go to bed?______lie down occasionally?________
At what age did you put on a corset?__________
Do you wear one now?________________________________
Sleep: No. of hours____continuous______Do you dream?_
Hours per day: Classes____study______relaxation____
active exercise____________________________________
How much systematic work in gymnastics have you had?_
Remarks:

Some of the questions asked on the health inventory
sheet were duplications of material to be found on the
regular medical and physical history blanks, others
were supplementary and could, I felt, give me a better
check on general health habits. The girls were also
given monthly sheets for recording each period.
Name

Date: period started__________________stopped__________

How do you feel any day for a week before your period?

Backache_ Headache_ Legache_ Abdominal pain_ Nervousness_ Tired_ Irritable

Do you take any medicine?________________________
If so, what?_____________________________________

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<th>Day</th>
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<th>3d</th>
<th>4th</th>
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<td></td>
<td></td>
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<td>Effect of foods</td>
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Remarks: ________________________________

During the first quarter, (from September through December) I met with all of those girls as they were "off-the-floor". The custom being to have girls observe the work during their menstrual periods and hand in "Menstrual Report" forms for each class observed. During those four hours each week, I gave short talks about the function of menstruation, attitudes toward it, hygiene and care during the periods and demonstrated, first the Mosher exercise, then other menstrual exercises, emphasis-work for constipation.
The procedure as outlined by Dr. Mosher was followed exactly. (Figure 1) "All tight clothing having been removed, the woman is placed on her back, on a level surface, in the horizontal position. The knees are flexed and the arms are placed at the sides to secure perfect relaxation. One hand is allowed to rest on the abdominal wall without exerting any pressure, to serve as an indicator of the amount of movement. The woman is directed to raise the hand by lifting the abdominal wall without straining, then to see how far the hand can be lowered by the voluntary contraction of the abdominal muscles, the importance of this contraction being especially emphasized. This exercise is repeated ten times, night and morning, in a well-ventilated room, preferably while she is still in bed in her night-clothing. She is cautioned to avoid jerky movements and to strive for a smooth rhythmical raising and lowering of the abdominal wall. These exercises should be taken twice daily every day in the month including the time of menstruation. The bladder should always be emptied before the exercises are begun. The breath must not be held while the exercises are being performed. If she is inclined to make the mistake of holding her breath, let her keep her mouth open, breathing naturally. It is often necessary to urge the concentration of attention upon the abdominal muscles and to forget the breathing, which will take care of itself." (48)

The second demonstration was the Knee-chest Position (Figure 2) to be held from two to five minutes.
As girls were ready for them, I gave the "Treading" (Figure 3).

Position -- Kneel on floor with head resting on arms folded on floor.

Movement -- Stretch right foot back as far as possible until the knee is straight, letting the back sag down. Return right knee to bent position under abdomen. Repeat left. Continue from ten to fifty times.

Rocking Horse (Figure 4).

Position -- Kneel on floor; bend forward until chest nearly touches knees, arms stretched forward, hands resting on floor, shoulder distance apart.

Movement -- 1. Swing body forward and down to floor; straightening knees and bending elbows. 2. Return to starting position. Repeat swinging easily forward and back. Continue ten to twenty times.

Too much emphasis cannot be placed on regularity of habits. This I tried to accomplish by personal conferences at least once a month. It is hard for those outside campus life to realize just how much college girls do beside their routine class work. The average number of hours spent in the class room was four, the average number of hours spent studying was four, -- with thirty-eight percent in this group. Two girls in the group studied on an average of ten hours a day. Both of them were underweight, lacked initiative and vigor and devoted no time to recreation and relaxation. Their gymnasium work was taken as a dose of medicine, no "joy in ball and tennis" there. Both were
subject to headaches, constipation and dysmenorrhea. One of the girls rated slightly above the average scholastically, while the other was just average. It was not until February that I felt any ground had been gained in working for regular relaxation periods, regular out of door exercise and more sleep. Neither of the girls worked consistently on the Mosher exercises but after a couple of months, freer from pain than they had been all year, they showed a little more interest and have since been working more regularly.

Fifty-one percent of these girls never take any time off for relaxation while they are in school. Twenty-one percent found time for an hour at odd times during the day, counting the minutes spent visiting after meals and dancing after dinner before the study hour. After checking the time spent in various activities throughout the day, I am convinced that fifteen minutes, flat on the back in bed with complete relaxation and absolute quiet, would do more for our girls than the half hour dancing after dinner. The average girl, living in sorority houses or outside the dormitories, walks on an average of five miles a day to and from classes. She climbs stairs to the third or fourth floors of buildings to two or three classes a day and takes gymnasium work besides. She gets her exercise but little recreation and more often no relaxation, hence we increase our number of nervous irritable individuals who are not able to work to their maximum efficiency.
Due to reregistration, I could not meet the same girls in their original groups, the second quarter, (from January through March) so depended entirely upon the contacts through the conferences. Throughout the entire time they handed in the monthly forms which were somewhat different from their "off-the-floor" Menstrual Reports.

The youngest girl in this group was sixteen years of age, the oldest thirty-four years, the mean being twenty years. This is somewhat higher than the means for the larger groups cited above but is biased by several who were above the average age for college women. The average height for the group is 63.4 inches, with a range from 58 to 69.8 inches; the average weight 121.25 pounds; lung capacity 166.1 cubic inches, varying from 70 to 270 cubic inches. The ages at which menstruation began were from 10 to 18, the mean was 13 years and 5 months. Six and one-half percent menstruated before twelve years and 29% before thirteen years of age. There were no cases menstruating between 16 and 18 years and the one girl who menstruated at 18 years was a Finnish girl whom one would expect to mature much earlier than the average.

Of this group, 66% found that study and mental application at the time of the menstrual period was more of an effort; 34% found no difference at this time than at any other during the month. It is hard
to get accurate reports of the number really suffering from menstrual pain because some girls make so much of small pains and others so little of large pains. Perhaps a truer estimate can be made from the answers to some of the questions in the inventory. Thirty-four percent do not find it necessary to go to bed because of pain at the menstrual period, 27% always go to bed the first day and sometimes longer; 39% sometimes go to bed for all or part of the first day, or rest frequently during the several days of the period. Of those who have pain, I found half of the 12% wearing corsets among the group and nearly always the girl who had put on a corset before or during the first years of menstruation suffered more than the one who put one on later or wore none at all, showing the weakening effect on the abdominal muscles.

There were 17% with periods with less than 20 days intervals, and 32% with intervals of more than 32 days. This leaves 51% with intervals falling between 21 and 31 days; some of those should rightly be classed with the 49% of cases showing irregularities. Even so, the mean number of days intervening between periods was 27.6 days. The length of the periods varied from three to ten days, the mean being 5.5 days. Sixty percent of these had periods of less than four and more than six days.

Case 6 D, a girl of nineteen, reported regular periods of five days with twenty-eight day intervals, but a close check revealed periods of seven and eight days with intervals of twenty-two days. At the end of the
fifth month she had eliminated a part of the constipation usually experienced just previous to the period and had changed to periods of six days with twenty-four day intervals. This had been a gradual and consistent change which should be permanent.

So often girls with little trouble, give no thought to the function and because of their lack of knowledge make no effort to correct minor irregularities which are so easily corrected when the girl is young and which can become vital at a later date. Case 11 E also reported regular twenty-eight day intervals and a period of from three to four days. For six months she menstruated every twenty-one days, for five or six days. She had symptoms of too abundant flow, headache, backache, and pains during the entire period. She complained about not being able to exercise at the time of her period. One month, after making such an excuse and apparently suffering more than usual, in the morning, I met her at a dance in the evening, feeling fine. Later I was able to persuade her that the regular exercises would have as good an effect as dancing. It did, but seventy-five percent of the change was due to her mental attitude. She had been very sincere in believing that she was not able to do things during her period, but that one time she did not believe it thoroughly enough to stay home from a "house formal" for which "bids" had been at a premium and was willing to risk the consequences, which in this case were good ones.
Often girls will miss a period entirely when nothing is the matter. Several cases of this type among girls who had not been menstruating many years do not seem to have established the proper balance, but respond very well to treatment. The most serious drawback to following these cases through seems to be weekends full of social affairs that disturb the girls regular routine and stir up many of them who are after "thrills".

Postural cases respond very slowly. Case 5 H, a freshman, suffers with dysmenorrhea to such an extent that she feels she must go to bed. She is underweight and looks frail. She has been taking corrective work for a dorsal curve beside work for menstrual disorders. Some months she seems to get results and others none at all. Case 15 F, a senior with an S-curve, has cramps for two or three of the seven days of her periods, which come at intervals of twenty days. She has very good intentions but forgets them outside the gymnasium, still she gets some good results if she has a conference or class a few days before the period so that some one can remind her to watch her eating and drinking, her elimination and exercise habits.

Case 19 B showed the effect of inactivity on a girl who had been used to leading an extremely active life. She had had regular periods until she came to college, then she menstruated too frequently and had too profuse a flow and pain. Examinations showed no organic trouble.
She was a ranch girl accustomed to horseback riding every day, including the time of her menstrual period. When she entered college she was told that she must not do regular gymnasium work during her period. She was already doing much more inside work than she had done at home and did not have the chance for the real active outdoor exercise she had been accustomed to doing. Arrangements were made for work for her during her periods, she also wrote home and had her father send a horse which she rode almost daily. This spring she is making records in track and has overcome practically all of last fall's difficulties.

Constipation is an important factor in considering irregularity and menstrual pain. In most cases constipation is the result of disturbed circulation and digestion and may be improved by regular diet and exercise. Dr. McKenzie (45) reports twelve percent of college students complaining of constipation at their preliminary examination, due to a sudden change in diet and occupation on leaving home and "in most cases a few simple exercises and the following hints on diet are sufficient to reestablish regularity."

(1) Drink freely of water, a glass or more on rising and retiring.

(2) Eat carrots, cabbage, lettuce, celery, turnips, asparagus, sterilized bran and other bulky foods.

(3) Eat grains, fruits, figs, prunes, and other laxative foods. Masticate thoroughly.
(4) Avoid fried foods, meat overdone, hard boiled eggs, pastry and much sugar.

(5) Cultivate habits of regularity in the hour of evacuation."

I found twenty percent of my group used laxative regularly, some through ignorance, others because of laziness. The following preparations were used: phenalox, cascara, herbs, phenodal, "pink pills", Pierces Pellets, magnetia, mineral oil, Hinkle, Nature's Remedy and Nujol.

Constipation may be the result of poor posture, improper diet, lack of water, lack of exercise or careless habits. There is usually a condition of abdominal laxness. The importance of strengthening the abdominal muscles in support of the organs cannot be over-estimated.

Again we return to the Mosher exercise as the best method of overcoming a weakness which has such far reaching effects. To that may be added several exercises which can be used to advantage.

Doubling over (Figure 8). Sit in chair with feet resting on chair or bench two or three inches lower, with right arm resting across abdomen, left arm hanging at side. Bend forward quickly, pressing arm into abdomen and keeping knees together. Twenty to thirty times in groups of fives. Do not alternate arms. Do not give if there is dysmenorrhea.

Knee circling (Figure 6). Lying on back bend both knees to chest. Circle legs, keeping knees together and bent, right to left -- never from left to right.
Toe Touch. (Figure 5) Lying on back with arms extended at shoulder height, touch hand with opposite foot. Replace. Alternate twenty to thirty times.

Side Squeeze (Figure 7). Kneel, sit on floor to left of knees; clasp hands back of head. Bend to right side, touching floor with elbows. Same to opposite side. In groups of threes, six to twelve times. The "Treading" and "Rocking Horse" may also be added to the group.

Little work was done with feet, but there is a definite relation between foot troubles and menstrual disorders. Harriet Wilde (76) summarizes the results as follows: "fatigue and weariness, leg ache, back ache, headache, poor posture, indigestion, constipation; pelvic disorders, menstrual irregularities, inability to exercise sufficiently with resultant overweight, irritability, ill health, inefficiency, and unhappiness."

Just what are the average girl’s reactions to her menstrual function? She notices a headache, or tired feeling or back ache several days before her period is due. That, according to some authorities is normal and natural, and true enough, is experienced by a large percent of girls. But it need not be if we have the proper attitude toward the function and the right instruction about it. The tired feeling, headache and irritability are due to the general blood pressure being lowered by the excessive congestion in the reproduction organs, and to an inactivity which brings about a lessened oxygen intake and decreased carbon
dioxide elimination. There is also an added stimulation to
the sex centers producing emotional unstability and often
depression and melancholy. Unless she has been taught
differently she begins to think "Oh dear, I'm going to have
another bad time" and gets her hot water bottle ready or
stays in from class or the walk she had planned to take.
Many girls stop their regular bathing. This is quite wrong.
The body is about to lose blood that is ordinarily taking
part in regular metabolism. The rest of the system has
more work to do with less blood to work with. Exercise
helps to equalize the circulation, to increase elimination
and to keep the mind active with other thoughts than those
associated with pain, distress or sex stimulations, which
the average girl does not understand.

Regularity and the formation of proper habits count
here as well as anywhere. College girls live by bells or
whistles -- the rising bell, the breakfast bell, a scramble
to pick up clothes and get beds made, then class whistles.
There are few who learn as freshmen to so use their time
that necessary things may be accomplished, and the so-
called "student activities", added without interfering.
It is seldom one finds a girl who has time for everything.
That is the reason so many do not make the extra effort
needed to do even simple exercises which have been proved
of value. For those girls who are incapacitated one week
in every four, their value to themselves and the world is
reduced twenty-five percent. They lose thirteen weeks
every year. By spending ten minutes a day -- five in
the morning and five at night, they could eliminate
practically all of that disability. Ten minutes a day
throughout the year would mean two and one half days
actual time spent to reduce the loss of thirteen weeks in-
capacity. Is it worth the effort to the individual, to the
race? It means stronger women who can bring forth a race
of stronger, healthier, happier children. Has any girl a
right to say "I have so little trouble, it isn't worth
bothering about" or "I can't remember to take the exercises"?
She remembers to eat her meals, she remembers to go to
classes, she even remembers to take nasty pink pills that
aid in giving her trouble at her menstrual period. It is
up to the doctors and physical directors to live up to their
training and make use of their pedagogy so that these girls
will feel their responsibility to themselves and the race
and find out how to give time to the right things. It is
a sin and a crime for any physician to say because there is
nothing much the matter with a girl that nothing much need
be done. It is wrong for physical directors to let girls
go thru the year with no special efforts toward relieving
them from unnecessary pain. Dr. Arnold at New Haven has
taken the radical step in not excusing girls from any
classes except swimming, during their menstrual periods.
He reports (3) periods farther apart, of shorter duration
and with milder pain. His experiments have been carried
over a comparatively short period of time and no effort
has been made to check on the health of these girls.
after they leave school. There is considerable opposition to his plan, as might be expected when doctors and physical directors are used to excusing girls regularly from all work at that time. Some directors maintain that girls leave New Haven and go elsewhere after a year just because of the strenuous work. I do not believe that colleges and normal schools are ready for that plan. There is danger of doing more harm than good. But, could we get the girls when they first menstruate and train them with that in view, there is no doubt but that they could carry regular work throughout their college courses, and be better women because of it.

I am not in favor of excusing girls regularly from class work, during their menstrual periods. Some stay out of class, when their physical condition does not demand it, just because the gymnasium department allows them excuse privileges during that period. Others misuse the privilege and report longer periods than they really have and miss more classes than they should. And I do not believe that any girl is benefited by sitting on the side lines observing the work of the class, in a cold gymnasium at any time, and especially not at her menstrual period.

The best arrangement seems to be special classes. Girls could be excused from their regular class at the beginning of their periods, but instead of sitting on the side-lines and observing the others, they would report to an instructor taking care of all those excused from regular classes. Here it is possible to watch each girl and give
special attention necessary, as well as to regulate the work to fit her special case. Here would be the place to do the educational work, because the groups would be smaller, and talks would come at the psychological moment. It is easy enough to have some one tell about how to avoid sickness and pain, but it never strikes home so well, if one has no pain at that time. It is easy to throw meetings open for questions and discussions, but the individual does not always think of the vital questions at the time if she has not thought about them before, or has not recently experienced the things she questions. For these reasons, I maintain that the best, most constructive work can be done with girls during their periods, than can be done at any other time. For these reasons, I believe the best plan is to excuse girls from regular gymnasium classes, sports, swimming or dancing and have them report to special classes throughout their menstrual periods. It would mean a special instructor who could devote her time to that work alone whenever regular classes were in session. She would be responsible for making girls understand the physiology of their periodic function, and do away with the idea that it is a "sick time". She would supervise the work to restore the tone and action of the diaphragm and abdominal muscles so that they may overcome the effects of gravity on the circulation, and give the proper support to abdominal organs in their natural position. She would develop the work so that girls were no longer inactive during the menstrual periods, so that they used more care in observing
ordinary rules of eating, sleeping and bathing.

It has been proved that college women gain in physical strength and lung capacity during their four years residence. It now remains to be proved that with systematic work work directed at the source of her so-called "inevitable incapacity", from the time she enters, a freshman, until she leaves, a senior, that she might leave college with no menstrual pain, shorter periods with longer intervals between, requiring no time off from her work, thereby reducing her inefficiency to the minimum. I believe it is possible within our own generation -- if so, think of the possibilities of the next generation whose daughters have no handicaps of traditions to overcome, in regard to their menstrual function.
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