a long time, even though the gut was washed repeatedly with fresh Tyrode solution. The contraction caused by 1 ml. of C.D. could be antagonized completely by mepyramine maleate (0.02 γ/ml. in the bath).

We have thus obtained some evidence that our C.D. contained a histamine liberator, and we should like to advance the hypothesis that some of the symptoms of byssinosis are caused by a histamine liberator in the cotton dust inhaled by card-room workers. Our evidence indicates that the histamine release can take place without a preceding antigen-antibody reaction.

Summary

Inhalation of an extract of cotton dust caused a delay in the clearance of nitrogen from the lungs during oxygen-breathing.

This effect, which presumably is due to bronchial obstruction, was obtained in two men who had not previously been exposed to the dust in cotton-mills.

The effect was not caused by histamine present in the extract.

The results of our experiments, as well as some of the symptoms of byssinosis, may be explained by the assumption that the cotton dust contains a histamine liberator.

Some evidence was obtained, from animal preparations, that the cotton-dust extract used here contained a substance capable of releasing histamine.

We thank Dr. L. Muller, physician-in-chief of the Industrial Medical Service at Enschedé, The Netherlands, for supplying us with the samples of cotton dust.

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In America six deaths from rabies occurred in 1958 and five in 1959 up to November 27. Of the 11 cases, five are attributed to dog bites, three to bites from bats, one to a bite from a fox, one to a bite from a skunk, and one unknown. While in the U.S.A. the animal mainly responsible for transmission is the dog, more and more evidence has been brought forward to show the importance of the bat in maintaining the infection in wild-life and causing infection in man. Since the first U.S. report of bat rabies was made in Florida in 1953, 359 cases of bat rabies have been reported in the U.S.A.; rabies in wild animals is found most frequently in the skunk, 1,005 cases being recorded in 1958. In Germany the bat appears not to be important in maintaining the infection in nature. The main reservoir is the fox: in 1958 1,017 cases of rabies in foxes were recorded in the Federal Republic. In Iran, rabid wolves are the greatest danger. The Iran Pasteur Institute reports, from 1949 to 1958, 443 persons bitten by wolves, with 39 deaths. Elsewhere, the dog plays the most important role. The complexities of the situation are, however, considerable, as exemplified by the Institut Pasteur of Algeria, which reports the following rabid animals in 1958: 915 dogs, 91 cats, 27 rats, 13 head of cattle, 10 donkeys, 9 jackals, 4 monkeys, 2 mice, 1 fox, and 1 rabbit. (W.H.O./55.)

EFFECT OF MENSTRUATION ON SCHOOLGIRLS' WEEKLY WORK

BY

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Menstruation has from the earliest times been regarded as an evil omen. Primitive and civilized people have made it the subject of endless taboos. Slowly and painstakingly evidence is accumulating which reveals the effect of menstruation on the different aspects of a woman's life (Morton *et al.*, 1953; Cooke, 1945; Bickers and Woods, 1951; MacKinnon *et al.*, 1959; Dalton, 1959). The more this knowledge is appreciated the more sympathetically can we regard the vagaries of womanhood, with the inequalities thrust upon her by hormonal variations of the menstrual cycle. This investigation was prompted by observing the mental dullness of many women when interviewed during the premenstruum.

In this study an analysis of data supplied by a girls' school is collated to show the effect of menstruation on general schoolwork, and, secondly, personal observations at another school suggesting its possible correlation with the behaviour of the schoolgirl.

Method

The data were collected from a public boarding-school for girls in south-east England during the autumn term. It is the custom at this school for each subject of the girls' work to be marked from 10 to 0 and these marks to be averaged each week, giving a weekly mark. The form mistresses of 15 forms supplied details of the weekly marks of 352 girls, aged between 11 and 17 years inclusive, and the matron supplied the dates of the girls' menstruations, which each girl entered in the usual book when collecting sanitary towels. The data were obtained without the knowledge of the teachers or girls. Bearing in mind that the weekly mark represents the average of 7 to 12 different subjects, marked by as many different teachers and covering 15 forms, it will be appreciated that the effect of an exceptionally difficult piece of work in one form in one subject or the inconsistent marking by a teacher due to her menstrual variation will be lost in the average of the weekly mark. In the analysis the weekly mark of each girl is compared with her mark in the week immediately preceding it to note if a rise or fall in grade has occurred; this necessitates the exclusion of the first week of term, the week following half-term holiday, and the week following any absences, as there is no weekly mark during the week immediately preceding it with which to compare.

Difficulties of definition arise because the school week has only five working days. The most marked symptoms of the premenstruum occur within the five days immediately preceding menstruation (Greene and Dalton, 1953), so for the purposes of this investigation the "premenstruum" was defined as the five days immediately preceding menstruation, and the "premenstrual" week as the week which contained at least three premenstrual days during the five-day school week. Similarly, the "menstrual" week was defined as

one in which menstruation was present for at least three of the five schooldays, and the "post-menstrual" week as one in which at least three of the five schooldays occurred during the five days immediately following menstruation. "Intermenstrual" weeks were those which did not fall into the previous three categories. Thus if one girl's menstruation lasted from a Friday until the following Monday, the week in which menstruation started would be the "premenstrual" week and the following week would be the "post-menstrual" week. This accounts for the apparent differences of figures; for the total of 1,560 weekly marks available for analysis from the 217 menstruating girls included 324 premenstrual weeks, 342 menstrual weeks, 315 post-menstrual weeks, and 579 inter-menstrual weeks.

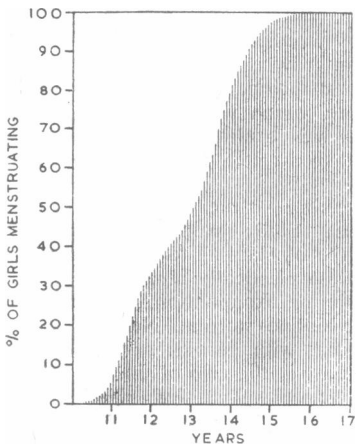

FIG. 1.—Menstruation at various ages (352 girls).

During the 12-week term 135 girls had no menstruation, 28 girls one, 73 girls two, and 116 girls had three or more regular menstruations. Fig. 1 shows the percentage of girls menstruating in the various age-groups, which is a normal curve for English schoolgirls. As 45% of the girls had only one or two menstruations during the 12-week term it follows that some of the "intermenstrual" weeks correspond to a missed menstrual period, and therefore these weeks are better regarded as an average of all weeks.

Results

Falls in the weekly marks compared with the previous week were noted in 27% of the girls during the premenstrual week, in 25% during the menstrual week, and in only 10% during the post-menstrual week. In direct contrast to these figures a rise in weekly marks was shown in 17% of girls during the premenstrual week, in 21% during the menstrual week, and in 30% during the post-menstrual week (Fig. 2). This fall in the standard of school work in 27% during the premenstruum and an improvement in the work in 30% following menstruation reveals the significance of menstruation as a factor affecting the day-to-day performance of schoolgirls (Fig. 3). Further analysis of these weekly marks revealed that this pattern of premenstrual fall and post-menstrual rise was equally present in all age groups, and also occurred equally among girls with only one menstruation per term and those girls menstruating regularly, equally among the bright girls (more than six months below the average age for the form) and the duller girls (more than six months above average age), and was equally distributed among the consistent workers, who had a variation of only two marks during the term, and the inconsistent workers, whose weekly mark fluctuated over four or five grades.

In considering the effect of a few off-colour days during the premenstruum on the school work it is well to appreciate that some of the marked work used in determining the weekly mark covers new work learned during class and tested in the same week—for example, mathematical principles, grammatical rules in English, French, or Latin—while in other subjects homework consists in learning work to be tested the following week. Thus the marking during the menstrual week reflects the failure to learn during the premenstrual week and also the improvement in performance consequent upon the relief of water retention accompanying the full menstrual flow.

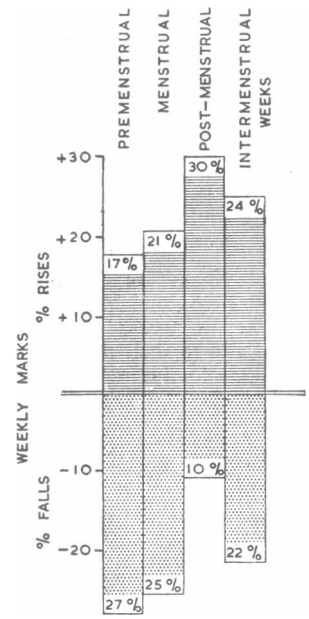

FIG. 2.—Effect of menstruation on 1,560 weekly marks.

Though it was not possible to prove statistically, it would appear that the schoolgirl's behaviour may also be adversely affected by menstruation. The charts in Fig. 4 were seen displayed in the dormitory of a London independent school for girls (mixed day and boarders). Here each morning the 24 boarders in the middle school, aged 10 to 14 years, receive a grade, A to D, from the matron for tidiness of her bed and drawer. An interesting pattern is revealed with falls in tidiness grades occurring at intervals of 21 to 30 days. Though the dates of menstruation were unknown in all the girls except Girl I, it is significant that each of her three falls in tidiness grade coincided with menstruation. Was premenstrual tension responsible for the carelessness of this schoolgirl before breakfast? And does the same apply to the other girls whose charts are also shown?

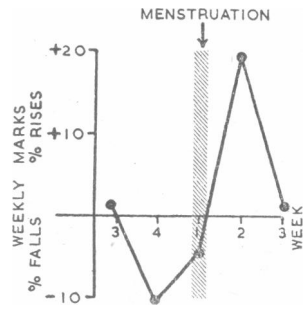

FIG. 3.—Variation in schoolgirls' marks due to menstruation.

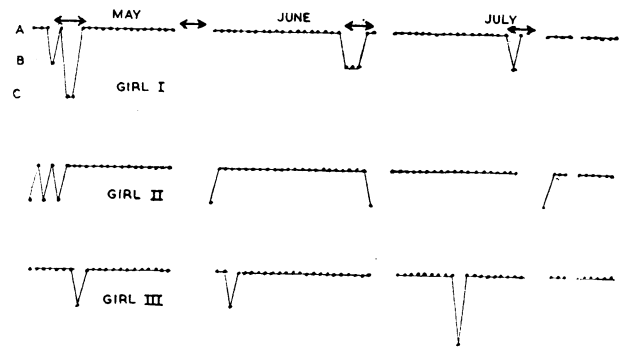

FIG. 4.—Daily tidiness grades with cyclical drops. Girl I: 12 years 6 months; drops in tidiness grades at intervals of 42 and 21 days; menstruation shown by arrows. Girl II: 12 years; drops in tidiness at intervals of 26, 23, and 25 days. Girl III: 13 years 6 months; drops in tidiness grades at intervals of 21 and 27 days.

Summary

The adverse effect of menstruation on the normal school work of 217 menstruating girls, aged 11 to 17 years, is evidenced by the finding that one in every four girls had a fall in weekly mark during the premenstruum followed by a rise after menstruation. It is appreciated that in times of stress the premenstrual symptoms are increased (Dalton, 1955). It would appear, therefore, that on occasions of important examinations the handicap imposed by menstruation will be proportionately increased. About one girl in six in any examination entry will be in her premenstruum and thus at her lowest intellectual ebb. While zealots campaign assiduously for equality of the sexes, Nature refuses to grant equality even in one sex.

My thanks are gratefully expressed to Miss Audrey E. Fryer, M.A., and Miss M. G. Lloyd Thomas, B.Litt., M.A., the headmistresses who so kindly supplied the necessary data, and to their matrons and staff, and also to Dr. E. W. Dunkley for his wise counsel.

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Medical Memoranda

A Case of Phocomelia Associated with Severe Mental Deficiency

Phocomelia is a congenital malformation of the osseous system characterized by the absence or extreme smallness of the arms, forearms, thighs, and legs, producing a pronounced shortening of limbs. The hands and feet, which may be fairly normal in appearance and development, seem inserted more or less direct into the shoulders or pelvis of the patient. As the micromelic appendages resemble the physical outlines of a seal's flippers, the condition is known as phocomelia.*

Sometimes, however, only the arms or the legs are affected and, less uncommonly, a single arm or leg, with all the other limbs otherwise normally formed. The hands and feet, however, may show numerous congenital anomalies, such as disproportionately short, long, supernumerary, and webbed fingers or toes.

This exceedingly rare bone anomaly is related to prenatal factors arising during the early phase of foetal development which prevent the laying down of certain parts of the osseous system. The cranial vault, the vertebral arches, and the pelvic and shoulder girdles may likewise manifest serious structural deficiencies.

Short references to phocomelia have been made by Church and Peterson (1911), Aschoff (1928), and Kaufmann (1929), but the most descriptive record, with photographs, has been contributed by Patten (1946). None of the above-mentioned authors, however, have investigated psychologically the mental condition and intellectual state of their patients.

**Phocos*, Greek for seal. *Melos*, Greek for limb.

CASE REPORT

A case of phocomelia has recently been admitted to this Mental Deficiency Institution. She is a white baby girl aged 3.7 years, having a mental age of 8.2 months and an intelligence quotient of 19, being classified as belonging to a low-grade type of mental defect (idiot).

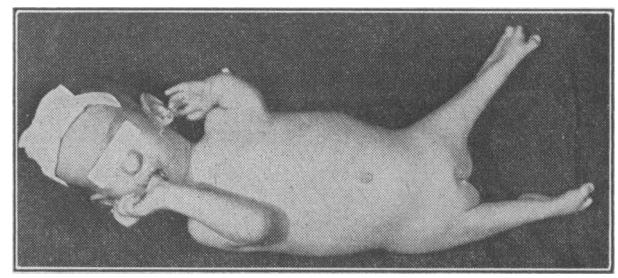
She is of Caucasian race, and comes from a non-farm rural environment. She is the younger of two siblings, her brother being of normal physique and intelligence, and in good health.

The mother, who is a diabetic with a history of psychosis, was 35 and the father, who has a peptic ulcer, 43 at the patient's birth. Histories of alcoholism in the paternal and psychosis in the maternal grandparents have also been recorded.

The patient was an eight-months child. The mother felt well during the pregnancy, and labour was said to have been uneventful. The baby weighed 5 lb. (2.3 kg.) at birth, and had feet and a left arm growing out of the lower torso and left upper shoulder-chest region, respectively. She had a hare-lip and a cleft-palate, which were recently repaired surgically. Otherwise she was healthy, breathed without difficulty, and moved about in the crib playfully. No other information was available.

Physical Examination.—Skin: clear. Scalp: normal. Hair: fair and fine. Eyes: blue; palpebral fissures are narrow, with a certain degree of slanting towards the outer angles. Nose, lips, and palate plastically repaired. Lungs: clear to anterior and posterior examination. Heart: no murmurs heard and cardiac outlines normal. Neuromuscular system: she is right-handed, with pareses of both lower extremities and left upper limb; the grip of the right hand is normal; reflexes of left biceps active, right triceps sluggish; left biceps and triceps reflexes are absent; the upper and lower abdominal reflexes, both left and right, are active, and the plantar reflexes are normal bilaterally.

Special data.—Weight on admission, 14 lb. 6 oz. (6.5 kg.). (In the three weeks since her admission she gained over 1 lb. 4 oz. (560 g.) in weight.) Length, 22 in. (55.9 cm.). Cranial circumference, 17½ in. (43 cm.). Length of normal right arm and forearm, 9 in. (23 cm.); shortened left arm and forearm, 5 in. (12.7 cm.). The lower limbs measure only 7½ in. (19 cm.), including the feet. Torso/Leg ratio, 19/14½ in. (48/37 cm.). The inner aspect of the skin of the shortened arm is adherent along the axillary line to the skin of the outer chest wall; the left elbow-joint is movable and the left forearm very short. There is syndactylism of both feet, involving the second and third as well as the fourth and fifth toes, which are unusually small. A pilonidal sinus is seen in the ilio-coccygeal region.



Roentgenological Report.—There are most amazing osseous defects in this child. The left humerus, radius, and ulna are underdeveloped and deformed, but the bony outlines of the right upper limb are normal. Both femurs are hypoplastic and of abnormal shape, and both tibiae and fibulae are absent. The facial bones, particularly the sphenoid, ethmoid, maxillary, and mandibular structures, are rather smaller than usual, and there is a cleft in the bony palate. The left shoulder-blade is hypoplastic, of irregular outline, and shows some defect in its centre. The cranial vault exhibits slight digital markings, with some thinning of the inner table.