The evidence suggests a spread of the disease from child to child and from child to school-teacher, and that very close personal contact was necessary.

It was interesting to note that no member of a class of nursery children, in the charge of a school-teacher suffering from the disease, contracted the illness. It was observed that the incidence in children under school age was low.

Clear cases of infection of two school-teachers who were friends occurred at one school, with an interval of three weeks between the illnesses. No children in their respective classes were affected, although the disease was prevalent in the school. It seems that the infective period is a short one, and Pickles (1939) states that further evidence of this is noted in the periodicity of attacks. A two-weeks isolation period was not followed by any return case.

Conclusions

It appears that epidemic catarrhal jaundice spreads chiefly in school-children, but young school-teachers frequently contract the disease.

There is probably among the general public a lack of appreciation that cases of jaundice occurring in children may be infective.

This disease seems to have a short infective period, to be spread by close personal contact, and to have an incubation period of between three and four weeks.

It is spread through an ultramicroscopic virus, notably by way of the upper respiratory tract. No effective measure of control appears available. School closure leads to scattering of the disease over a wider area.

A period of two weeks' isolation seems to be sufficient. This was carried out in the present outbreak, and there were no return cases.

The town-dweller appears to have little immunity from the disease, which spreads in the same manner as in rural areas. Two age groups are chiefly affected—6 to 10 years and 20 to 30 years. It is possible that the former group is affected because children of this age may be more sociable in their habits.

An epidemic of enteritis may occur coincidentally with an epidemic of catarrhal jaundice if either occurs out of season.

I wish to express sincere thanks to Dr. R. H. H. Jolly for permission to carry out this investigation.

REFERENCES

- Barber, H. (1937). *British Medical Journal*, 1, 67.
 Frazer, E. M. R. (1935). *Ibid.*, 1, 701.
 Lisney, A. A. (1937). *Ibid.*, 1, 703.
 Morgan, M. T., and Brown, H. C. (1927). Ministry of Health Report on Public Health and Medical Subjects, No. 42, London.
 Pickles, W. N. (1930). *British Medical Journal*, 1, 944.
 — (1939). *Lancet*, 1, 893.

PEDICULOSIS CAPITIS AND INTELLIGENCE IN W.A.A.F. RECRUITS

BY

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Recently much interest has been aroused in the question of the correlation of parasitic infestation, particularly scabies, with intelligence. The results so far have been controversial. Hodgson (1941a, 1941b) found that the incidence was higher in men of inferior intelligence, whereas Mellanby *et al.* (1942), attempting to corroborate Hodgson's work, found that men suffering from scabies were mentally an approximately normal sample from the Army.

The Investigation

The opportunity for the present investigation occurred during psychiatric work at a large W.A.A.F. depot when selecting recruits suitable for trade training, those suitable for acceptance in the Service but not for trade training, and those unlikely to become efficient airwomen. Broadly speaking, the problem

resolves itself in the main into one of intellectual grading, although obviously other factors, such as personality, temperament, previous work, and social history, enter too. The correlation between parasitic infestation and intelligence therefore has a practical aspect: thus in cases in which doubt occurs, opinion may be, and in fact has been, swayed by the incidence of scabies, pediculosis, or, as sometimes happens, both.

In the W.A.A.F. pediculosis capitis is by far the greatest of all parasitic problems, and because of the relatively large numbers infested the correlation of intelligence and infestation was attempted. All W.A.A.F. recruits on arrival at the depot are examined for pediculosis capitis by specially trained medical orderlies as part of the routine F.F.I. examination. Those found to be infested are detained in "head huts" for treatment, and their intelligence tests, psychiatric examination if necessary, and trade selection are postponed till such treatment is completed.

The intelligence test used on all W.A.A.F. recruits is the "G.V.K." test, devised by Dr. W. Stephenson of Oxford. This consists of three group paper and pencil tests applied by specially trained W.A.A.F. officers and airwomen under standard conditions. They are divided in accordance with the Spearman approach to intelligence into "G" tests (general analytical intelligence), "V" (verbal intelligence), and "K" (practical-mindedness). The raw score on these tests is converted into percentiles expressing in percentage terms the standing of a recruit in relation to other recruits.

Results

The G.V.K. scores expressed in percentiles of 312 recruits after treatment for pediculosis capitis are given in Table I. The percentile G.V.K. scores of 312 unselected recruits found to be free from pediculosis capitis are given in Table II.

TABLE I.—G.V.K. Scores in Percentiles: Recruits Treated for Pediculosis Capitis

Percentiles	Number of Recruits		
	G	V	K
90-99	7	6	0
80-90	15	22	0
70-80	26	14	2
60-70	21	15	3
50-60	31	19	8
40-50	28	22	9
30-40	42	31	32
20-30	44	34	47
10-20	41	64	57
0-10	57	85	154
Total	312	312	312

TABLE II.—G.V.K. Scores in Percentiles: Unselected Recruits free from Pediculosis Capitis

Percentiles	Number of Recruits		
	G	V	K
90-99	70	53	7
80-90	65	65	17
70-80	44	42	12
60-70	23	19	24
50-60	24	21	33
40-50	25	20	39
30-40	23	27	44
20-30	25	19	51
10-20	8	27	44
0-10	5	19	41
Total	312	312	312

A comparison of the two tables shows very clearly that the number of recruits with the lowest percentile scores is greater in all three tests in those treated for pediculosis capitis. Thus, in G, V, and K there were respectively 212 (69%), 236 (76%), and 299 (96%) with percentile scores of between 0 and 50 in recruits treated for pediculosis capitis, as compared with 86 (28%), 112 (36%), and 219 (71%) in those found on initial F.F.I. examination to be uninfested.

Summary

On initial F.F.I. examination 312 W.A.A.F. recruits found to be infested with pediculosis capitis were treated and then given the Stephenson G.V.K. intelligence tests. The scores after

conversion into percentiles were compared with the percentile scores of 312 unselected recruits who were uninfested.

There was a marked difference in the scores of the two groups, the lowest scores in all three tests being found in the infested group, suggesting that pediculosis capitis is more prevalent among the less intelligent recruits.

I wish to thank A.S.O. Comley, W.A.A.F., and Corporal (now Sergeant) Minnitt, W.A.A.F., for their very valuable assistance.

REFERENCES

- Hodgson, G. A. (1941a). *British Medical Journal*, 1, 316.
 (1941b). *Lancet*, 2, 791.
 Mellanby, K., et al. (1942). *Ibid.*, 2, 596.

TREATMENT OF MALARIA IN ENGLAND

BY

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The manifestations of malaria as seen in England are almost protean in appearance and character, so it is probable that many cases are overlooked. In particular this is true of the subtertian, in which the classical periodicity is not always to be found and which may indeed show no fever. Most of the cases seen in England are probably examples of relapse, because patients generally have resorted to some antimalarial drug with the onset of the primary fever in the Tropics. Frequently, however, the dosage which they use is so inadequate that return to a colder climate precipitates an attack.

During a period of a little more than 18 months there have come under observation and treatment at the Seamen's Hospital 60 cases of malaria in which the diagnosis has been confirmed by finding parasites in blood films. The numbers may appear trifling to those who are accustomed to this infection in regions where it is indigenous, but to English practitioners they may seem formidable. In the course of diagnosis and treatment some problems have appeared, but with few exceptions it has proved possible to adhere to a standardized procedure. Certain variations, both in the nature and in the length of treatment, have been unavoidable as a result of exigencies of war, but the main therapeutic scheme has been similar in 57 cases of subtertian malaria. The overwhelming preponderance of subtertian infection was natural, since most of the patients had been infected in Freetown, Sierra Leone, where other species of malaria are almost unknown. In 40 a history of previous quinine therapy was obtained, but, as many of the patients were foreigners and the language difficulty sometimes did not permit of an accurate and detailed statement, it was not always possible to find out whether quinine had been taken prophylactically or therapeutically. Previous quinine therapy had undoubtedly modified the clinical picture very greatly and increased the difficulties of diagnosis. One patient at least, dissatisfied with delay while the diagnosis was being established, continued to take quinine surreptitiously while in hospital, thus rendering the difficulty even greater.

Diagnosis

Throughout the period under review it has been considered essential to demonstrate malaria parasites in the blood film before starting specific therapy, but in order not to overburden the pathological service an attempt has always been made to establish a clinical probability before calling in laboratory aid. Of the patients 44 had fever at the time of admission, while 24 complained either of shivering attacks or of malaria, and in these cases the probability was considered to be sufficiently great to justify blood examination; but during the same period more than 40 men were admitted diagnosed wrongly as cases of malaria either on their own initiative or by the masters of their ships, and among the various causes of symptoms "influenza," bronchitis, cystitis, and tuberculosis were found to be the most important in order of frequency. Any patient who develops a fever after recently returning from the Tropics is, of course, to be suspected of malaria, but it is

just as important to recognize the multitude of other febrile conditions which may be present as it is to diagnose malaria correctly when it is present. In any suspicious case blood films must be examined on more than one occasion, and the blood should preferably be taken when the fever is at its highest. The use of a preliminary injection of adrenaline half an hour before the taking of blood films is referred to later. The character of the fever was not found very helpful, and only two cases remained undiagnosed for long enough to reveal tertian periodicity.

Among the more baffling symptoms generalized aching pain in the limbs was described in 4 cases, abdominal symptoms in 3—one of which cases was admitted as an acute abdominal emergency and one on account of bloody diarrhoea—and 10 gave headache as their main complaint. One patient was admitted unconscious, with high fever. Cerebral malaria was promptly diagnosed, since it is an established custom to regard all pyrexial comatose patients as suffering from malaria until some alternative diagnosis is established. In 43 the spleen was palpable, but in only 5 was more than a 2-finger enlargement recorded, while in a certain number of cases the organ could be felt only by deep subcostal palpation with the patient lying on his right side. Considerable practice is necessary to detect lesser degrees of splenic enlargement, and it is slight splenomegaly which is most likely to help in diagnosis of doubtful cases. Anaemia of varying degree was present in almost every case, but haemoglobin estimations were made only in those cases in which, on clinical grounds, a severe depression was anticipated. Out of 22 cases in which the haemoglobin was determined 17 gave values below 70%.

The blood examinations for parasites were carried out by Dr. Arthur Davies; he recorded malignant tertian rings alone in 39 cases, rings and crescents in 13, and crescents only in 5 cases. Benign tertian parasites were found in 2 cases and quartan malaria in a single instance. One of the benign tertian patients had apparently been infected either in South America or in Panama, while the other had spent some years in India although he had been for a few weeks in Freetown also. The quartan infection apparently originated in the Philippines. Out of 60 cases in the series, parasites were found at the first examination in 42 and at the second examination in 13, while in the remainder multiple examinations were necessary. In 2 cases parasites were discovered only in films taken after the injection of adrenaline, given as a simple subcutaneous injection, usually before the second examination. The intravenous technique of Ascoli was not employed.

Treatment

The benign tertian and quartan infections were treated with quinine only. The subtertian infections were treated with a combination of mepacrine (atebrin) and quinine, pamaquin (plasmoquine) being given subsequently to those patients in whom the sexual forms of the parasite had been found. In all cases two equal courses of mepacrine 0.1 g. t.d.s. combined with quinine in varying dosage were given, while in the intervening period quinine alone was used. The original course lasted 15 days, but later the course was extended to 21 days: throughout the series, however, it was divided into three equal periods—two of mepacrine and quinine together and one of quinine alone. In the original course quinine 10 gr. t.d.s. was given, but this was subsequently reduced to 5 gr. b.d. without any adverse effect on the therapeutic result being noted. The total dosage now given in 21 days is 4.2 g. of mepacrine and 210 gr. of quinine. The course is therefore now as follows:

First week: Mepacrine 0.1 g. t.d.s.; quinine 5 gr. b.d.

Second week: Quinine 5 gr. b.d.

Third week: Mepacrine 0.1 g. t.d.s.; quinine 5 gr. b.d.

After completion of the above course pamaquin was added in cases in which crescents were present.

The considerable total dosage of drugs was regarded as justified when treating patients in England, where there is no danger of reinfection and where the number under treatment is inevitably so small. No case of quinine sensitivity was encountered, and only 4 developed yellow mepacrine pigmentation. Of these, 3 were but slightly tinged; but the fourth patient, who had been certified as fit for duty, was sent back with a pointed letter about the fitness of "jaundiced" patients.