pneumococcal meningitis. The other patient, who was admitted in a desperately ill condition, died after four days, showing no response to sulphapyridine. Post-mortem examination revealed red hepatization of one lung and extensive fibrosis of the other, with dense, almost cartilaginous, pleural adhesions. Only two cases showed any complications. One developed a sterile effusion which absorbed satisfactorily, and was only 35 days in hospital; the other developed a lung abscess which finally healed by fibrosis after many weeks.

As the hospital was situated in a hyperendemic M.T. malarial area all patients had routine blood films examined for malaria parasites. Parasites were found in only two cases, which were treated with quinine in addition to sulphapyridine.

Bronchopneumonia

The 52 cases in this group were acutely ill on admission and showed signs of generalized bronchitis with areas of patchy consolidation in both lungs. A productive cough was a prominent feature. They were treated by the oral administration of sulphapyridine, which was followed by a drop in temperature less dramatic than that in lobar pneumonia, but their recovery was rapid and complete. Only one case showed any complication, and that was an interlobar effusion which absorbed completely without interference.

There was no single death in this group, whose mean stay in hospital was 20.5 days.

Pleurisy

In every one of the 12 cases the symptoms were fever and pain in the chest, and a dry friction rub was found on physical examination. In no instance did an effusion develop. The treatment consisted of sedative cough medicine and heat in the form of kaolin poultices. The majority of these patients were examined radiologically and showed no evidence of any tuberculous focus.

The mean stay in hospital was 17.2 days, and none had been readmitted for a chest complaint over a follow-up period of from 2 to 6 months.

Pulmonary Tuberculosis

The 7 cases of pulmonary tuberculosis were confirmed by radiographs and sputum examination. With one exception they all had extensive lesions of the exudative type, with little evidence of resistance. The one exceptional case had an acute flare-up of a chronic fibroid phthisis, which settled down again with rest in hospital. One of the more active cases was admitted with a massive pleural effusion, which partly absorbed and recurred on three occasions. Contrary to tradition and our expectations, the incidence of pulmonary tuberculosis is low, and when seen was of the acute adult type, and no case of Ghon's focus or other evidence of the primary infection of childhood was seen.

All these cases were medically "boarded" and invalided from the Service.

Lung Abscess

One soldier was admitted in a very toxic state, having just returned from a month's leave in a bush village up-country. On examination he was found to be emaciated, with a swinging temperature and copious foul sputum. Radiographs showed two cavities with fluid levels in the right lung. He did not respond to treatment, and died ten days after admission. At necropsy a large abscess cavity was found in the right upper lobe, extending down to involve the middle lobe, and this had burst into the pleural cavity just before death. The left lung showed scattered areas of bronchopneumonia.

Bronchitis

This was the largest group in the series, and consisted of 159 cases. Five of these cases were acute exacerbations of chronic bronchitis, and the men were invalided from the Service; of these five, three had a superadded asthmatic condition. The remaining 154 patients had acute infections, one having an associated asthmatic element not severe enough for invaliding. They all responded readily to expectorants and inhalations, and required only a few days in bed. In four instances malaria parasites were found in routine blood films, and these patients responded to quinine.

The mean stay in hospital of these bronchitic patients was 11 days.

Minor Upper Respiratory Infections

This group included cases of coryza, pharyngitis, tracheitis, and sinusitis. They had been sent to hospital owing to a considerable pyrexia, which in practically all instances lasted at most 24 hours, when the patients were convalescent, apart from the very small number (five) suffering from sinusitis. In none of these cases were malaria parasites found.

Discussion

There is clear evidence that the African is much more susceptible to acute respiratory infections in the Tropics than the European. During the period under review there were only a few cases of bronchitis and minor upper respiratory infection and no cases of pneumonia or bronchopneumonia in the European wards of the hospital. Chill would appear to be a very important precipitating factor, as shown by the three peaks of high incidence of respiratory infection during the nine-months period. Two of these peaks were associated with the arrival of fresh troops after transit by sea entailing sleeping on deck, when the night cold of a moving ship affects the African severely. The third peak occurred in January, when the weather is at its coldest and the Europeans are at their fittest, with a low sick rate.

It is worthy of note that in all this series only six showed malaria parasites, whereas in the European any acute infection, by lowering the general resistance, allows latent malaria to manifest itself.

Although respiratory infections are seen to be the cause of much sickness, with removal to hospital and temporary loss of man-power, they respond readily to treatment. Serious complications are rare and the death rate low, and the permanent loss of man-power to the Army is very small.

Summary

Of 1,250 admissions to the African wards of the medical division of a general hospital in West Africa, 375 (30%) were acute respiratory infections.

Only one of these cases was of tropical origin, being an instance of paragonimiasis.

There were only two deaths among 76 cases of acute lobar pneumonia (2.6%). No deaths occurred in 52 cases of bronchopneumonia. The third death in the whole series was that of a soldier admitted with advanced lung abscess.

Complications were very rare: among the lobar pneumonia cases, one lung abscess and one sterile effusion; and one interlobar effusion in a case of bronchopneumonia.

An important aetiological factor in these respiratory infections appears to be a degree of chill not affecting Europeans.

The mean stay in hospital for the various groups was as follows: lobar pneumonia, 21.8 days; bronchopneumonia, 20.5 days; pleurisy, 17.2 days; bronchitis, 11 days.

Our thanks are due to Brig. R. A. Hepple, O.B.E., M.C., late R.A.M.C., for permission to publish this article.

NIGHT VISION IN THE ARMY

REPORT OF 10,333 TESTS

BY

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The purpose of this article is to give additional facts to those already published by Rycroft (1942) and Craik (1943) on the conditions of the Army night-vision test and to place on record the results of a large number of tests.

Rycroft has already given an account of the Army night-vision test apparatus. In this series a certain modification of the technique described by him was employed, and is mentioned below. The brightness figures in Table I have kindly been supplied by Dr. K. J. W. Craik of the Psychological Laboratory, Cambridge, who designed the test. He has asked us to emphasize that these figures are approximate only, because the

filter material (neutral cellastoid) through which the pentagon screens are regarded is not perfectly neutral. It is slightly blue. He points out that, in comparing the results obtained by different types of adaptometer, the colour of the light can make a big difference to the visibility of the light at low illuminations for a constant brightness at high illuminations.

It is also emphasized that the test is one of scotopic visual acuity and not of minimum light threshold. Though this is so, the brightness of the screens as seen through the filter (see below) corresponds closely with the absolute light threshold of 1 to 10 micro-millilamberts (Duke-Elder, 1942).

TABLE I.—*Showing Brightness Figures. (The pentagon screens are tabulated in ascending order of brightness)*

Screen	Brightness of Screen	Brightness as seen through Filter
1	0.012 e.f.c.	— 5.52 log. e.f.c. = 3.0 μ ml.
2	0.021 "	— 5.28 " " = 5.2 "
5	0.031 "	— 5.10 " " = 8.0 "
3	0.051 "	— 4.90 " " = 12.5 "
4	0.095 "	— 4.621 " " = 24.0 "

The subjects in this series were from first-class units demanding a high standard of physical fitness and composed largely of volunteers. The purpose of the test was to find men who could be recommended as especially suitable for responsible posts in night operations and to eliminate from operational personnel men with poor night vision. The procedure was briefly as follows:

The men were taken in groups of five or six. Each group was dark-adapted for 30 minutes in dark goggles of a density which, with the lighting conditions, resulted in the first 10 minutes being spent in dim twilight and the last 20 in darkness. Each subject was then tested separately; his goggles were removed and he regarded the pentagon through the windows of a viewing-screen. An easy side of the pentagon was presented to him first, after which the sides were presented in any order. Five seconds was the maximum allowed for any one side at a time. Marks were awarded according to the most difficult side for which two consecutive correct answers were given. Each subject was handed a ticket showing

TABLE II

Age	Total	5/5	4/5	3/5	2/5	1/5	0/5	Av. Marks for Each Age
18	43	20	14	8	1	0	0	4.23
19	492	213	165	78	26	7	3	4.10
20	941	339	339	141	45	13	4	4.12
21	933	353	339	147	66	18	10	3.99
22	1,269	450	448	236	96	24	15	3.91
23	1,099	359	385	220	94	25	16	3.83
24	766	235	282	140	75	18	16	3.77
25	664	210	215	146	64	15	14	3.75
26	779	232	283	172	73	12	7	3.81
27	646	169	238	143	72	18	6	3.71
28	588	171	207	128	52	19	11	3.72
29	479	127	179	100	56	11	6	3.70
30	382	100	135	86	45	9	7	3.66
31	272	78	86	59	29	14	6	3.61
32	241	57	91	45	30	8	10	3.54
33	158	43	53	34	14	11	3	3.60
34	132	31	48	32	12	4	5	3.57
35	120	28	38	26	19	6	3	3.45
36	102	16	42	27	9	5	3	3.53
37	67	16	21	19	6	1	2	
38	64	18	21	19	1	3	2	
39	35	6	15	8	4	2	0	3.36
40	19	4	7	5	1	2	0	
41	12	6	2	1	2	1	0	
42	11	2	4	4	0	0	1	3.36
43	6	2	3	1	0	0	0	
44	2	1	0	0	0	1	0	
45	3	0	1	1	0	0	1	3.36
46	1	0	1	0	0	0	0	
49	1	0	0	0	0	1	0	
50	2	0	0	1	1	0	0	3.36
51	2	0	1	0	1	0	0	
52	1	0	0	0	1	0	0	
55	1	0	0	0	1	0	0	
Total	10,333	3,346	3,663	2,027	896	248	153	

his marks. The group left the dark-room together, and handed their mark tickets to the recording clerk. A group could be tested in this way within five minutes. One hundred and fifty is a convenient number of men to test in a day, but over two hundred can be dealt with without undue fatigue.

The viewing-screen mentioned above is glazed with goggle-glasses—"triplex," the middle element being a neutral cellastoid

filter. Its advantage over goggles is that the space around the eyes is not closed. Fogging is thus prevented or greatly diminished, and can easily be attended to by means of a good-quality "anti-dim" substance. It also ensures that the same density of filter is used for all subjects. The results of this series of tests are shown in the accompanying Tables and Graphs.

TABLE III.—*Distribution of Marks in Total*

5/5	4/5	3/5	2/5	1/5	0/5
32.4%	35.4%	19.6%	8.7%	2.4%	1.5%

TABLE IV.—*Distribution of Marks in Age Groups*

	5/5	4/5	3/5	2/5	1/5	0/5
18-22	39.0%	35.5%	16.6%	6.3%	1.7%	0.9%
23-27	30.4%	35.3%	20.5%	9.6%	2.2%	1.4%
28-32	27.1%	35.5%	21.3%	10.7%	3.1%	2.0%
33-37	23.1%	34.9%	23.8%	10.3%	4.6%	3.1%
38-55	24.4%	34.4%	25.0%	7.5%	6.3%	2.5%

A large majority of the subjects had visual acuity of 6/12 or better in both eyes, without glasses, so that no comparison can be made of scotopic with photopic visual acuity.

The fundi of all the men who received low marks were not examined, but in those that were examined no pathological changes were found. Where there are no fundus changes the cause of poor night vision is often obscure, and it is often difficult in such cases to assess the truth of the subject's answers. While most of the men with 1/5 and 0/5 stated that they did not see well in the dark, a few were emphatic that they had no difficulty, and it is probable that 0/5 just includes the minimum end of the range of normal scotopic vision.

FIG. 1.—Table IV in diagrammatic form.

FIG. 2.—Results in graphic form. Ordinates=Average marks out of five. Abscissae=Age groups.

If the brightness is raised two stages, so that that of screen No. 4, as seen through the filter material, is between 60 and 70 μ ml., 1/5 comes within the range of the pathologically night-blind, since this screen has been found to be visible under these conditions to one or two cases of retinitis pigmentosa.

The results correspond fairly closely with those obtained by Steadman (1943) using a different adaptometer. Rycroft

obtained a considerably higher proportion of men with 0/5—7% in even his best group. This discrepancy is probably mainly due to difference in technique, and emphasizes the advantage of the viewing-screen over goggles. In spite of constant attention the latter become fogged and are a source of error.

The chief interest of this series of results is the illustration it gives of the downward trend of scotopic vision which occurs with advancing years. According to these results the drop begins before the age of 18. Since, however, the drop from the average at 18 to that at about 44 is only in the region of 3 μ ml., this point is of theoretical rather than of practical importance.

Summary

The brightness figures of the Army night-vision test are given, with a qualifying remark on the colour of the light in adaptometers. Though the test is one of form sense it appears that the minimum light necessary for the discrimination of a simple form is in the region of the absolute light threshold.

The results are recorded of 10,333 tests, the subjects of which were high-category men between the ages of 18 and 55. They illustrate the downward trend of scotopic vision which occurs with advancing years.

We wish to thank Brig. Sir Stewart Duke-Elder, Consultant Ophthalmic Surgeon to the Army, for permission to publish this article; also Dr. Craik, to whom the first part of the article is due.

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FILARIASIS IN THE MIDDLE EAST

BY

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It is not unusual to meet with cases of clinical filariasis among African native troops in the Middle East, and one of us (J. F.) has seen them in all three hospitals to which he was temporarily attached.

In view of the high incidence of microfilariaemia among natives in certain regions of Africa reported in the literature, it was considered of interest to carry out a routine examination of the blood of all negro patients in the wards of a general hospital, irrespective of the condition for which they were admitted. At the same time information was obtained of the country of origin in each case and the period that had elapsed since they left their homes: in practice this period corresponded to the time of enlistment. The findings are shown in Table I.

An inspection of the table revealed that: (1) 12 cases (29%) out of 42 showed the presence of microfilariae; (2) 30 out of the 42 patients came from Uganda, and all the positives were in this group—i.e., Uganda soldiers showed 40% infestation with filaria; (3) of the 12 cases of filariaemia only two had clinical filariasis; (4) the patients with filariaemia had left Uganda from 10 months to 2 years and 8 months previously.

An attempt was made to determine the species of filaria present by doing relative counts morning and evening. The results appear in Table II, the number of filaria recorded being the total found in an entire uniform wet film.

It is clearly impossible to infer the species in more than three cases in this series: of these three one was *L. loa*, the other two *W. bancrofti*. Unfortunately there was no opportunity of continuing the investigation to determine the diagnosis by more frequent counts or by staining methods.

One point of interest that emerges is the large number of instances (10) in which only one larva was present in an entire wet film. In those cases an average of 15 minutes elapsed before the larva was found, and it is not unlikely that a less leisurely examination would have yielded more negative results: five such negative results were in fact reported by a laboratory assistant whose speedy disposal of 20 films (in about 50 minutes) roused suspicions as to the reliability of his findings. In view of the number of films with only one larva in the entire specimen it seems probable that some of the negative results

might have been positive if a greater volume of blood was examined, or if a concentration method was used at which a quantity of blood was haemolysed and a centrifuged deposit examined. The use of thick films, dehaemoglobinized and stained, should also increase the number of positives in a filarial survey.

TABLE I

No.	Ag	Country of Origin	Years since leaving Home	Presence of Microfilaria in Blood	Clinical Diagnosis
1	36	S.W. Africa	18/12	—	Corneal ulcer
2	25	Uganda	10/12	—	Inf. hepatitis
3	37	"	15/12	—	Sciatica
4	20	"	15/12	—	N.Y.D. headache
5	22	"	11/12	—	Herpes zoster
6	21	"	1	—	Lobar pneumonia
7	20	"	15/12	—	"
8	26	"	15/12	—	Clin. malaria
9	21	"	11/12	—	"
10	24	"	15/12	+	Pneumonia (conv.)
11	21	"	15/12	+	Filariasis
12	25	"	11/12	—	Pneumonia (conv.)
13	24	"	2	—	N.Y.D. haemoptysis
14	18	"	10/12	+	Pneumonia (conv.)
15	20	"	2	—	Taenia infest.
16	25	"	32/12	+	Inf. hepatitis
17	19	Kenya	11/12	—	Taenia infest.
18	22	Uganda	1	+	Cellulitis
19	20	"	15/12	—	Arthritis
20	25	"	11/12	—	Clin. malaria
21	21	"	2	+	Filariasis
22	22	Kenya	1	—	Diarrhoea N.Y.D.
23	26	"	2	—	Dysentery N.Y.D.
24	23	Uganda	11/12	—	"
25	18	"	9/12	—	"
26	42	"	15/12	+	Shiga dysentery
27	33	"	3	—	Dysentery N.Y.D.
28	20	"	21/12	+	Inf. hepatitis
29	25	Seychelles	5/12	—	Dysentery N.Y.D.
30	23	Tanganyika	1	—	Ankylostomiasis
31	23	Swaziland	1	—	Schistosomiasis
32	25	Uganda	15/12	+	Arthritis
33	25	"	15/12	+	Bronchiectasis
34	22	"	10/12	+	? Tb. chest
35	25	Kenya	13/12	—	Bursitis shoulder
36	23	Uganda	11/12	—	Mumps
37	19	Uganda	10/12	—	Pneumonia (conv.)
38	42	Bechuanaland	15/12	—	Cataract
39	30	Uganda	8/12	—	"
40	20	Kenya	1	—	Dysentery N.Y.D.
41	25	"	25/12	—	"
42	20	Uganda	1	+	"

The transmission of filariasis is by a wide range of insects. Manson-Bahr instances 24 species of mosquito capable of transmitting *W. bancrofti*, and these include 8 culicines, 11 anophelines, 3 aedes, and 2 mansonioides: among those are *Culex fatigans*, transmitted by mangrove-flies only (*Chrysops*), while the intermediate hosts of *A. perstans* are limited to the midge genus *Culicoides*. It is clear, therefore, that malarious areas such as occur in the Middle East are likely to favour the dissemination of *W. bancrofti* infection, and, even though the incidence of clinical filariasis is not high among infested individuals, it does not seem desirable to expose non-filarial

TABLE II

No. of Case	Original Serial No.	Filaria Count		Species Present
		9 a.m.	9 p.m.	
1	10	3	3	?
2	11	1	38	W. bancrofti
3	14	1	1	?
4	16	1	0	?
5	18	1	0	?
6	21	20	0	L. loa
7	26	1	14	W. bancrofti
8	28	5	2	?
9	32	1	0	?
10	33	1	0	?
11	34	1	1	?
12	42	1	2	?

districts to the consequences of introducing heavily infested bodies of troops such as the Uganda natives.

The scope of the present investigation is admittedly too limited to justify any sweeping recommendations such as the cessation of recruiting in endemic filarial areas of Africa. Nevertheless it does seem desirable to introduce a routine blood-film examination for natives in such areas and to assign infected cases for local duty only. Whatever precautions might be taken with infected troops (segregation, mosquito netting), the great length of time, extending into years, during which filariae are present in the blood stream renders the probability of eventual dissemination one of definite proportions.