The following have been elected members of the New South Wales Branch:—

Dr. James Arthur Murphy, Goulburn.
Dr. Ulick Bourke, Dungog.

The following have been nominated for membership:—

Dr. Joshua Young Wai, Goodooga.
Dr. Thomas R. Earls Davis, Royal Prince Alfred Hospital.

Medical Appointments Vacant

DEPARTMENT OF TRADE AND CUSTOMS.
QUARANTINE SERVICE.

APPLICATIONS are invited for the position of QUARANTINE OFFICER in the Commonwealth Quarantine Service. Applicants must be qualified medical graduates, and must state their age and record of experience.

Salary, £400 per annum.

The position is exempted from the provisions of the Public Service Act or any of its amendments.

Preference will be given, other things being equal, to candidates holding the Diploma of Public Health.

The Successful Applicant will be required to take up duty at Brisbane or such other Station as may be directed.

Applications should be addressed to the Director of Quarantine, 51 Spring Street, Melbourne, and should be lodged on or before October 31st, 1914.

F. G. TUDOR,
Minister for Trade and Customs.

COMMONWEALTH NAVAL DOCKYARD, COCKATOO ISLAND, SYDNEY.

APPOINTMENT OF CIVILIAN MEDICAL OFFICER.

APPLICATIONS are invited from Qualified Medical Practitioners for appointment as MEDICAL OFFICER (Civilian) at the **Commonwealth Naval Dockyard, Cockatoo Island, Sydney.**

Appointment will be for three years, at a consolidated salary of £400 per annum, and may be terminated by a month's notice on either side. The successful applicant will be required to pass a medical examination as to physical fitness, and must take up duty at his own expense.

Full particulars are advertised in the Commonwealth Gazette of the 3rd October, 1914, and may be obtained on application to the Naval Secretary, Navy Office, Melbourne, or from the District Naval Officer, Naval Staff Office, Brisbane, Sydney, Adelaide, Fremantle, and Hobart.

Applications must reach the Naval Secretary, Navy Office, Melbourne, not later than 2nd November, 1914.

S. A. PETHEBRIDGE,
Secretary.

Department of Defence, Melbourne.

Medical Appointments Sought, etc.

LOCUM TENENS.—M.D. desires Engagement. Apply G.P.O., Sydney, N.S.W., Box 2373.

Dr. Nash desires to let his rooms, 219 Macquarie Street, Sydney, during his absence on military duty.

Births, Marriages, and Deaths.

The charge for inserting announcements of Births, Marriages and Deaths is 5s., which sum should be forwarded in money orders or stamps, with the notice, not later than the first post on Tuesday morning, in order to ensure insertion in the current issue.

Death.

GRIGSON.—On October 8, 1914, at a private hospital, Darlinghurst, Sydney, Charles William Grigson, aged 66 years.

Diary for the Month.

Oct. 20.—New South Wales Branch, B.M.A., Council Meeting.
Oct. 21.—Western Australian Branch, B.M.A., Branch Meeting.
Oct. 21.—Victorian Branch, B.M.A., Clinical Meeting.
Oct. 23.—Melbourne Hospital Clinical Meeting.
Oct. 27.—New South Wales Branch, B.M.A., Committee Meetings.
Oct. 27.—Victorian Branch, B.M.A., Eye and Ear Section.
Oct. 28.—Victorian Branch, B.M.A., Council Meeting.
Oct. 29.—South Australian Branch, B.M.A., General Meeting.
Oct. 30.—New South Wales Branch, B.M.A., Ordinary Meeting.
Nov. 3.—New South Wales Branch B.M.A., Council Meeting.
Nov. 4.—Opthalmological Society of New South Wales.
Nov. 13.—New South Wales Branch B.M.A., Clinical Evening.
Nov. 17.—New South Wales Branch B.M.A., Council Meet-
Nov. 18.—Western Australian Branch B.M.A., Branch Meeting.
Nov. 24.—Victorian Branch B.M.A., Eye and Ear Section.
Nov. 24.—New South Wales Branch B.M.A., Committee
Nov. 26.—South Australian Branch, B.M.A., General Meeting.

Warning Notices.

Medical Practitioners are requested to communicate with the Honorary Secretary of the Branch of the British Medical Association before applying for any appointments referred to below:—

Branch.	APPOINTMENTS.
QUEENSLAND. (Hon. Sec. B.M.A. Building, Adelaide Street, Brisbane).	Brisbane United F.S. Institute. F.S. Lodges at Longreach. F.S. Lodges at Warwick.
WESTERN AUSTRALIA. (Hon. Sec. 230 St. George's Terrace, Perth).	Swan District Medical Officer. All Contract Practice Appointments in W.A.
NEW SOUTH WALES. (Hon. Sec. 30-34 Elizabeth Street, Sydney).	Australian Natives Association. Balmain United F.S. Dispensary. Burwood District F.S. Institute. Goulburn F.S. Association. Leichhardt and Petersham Dispensary. M.U. Oddfellows Med. Inst., Elizabeth Street, Sydney. N.S.W. Ambulance Association and Transport Brigade. N. Sydney United F.S. People's Prudential Benefit Society. Phoenix Mutual Provident Society. F.S. Lodges at Braidwood. F.S. Lodges at Casino. F.S. Lodges at Lithgow. F.S. Lodges at Mudgee. F.S. Lodges at Orange. F.S. Lodges at Parramatta, Granville, Penrith and Auburn. Killingworth Colliery, Newcastle. Seaham Colliery No. 1, Newcastle. Seaham Colliery No. 2, Newcastle. West Wallsend Colliery, Wallsend.
SOUTH AUSTRALIA. (Hon. Sec. 3 North Terrace, Adelaide).	The F.S. Medical Assoc. Incorp., Adelaide.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this Journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to the "Medical Journal of Australia" alone, unless the contrary be stated.

All communications should be addressed to "The Editor," "Medical Journal of Australia," B.M.A. Building, 30-34 Elizabeth Street, Sydney, New South Wales.

MEDICAL JOURNAL OF AUSTRALIA.

Vol. I. SYDNEY: OCTOBER 24, 1914. No. 17.

ON THE OCCURRENCE AND PATHOLOGY OF ENDEMIC GLANDULAR FEVER, A SPECIFIC FEVER, OCCURRING IN THE MOSSMAN DISTRICT OF NORTH QUEENSLAND.

By **A. Breinl, H. Priestley and J. W. Fielding**
(From The Australian Institute of Tropical Medicine).

O. Smithson(1) called attention in 1910 to a specific fever, occurring throughout the Mossman district, situated in North Queensland, which he termed "Mossman Fever."

In the report of the Commissioner of Public Health of Queensland for 1913, Clarke(2) gives a detailed and exhaustive account of the distribution and symptomatology of this fever, summarizing his experiences, collected during six years of residence in the district.

Since Clarke's report appeared in a publication not generally accessible it was deemed advisable to make free use of his observations in the present communication.

Definition.

Endemic glandular fever is an acute disease, characterized by an irregular remittent fever of from three days to three weeks duration, accompanied by painless swelling of certain groups of superficial lymph glands, and by the appearance of a macular, or occasionally vesicular, rash.

History.

According to Clarke, the Mossman district was first opened up by Europeans in or about 1877, when timber-getters settled along the Daintree River, which is situated about 12 miles north of the present township of Mossman. A number of the early settlers informed him "that shortly after their arrival in the district cases of sickness occurred amongst them, of a continuous fever, lasting for several weeks, accompanied by swellings in the armpits and groin. They observed a similar disease amongst the aboriginal inhabitants" and stated "that this disease existed prior to their advent amongst the aborinals of the district.

A perusal of the hospital records furnishes definite statistics regarding the number of cases admitted to the Port Douglas Hospital, beginning from July, 1908. Earlier, malarial fever, dengue and this fever were classified indiscriminately as "fever." In 1907—during the time of the outbreak of plague in Australia—the disease was for a short period considered to be plague, although there was no death amongst the scores of cases admitted to the hospital. This diagnosis was based on the presence of enlarged lymphatic glands only, and had not been confirmed bacteriologically.

After 1908, for some unknown reason, the cases are referred to in the hospital records as filarial fever, though filarial larvæ had never been found with any regularity in the blood of the patients, and the resemblance between the two is but slight.

Mossman Fever.—Journal of Tropical Medicine, vol. XIII., No. 23, p. 351, 1910.
Annual Report of the Commissioner of Public Health, Appendix E1, Brisbane, 1913.

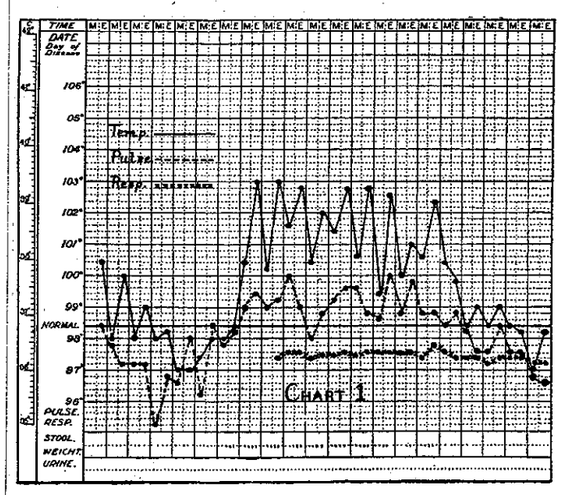
Distribution.

Clarke states that "the disease prevails between the coastal range of mountains and the sea, in the Mossman district, within a limited area, extending approximately 18 miles to the south and 30 miles to the north of the township of Mossman," a town situated at a latitude of 16° south, a few miles inland from Port Douglas. Dr. Clarke informed us personally that since writing his account he had seen sporadic cases of the same complaint from Mount Molloy and Mount Carbine (west of the town of Mossman, over the coastal range), and from Maytown and Bloomfield, near Cooktown.

One case treated at the Townsville Hospital had left the Mossman district nine days prior to the development of definite symptoms. He had, in all probability, contracted the fever before his departure.

Symptomatology.

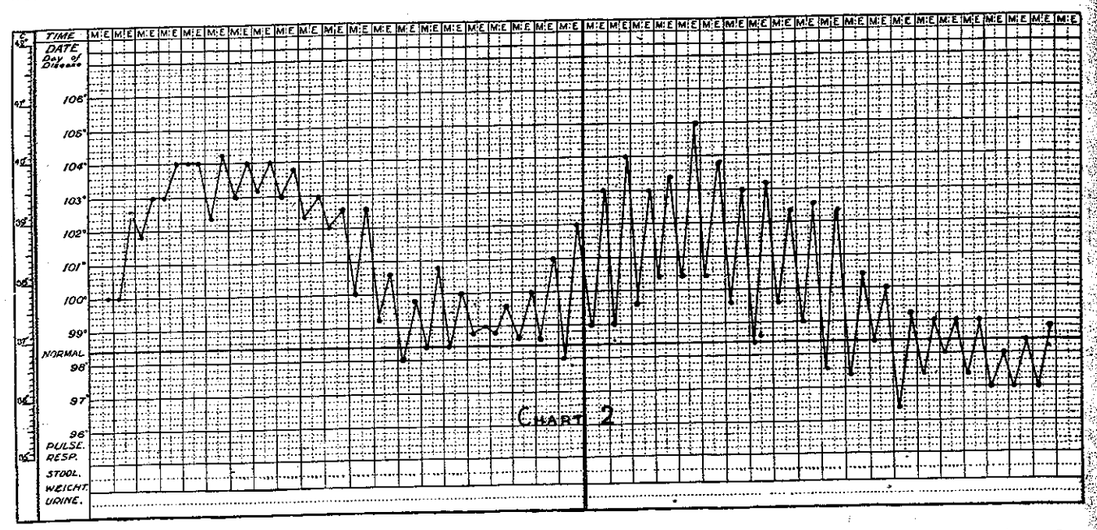
Clarke gives six days as the latent period between the "reception of infection and the onset of symptoms," but remarks that "for a few days in some cases even as long as eight days preceding the onset of pyrexia, the patient suffers from a feeling of malaise, with diminished appetite." In one of the cases observed by us, the temperature rose suddenly on the eighth day after his admission to the hospital. The patient was suffering from cane boils, but for two days previously he had complained of headache and loss of appetite. The case treated in the Townsville Hospital developed symptoms nine days after leaving Port Douglas, so that the length of the incubation period, may to a certain extent, vary and may be as long as ten days.



The anamnesis does not bring out any distinctive features. The disease begins with a general feeling

of malaise, with headaches, loss of appetite, accompanied by dry retching and vomiting. These symptoms become more and more marked as the disease progresses.

The temperature may rise suddenly (see Chart I.) or gradually (Chart II.), reaching its maximum within a few days, and is of a remittent type. Rigors



are seldom observed. The high temperature persists for about 10 days, but the time may vary from 3 days in a mild case, to 3 weeks or more in a severe case. After the period of pyrexia, the temperature falls by lysis.

The pulse-rate does not increase proportionately with the temperature. The pulse is soft, of low tension and often dicrotic. The rate of the respiration is not altered. Headaches, which may be purely frontal or occipital, are always present, and pains in the back of the eyes are common, accompanied by a certain degree of photophobia. The patients complain of pains in the back and limbs, but not to the same extent as in dengue fever. Anorexia is always noticed, and sleeplessness and nervous irritability are marked features.

The Lymphatic System.—An enlargement of certain groups of the superficial lymph glands, in the majority of the cases of the axillary and inguinal, less often of the cervical glands, is invariably present. A slight enlargement is often observed at the time of the onset of the fever, which becomes more marked as the disease progresses, so that during the height of the fever the lymph glands may be as large as a walnut, but do not, as a rule, exceed the size of a marble. They are hard, indolent and often tender on deep pressure, and do not show a tendency to abscess formation. As the fever abates, the swollen lymph glands decrease in size rapidly, though a slight enlargement may persist at times for months.

The spleen is not palpable, and the liver is normal in size.

Skin.—All the cases observed by us—only 30 per cent. of Clarke's cases—developed a well-marked rash on the trunk, arms and legs, and occasionally on the face, simultaneously with, or a few days after, the rise of the temperature, persisting for two to four days, and disappearing without any apparent desquamation. It may take the form of copper coloured macules, the slightly raised darker centre being surrounded by an erythematous halo, or may rarely be of vesicular character, closely resembling that of chickenpox.

The majority of the patients sweat profusely, mostly at night. The tongue is coated with a thick yellowish fur, which at a later stage becomes dark brown. Pains in the throat on swallowing are quite common, due to an hyperæmia of the pharynx. Vomiting of bile stained fluid often occurs. Most of the patients complain of constipation, but diarrhœa has been observed. The abdomen is not distended, nor is it tender on palpation. The urine does not show any changes beyond those due to the pyrexia, being concentrated and of dark colour.

The respiratory tract shows no changes other than an occasional slight bronchitis, and the heart is, except in very severe cases, but little affected.

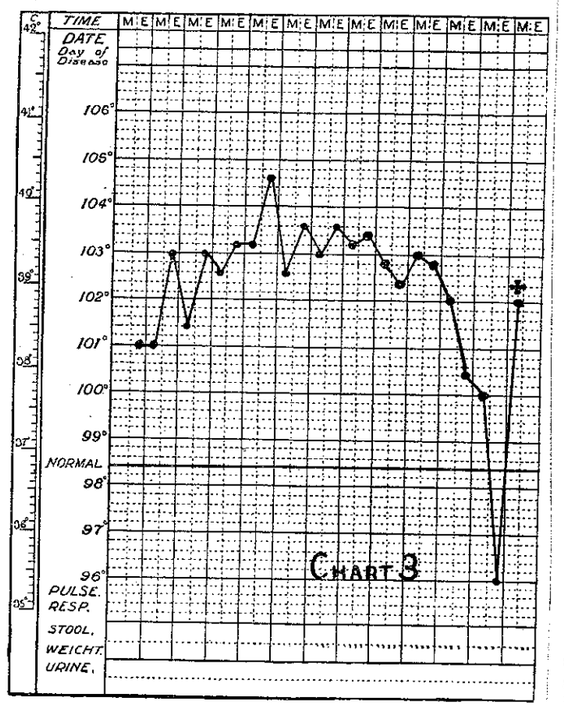
Relapses have been observed, as shown in Chart II.

Clarke, as a result of his large experience, classified the cases under three headings, namely, the restless, the drowsy and the chronic type.

The restless type, comprising about 92 per cent. of all his cases, is characterised by a marked nervous irritability, and restlessness, and occasionally twitching of the muscles, by troublesome nightmares and not infrequently by nocturnal delirium.

In the drowsy type, "the symptoms in general resemble those of the restless type, with the following exceptions: After an initial headache, often of distressing severity for a few hours, practically all symptoms of pain cease. The patient becomes drowsy and depressed, and he loses all interest in

his surroundings. He is easily aroused to take food or medicine, the perspiration is not so profuse as in the restless type. Although the patient in the early stages takes his food well, he loses weight rapidly. The tongue is very dry, and rapidly becomes coated of a deep brown almost black colour. There are frequent marked twitchings of the voluntary muscles. The superficial lymphatic glands are more enlarged than in the restless type of the disease. Nystagmus may develop late in the complaint. During the sec-



ond week after the onset of the pyrexia, the drowsiness may deepen into coma, and a fatal issue rapidly ensue. A sudden fall to sub-normal, followed by a rapid rise of the temperature to 103° or even higher may take place towards the termination of the disease (see Chart III.).

In general, the appearance of the patient resembles one with typhoid fever, but there is no distension or tenderness of the abdomen. The characteristic typhoid rash does not develop, the spleen is not enlarged, tympanites, perforation and hæmorrhage do not occurr. In 53 cases of the drowsy type, 8 of the patients had previously suffered from typhoid fever.

The chronic type, on the whole, resembles a mild restless type. In these cases, the temperature may rise from a little above normal or even sub-normal in the morning to 99° or 101° in the evening. The lymph glands are only slightly enlarged, a feeling of malaise is well marked. These symptoms may persist for three or more months.

One attack of the disease confers a slight and transient immunity only, and the same person may contract the infection at yearly intervals.

Prognosis.

The prognosis is, generally speaking, very favourable, and Clarke found, amongst 1482 cases, a mortality of less than one per cent.

Diagnosis.

When a case of endemic glandular fever occurs within the endemic area, the diagnosis does not present any difficulties to the experienced; but since this fever resembles in some of its clinical aspects certain other diseases, the differential diagnosis must be discussed.

Many of the cases of dengue occurring in Queensland show a more or less pronounced swelling of the superficial lymph glands, and the rash in dengue fever simulates, in many instances, that of endemic glandular fever. The course of the fever, however, differs. In typical cases of dengue, the pyrexia lasts for five days only, being followed after a remission of about two days by a short relapse, whereas in this fever a fairly high remittent temperature persists, usually for 10 days or more. The pains in the back, the bones and the joints, so well known in dengue, are but little marked. The pulse, rapid in the former and increasing proportionately with the temperature, is only slightly raised in endemic glandular fever. Besides, in dengue, the incubation period is shorter, the onset more rapid, and the convalescence extends over a longer period.

Endemic glandular fever was at one time considered to be bubonic plague. The differential diagnosis should not present any difficulties, since the swollen lymph glands in the latter are not symmetrically distributed, they are painful and tender and are prone to suppurate, though the course of the fever is similar in both.

On the whole, the clinical picture of the majority of cases of endemic glandular fever is not of the same severity as that of bubonic plague, and the anxious facial expression, so typical in the latter, is entirely absent. An isolated case of the fever outside the endemic area might be mistaken for bubonic plague, especially since the first cases of an epidemic are comparatively mild, but a bacteriological examination will decide the diagnosis.

In climatic bubo, a disease which occurs in North Queensland, and might be confused with endemic glandular fever, only the lymph glands of the groin become swollen and painful, and frequently suppurate, and the severe constitutional disturbances are invariably absent.

Endemic glandular fever has been termed, for an unknown reason, filarial fever, though there is no clinical resemblance between the two. In the case of filariasis, the swelling not only involves the lymph glands, but also the surrounding lymphatic tissue, giving rise to an extensive doughy swelling in the affected region.

It may be noted that filarial larvæ were found in less than 25 per cent. of Clarke's cases, and in none of our cases. Moreover, microfilariæ were absent from the blood of several cases who had suffered from the fever a year or more previously.

Etiology.

The etiology of endemic glandular fever is unknown.

A great number of smears of the peripheral blood and of lymph gland juice obtained by gland puncture from patients, stained by Giemsa's stain and by Breinl's wet methods were examined with entirely negative results.

Blood cultures were made from a number of cases on ordinary culture media, including serum, but were entirely negative in every case. The cultures made from the urine of one case showed no growth beyond a few colonies of staphyloccus albus.

Pathology.

The blood of a number of patients was carefully examined, and it was found that the number of red blood corpuscles and the amount of haemoglobin do not undergo any changes during the course of the disease.

The number of white blood corpuscles increases during the first few days, but a pronounced leucocytosis was not observed in any of our cases. The differential count showed an increase in the percentage of lymphocytes only. (See table I.)

TABLE I.

Date of Disease.	R.B.C.	W.B.C.	Differential Count. Polymorphs Neutrophiles	Transitionals	Lymphocytes	Eosinophiles	Large Mononuclear.
Case W. 2nd	4,630,400	6,900	71.8%	0.6%	25.6%	—	2%
7th	—	12,300	55.2%	0.4%	43%	—	1.4%
Case M. About 7th day	4,876,800	9,200	77.2%	1.0%	19%	—	2.8%
12th	—	11,766	53.4%	0.4%	44.6%	0.2%	1.4%

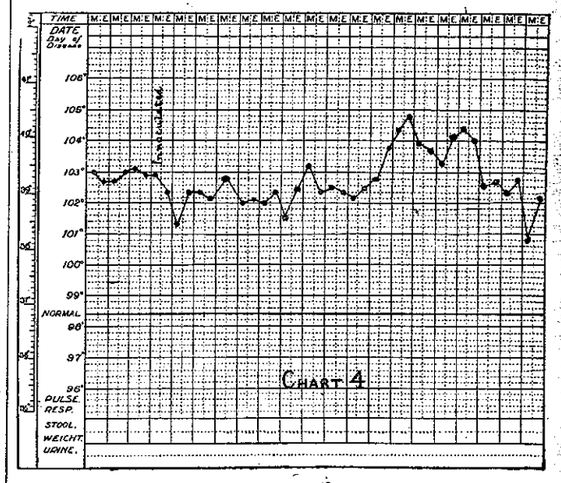
Histology of Lymph Glands.—Lymph glands from the groin and neck of one of the fever cases were extirpated. On cross section they appeared hyperæmic, of light pinkish colour, soft and œdematous. There were no necrotic areas noticeable.

The histological examination of sections stained by various methods showed the typical picture of an acute lymphadenitis. There was œdema and small celled infiltration in the periglandular tissue. The blood vessels of the lymph glands were distended, and free red blood corpuscles were scattered in between the glandular tissue. The lymphoid tissue was permeated by distended lymph spaces, containing a few blood corpuscles and endothelial cells, some of them in varying stages of degeneration, the chromatin showing fragmentation. Many of the endothelial cells contained cell debris; no necrotic areas were seen.

Animal Experiments.

Two monkeys (one Macacus rhesus and one Cercopithecus (?)) and one guinea pig, were injected with about 10 c.cm. of the peripheral blood of two patients, who showed well developed symptoms of endemic glandular fever. In these monkeys a definite rise in temperature was observed on the 9th and 10th day respectively, after inoculation (see Chart IV.).

Since the temperature of both monkeys rose after the same interval it is evident that the fever was due to an infection from the blood of the patient. The body temperature previous to inoculation was fairly constant, and fell, in one case five days, in the other four days after the onset of the pyrexia to



the normal; two control monkeys kept under the same conditions did not show any rise in temperature. The conclusion is therefore justified that the inoculation of blood from cases of endemic glandular fever into monkeys had given rise to a pyrexia, due to the causal agent of endemic glandular fever.

The lymph glands of the infected monkeys became slightly enlarged at the time of the onset of the pyrexia.

The guinea-pigs did not react to the inoculation in any definite way.

Epidemiology.

Persons of both sexes and of all ages are susceptible to endemic glandular fever. A racial immunity does not exist; Australian aborigines, natives of the Pacific Islands, and Asiatics are known to have contracted the disease. It seems that the old inhabitants of endemic districts contract the fever as well as newcomers, perhaps in a milder degree. A comparison of the number of cases of this fever which underwent treatment at the Port Douglas Hospital during the last few years, with the average maximum and minimum temperatures, and the monthly rainfall, makes it apparent that the air temperature, as such, and the amount of rainfall do not influence its incidence, and that there is no marked seasonal variation noticeable.

It is interesting to note that the number of cases admitted per month before April, 1911, was much higher than in the succeeding years (see table 2).

At the end of March, 1911, the district was visited by a cyclone, followed by a very heavy flood. The figures seem to indicate that there may be a causal connection between the ocurrence of the flood and the diminution in the number of cases.

The hospital records prove further that the incidence of the fever is not evenly distributed over the district, but that the greatest number of cases had come from certain well-defined localities, as a rule situated near to dense scrub country, although sporadic cases occurred throughout the whole district.

TABLE II.

Number of Cases of Endemic Glandular Fever admitted to the Port Douglas Hospital.

Month.	1908	1909	1910	1911	1912	1913	1914
January	—	5	11	15	4	4	2
February	—	8	20	15	8	6	6
March	—	9	15	20	9	6	5
April	—	9	12	5	1	4	4
May	—	7	18	3	5	8	8
June	18	5	13	2	6	10	4
July	21	15	25	4	4	12	6
August	25	31	21	4	9	6	—
September	24	38	10	—	2	12	—
October	17	21	17	1	7	3	—
November	3	2	14	8	9	4	—
December	1	2	12	7	5	3	—
Total	109	152	188	84	69	78	35

It was pointed out to us that farm hands employed in the cane fields, and farmers who were compelled to do manual work in the field, were more prone to contract the disease than supervising farmers, and that the number of women and children admitted to the hospital suffering from the fever formed a small percentage only of the total number of cases. During the six years for which records were obtainable only 43 women were admitted out of a total of 715 cases.

Since cases of endemic glandular fever have been observed in districts where no sugar cane is cultivated, it is clear that the incidence of the disease does not depend solely upon local conditions brought about by the cultivation of sugar cane. All cases observed in other localities were, however, men who had spent some time previously in the dense scrub.

Nothing definite is known about the ways and means by which the disease spreads. There is no doubt that it cannot be considered a contageous disease, since no case has ever originated amongst the staff of the Port Douglas Hospital, and no inpatient of this institution has contracted the disease whilst in the hospital, although no special precautions are taken to prevent the possible spread.

Water and food as sources of the infection can be eliminated by the consideration of the localized distribution. The local occurrence and spread of the fever, the incidence of the infection in proximity to scrub country, and, furthermore, the fact that it is mostly cane cutters and field workers sleeping in camps, situated in sheltered places near water, who contract the fever, whilst the greater number of supervising farmers, who spend only the day or part of the day in the field, escape infection, indicates that endemic glandular fever is, in analogy with dengue, malaria, etc., an insect transmitted disease.

During our short stay, extending over four weeks only, biting insects were collected from infected localities. Of those, biting flies as Tabanids, etc., do not make their presence felt in numbers throughout the whole year, and are plentiful during the summer months only. As sandflies show a sporadic distribution, and were not found in localities where fever was said to be prevalent, and as bed bugs and lice are seemingly of rare occurrence, mosquitoes are in all probability the most likely insect carrier. They are, as far as we could ascertain, the only biting insects attacking men present throughout the whole year and of general distribution. The collection made during our short stay only comprised the following insects:—

Culex fatigans, Stegomyia fasciata, Nyssorhynchus annulipes, Myssorhynchus bancrofti, Culex vigilax, Culex sitiens, and two new species not yet determined.

Of these only the two latter species are peculiar to the district.

In analogy to plague it is possible that native animals of infected districts may be connected with the spread of the disease.

The only wild animals of general distribution in the district are rats, which are at times very numerous in the cane fields. Unfortunately, no specimens could be obtained for examination.

Conclusions.

1. Endemic glandular fever is a specific disease occurring in the Mossman district of North Queensland, characterized by a high remittent temperature of about 10 days duration, enlargement of certain groups of the superficial lymph glands and the appearance of a rash.

2. The etiology of the fever is unknown, no parasites were discovered in the peripheral blood and gland juice, and cultural examination of blood and urine gave negative results.

3. Histological examination of enlarged lymph glands showed the typical picture of lymphadenitis.

4. Two monkeys were successfully infected by means of blood inoculation from two patients.

5. Epidemic glandular fever is in all probability an insect transmitted disease.

DYSMENORRHŒA.

By J. A. G. Hamilton, M.B., B.A.

Lecturer on Gynaecology, Adelaide University; Hon. Gynaecologist, Adelaide Hospital; Surgeon, Queen's Maternity Home, Adelaide.

It is not my intention in this short paper to enter into a wide discussion on the classification, etiology, causes, symptoms and treatment of this somewhat common and ambiguous disorder. Any of us who have been in practice for a number of years must notice that painful menstruation in young girls, especially amongst the leisured classes, and amongst shop and factory girls, and others whose hygienic

(Read at the Australian Medical Congress, Auckland.)