CLINICAL OBSERVATIONS ON ONE HUNDRED CASES OF “TRENCH” NEPHRITIS.¹

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The 100 cases from which this report is compiled were all seen at a General Hospital in France, in wards especially set aside for the reception of nephritic patients. The actual period of observation extended from early in January until late in February, 1917; the dates of onset in the cases considered varying from late in November to late in February. During the first few weeks of this period—that is, throughout the latter part of November and the whole of December, 1916—the weather was such as is usual in Northern France at the season—moderately cold, damp and sunless. From then onwards was a period of intense cold with northerly winds, snow, and a high proportion of bright clear days. The majority of the patients taken ill during the earlier period had suffered from exposure to cold and wet; during the latter the degree of cold was greatly increased, but the element of damp was largely eliminated by the continuous frost. With the exception of two cases, in which the kidney symptoms were discovered after admission to hospital, they all came down from the Casualty Clearing Stations with diagnoses of nephritis, acute nephritis or albuminuria. They varied greatly in severity from cases showing very marked signs of kidney trouble of a serious nature down to patients in whom the only symptom was the presence of albumin in the urine.

The cases at the two ends of the scale of gravity shaded so imperceptibly into each other that it was found impossible to make any line of demarcation, having on the one side those showing a morbid and on the other those with a possibly abnormal, but not necessarily pathological, condition of the kidney. No sharp line could be established between what were obviously that condition which one is accustomed to call acute nephritis, on the one hand, and on the other the cases which one might have been tempted to describe as “functional” or “postural” albuminuria. All seemed to be indications of an affection of the kidney differing in degree only.

The series included cases from many formations. The percentages were: Infantry 80; R.E.’s 8; R.F.A. 5; A.S.C. 4; R.G.A. 1; R.A.M.C. 1; R.F.C. 1. The formations in question were all actually in the field—that is, to say none of them were stationed at bases or on the lines of communication, and consequently even when not actually “in the trenches” the men had been subjected to considerable exposure. The one patient from the R.F.C. was attached to a kite balloon section on the Somme and had been living in roughly made shelters.

¹ Received for publication May 25, 1917.
**Age.**—The incidence in regard to age is spread with a rather striking evenness over the five-yearly periods between 20 and 40. The vast majority of the British soldiers in France fall between these ages, and it is not surprising that only one case occurred below 20, the age of this patient being 19. Considering, however, how comparatively few men of 41 or over are on active service in France it is rather suggestive that eight per cent of the cases fall into this category. The ages of incidence for the remaining ninety-one cases were as follows:—

- Age 20 to 25...23 cases.
- 26 to 30...21
- 31 to 35...23
- 36 to 40...24

There are probably considerably more men in the British Expeditionary Force in France between the ages of 20 and 30 than between 31 and 40, and it is certainly worthy of note that the number of cases in the former group was only forty-four as compared to forty-seven between the latter ages. There are, moreover, certainly fewer men in the field between 36 and 40 than between 20 and 25, and the fact that the figures for these two series are almost identical, 24 as compared to 23, points to the same conclusion—namely, that the liability to the malady increases with age.

**Service in the Field.**—A consideration of the time of service with the British Expeditionary Force brings out no very striking fact, save that twenty-one per cent of the cases had been in France for over one year. Three patients had been in France for only one month, but no period under that was recorded. The service in France of the remainder was as follows:—

- 1 to 3 months...23 cases.
- 3 to 6...28
- 6 to 12...25

**Past History.**—Investigation into the past history of the cases revealed a comparatively high incidence of acute rheumatism, a history of this disease being obtained in eleven. That the disease actually was acute rheumatism was ascertained as nearly as possible by enquiry as to symptoms remembered by the patient and length of stay in bed. Next to acute rheumatism came scarlet fever with an incidence of ten, in two cases with a definite history of consequent kidney trouble. Including these two cases acute kidney trouble occurred five times in all; in four other cases there was a history of swelling of the face and feet in the past of unknown causation, but probably associated with renal disorder. Of the other exanthematous measles occurred twice and diphtheria twice.

**Onset.**—The onset in the greater majority, eighty-five of the cases, was gradual. In the remaining fifteen the patient up to that time feeling comparatively well—as well as men expect to feel in the trenches in winter time—was taken ill so suddenly and violently as to be forced there and then to give up his work and go sick. Of these cases of sudden onset the first symptom in five was dyspnoea, in another five oedema coming on
suddenly during sleep. Two patients reported sudden and severe headache, in one case associated with vomiting; in one case precordial pain was the immediate cause of reporting sick, while one patient admitted unconscious could remember nothing from the time of his disembarking from the leave boat.

Symptoms.—Oedema. Oedema described by the patients themselves as “swelling” was the most frequent symptom of all. In twenty-two this was the first thing noticed; in sixty-eight it came on later; in a few cases not being noticed until the patient was actually in the Field Ambulance or Casualty Clearing Station. In only ten of the cases could no history of oedema be obtained.

In four cases it was curiously localized. In one of these on arrival in hospital the patient showed, with a slight general anasarca, a great enlargement of the right leg with little of the left; in this case no sore or other cause could be found to account for this difference. In a second case in which there was swelling of the left leg but none of the right, a small ulcer was present in the popliteal space on the affected side. This appeared before the swelling and healed in advance of the disappearance of the oedema. In a third case an oedema confined to one side of the face was associated with septic teeth on that side of the jaw. In the fourth case the immediate cause of the patient’s being evacuated from his unit was an intense oedema of the scalp and forehead. A note accompanied this patient from the C.C.S. to the effect that the swelling resembled a cellulitis, but that no septic focus could be found. All these four cases showed albumin, casts and blood in the urine. In the remaining cases the oedema was most frequently noticed by the patients in the face and backs of the hands. The thighs and knees were often reported as having been swollen—the legs less frequently so—this probably being due to the constriction of the puttees. In hospital the oedema was found to persist longest in the back and below the malleolus.

Other Symptoms.—The next commonest symptom was headache, which was complained of by fifty-nine. Of the more typical symptoms the most frequent was dyspnoea in forty-seven. Cough, often very severe, was present in thirty-six cases. Coryza was present in 16, hoarseness or loss of voice, presumably due to laryngitis, in 5, and sore throat in 5.

Early symptoms possibly referable to the urinary system were as follows: Pain in the loins in 39 cases; painful micturition in 7; frequent micturition 7; incontinence of urine 1. In three cases a diminution of the amount of urine passed was reported.

Vomiting was present at the onset in fifteen, and diarrhoea in four cases.

Apart from the pain in the loins referred to above, pain in other parts was also a prominent feature at the onset. A general aching, similar to that experienced in influenza, was described in 8 cases, in 16 it was localized in the legs, in 13 apparently in the muscles and in 3 in the shins. These last three cases were interesting as the pain and tenderness
was similar to that present in "trench fever," and like it, was associated with pain in the back. Pyrexia was present in these three cases for some time after the onset. It seems possible that there was here an intercurrent infection of the type known as "trench fever." Epigastric pain was present in six and precordial in three cases.

Epistaxis was reported in three cases. In five subconjunctival hemorrhages were present. In two of these were a very marked feature—in one the whole visible surface of the sclerotic was hemorrhagic, while in the other the discoloration was sharply confined to the outer half of each eye.

Shivering (? rigor) was present at the onset in five cases.

Pyrexia.—The earliest that any of these cases were seen was on the third day from the onset, while many were not seen until the tenth day; consequently it was impossible to determine whether or not the onset was attended by pyrexia in all cases. That this was sometimes the case was shown by occasional notes on the field medical card, recording temperatures up to 103° F.

Eighteen of the 100′ cases only showed any pyrexia on admission. In 6 the temperature dropped to and remained at normal within fourteen days of the onset, 5 more fell to normal within the third week, and 4 more within the fourth. The remaining three continued some degree of fever into the fifth week of the illness. It was very noticeable that the majority of these eighteen cases admitted with pyrexia showed some intercurrent affection sufficient to account for the fever. In 6 this was bronchitis, 3 more were the suspected cases of "trench fever" already mentioned, and 1 apparently a pyelitis.

A rather remarkable feature of the temperature chart was the occurrence, quite unexpectedly, and for no apparent cause of short periods of pyrexia, of from twenty-four to seventy-two hours. These were unattended by symptoms, except sometimes by headache and pain in the back. In 10 of 16 cases these occurred in the second week of the disease; in 4 in the third, and in 1 in the fourth. In one case three such minor relapses occurred in the fourth, fifth, and sixth weeks respectively.

Longer periods of pyrexia of from four to ten days after an apyrexial period occurred in seven cases, but in all these, with the possible exception of one, the causation of the fever was easily explicable. In 3 it was accompanied by severe bronchitis; in 1 by intestinal disturbances and diarrhoea; in 1 by a carbuncle on the face; and in another by marked shin pains and an apparent recurrent attack of "trench fever." The seventh case was a severe relapse, with drowsiness and marked haematuria, to which reference will be made later.

The conclusions arrived at in regard to pyrexia were:

(1) That apart from the actual time of onset on which records were not obtainable, pyrexia is not usually present in the early stages, unless due to some intercurrent infection.
Clinical Observations on Cases of "Trench" Nephritis

(2) That short pyrexial periods are liable to occur without apparent cause at any time up to the fourth week.

(3) That longer pyrexial periods occurring after an apyrexial period are always due to an intercurrent infection.

Association with Bronchitis.—The association of bronchitis with the kidney symptoms has been mentioned several times above, and, indeed, this was one of the most striking features of the series. It was actually seen, or a history of it obtained, in thirty-six cases; and it is probable that it was an early symptom in a great many more, as men in the trenches in winter get into the habit of disregarding a cough unless of unusual severity.

In four cases the bronchitis was so severe as to endanger the life of the patient, being of the purulent type, which has been so fatal in the British Expeditionary Force in France. In one of these cases pure cultures of Bacillus catarrhalis were obtained from the sputum; in a second of B. influenza. The remaining two were mixed infections, with a prevalence of the pneumococcus. These bronchitic cases were always troubled by dyspnoea, and this and the "weakness," complained of by twenty of the patients, probably accounts for the large incidence of dyspnoea found in the history of the onset.

Besides signs of bronchitis in the lungs, it was no uncommon thing in the edematous cases to obtain signs of fluid in the pleural sac at both bases. Its presence was demonstrated by exploration in three cases. The fluid was of a clear straw colour, and free from cells of inflammatory origin.

The Heart.—The apex beat was found in the sixth intercostal space in sixteen of the cases, but in only four was there any marked enlargement. In three cases a fugitive systolic bruit, apparently not due to any organic lesion, was heard at the apex.

The Urine.—Amount: Oliguria, understood as an output of urine of less than thirty fluid ounces in the twenty-four hours, was present for anything up to three days after admission in about 15 per cent of the cases, but was apparently due more to previous diminished intake of fluid than to any lack of functional capacity on the part of the kidney. In no case was there any difficulty in establishing a good flow of urine so soon as the patient was placed on suitable diet and drinks. In two cases patients went from twelve to eighteen hours without passing water, but the urinary flow was soon re-established under hot poultices to the loins and diuretic drinks.

In those cases with a low urinary output the specific gravity was high; thus, on the first two or three days after admission a specific gravity of 1,025 to 1,038 was not uncommon. Later, with a free fluid intake, it was always observed to fall, remaining in the great majority of cases at from 1,010 to 1,012.

Very high daily outputs of urine were fairly frequent, being particularly noticeable at the commencement of the disappearance of a profound general oedema. The highest amount recorded was 193 fluid ounces in twenty-four hours.
The reaction was universally acid.

Albumin.—Albumin was present in the urine in every case except one not seen until the thirty-second day but previously diagnosed as nephritis. It disappeared while the case was under observation in twelve cases, this disappearance taking place on dates from the eighth to the thirty-fifth day of the disease. The remaining cases all went to England still showing albumin in the urine, although in every case the percentage was sensibly diminished below that with which they were admitted. In only nineteen cases were the patients evacuated with an Esbach reading of more than one gramme of albumin to the litre of urine. As the cases were first seen at all periods in the course of the disease, very varying degrees of albuminuria were met with on their admission. In some instances, notably where there was much edema and bronchitis, the Esbach reading was extremely high. In many cases it was far above the 12 mark on the Esbach tube; in one instance the reading remained above this mark for four days after admission, even after fourfold dilution, indicating the presence of well over forty-eight grammes of albumin to the litre. There was further a tendency for sudden increases in the intensity of the albuminuria after periods of comparatively low albumin content. Such rises in the albumin output were often associated with periods of pyrexia (figs. 4, 5 and 6); in favourable uncomplicated cases the diminution in albuminuria was rapid (figs. 2 and 3).

Casts.—Casts were found in almost every case, though often not until repeated search had been made. They were usually granular or epithelial. Hyaline casts were also fairly common. Blood casts were found twice and waxy once. The only importance attaching to the presence of casts seems to be that in very large numbers they indicate a severe degree of damage to the kidneys. In a few cases the urine on standing formed a sediment consisting almost entirely of granular casts, and these were particularly severe and obstinate cases.

Hæmaturia.—Hæmaturia was present in every case; it varied greatly in degree, however, from cases where microscopic search of centrifuged urine yielded only a few red blood cells, to those in which the presence of blood in the urine was obvious to the naked eye. Urines showing much blood macroscopically fell into two classes—those in which the specimen was of a bright cherry red, without much sediment, and those of a dark brown colour with tendency to formation of a thick brown sediment on standing. This latter type of urine was always associated with what Abercrombie has described as "lower tract" cases, that is, those showing symptoms referable to the bladder and ureters. This is not a common type of the disease, only five cases occurring in the series, but it is very striking when seen. The patient complains of severe pain in the loins—sometimes confined to one side only, of frequency of micturition, and of scalding pains during and more particularly at the end of the act. Rather more headache than was usual in the ordinary type of case was complained of in these
cases; and fairly severe vomiting was present once. The urine in addition to large quantities of blood cells always showed bladder epithelial cells, sometimes in large amount. The big cubical cells from the superficial layer of the bladder epithelium were the most commonly seen, but stalked cells from the deeper layers of the epithelium were not infrequent. The cells usually occurred singly or in clumps of two or three, but occasionally sheets of epithelium, large enough almost to cover the field of a one-sixth objective, were met with. In addition to blood and epithelial cells from the bladder, these urines also always showed considerable numbers of granular casts. The appearances seemed to point to a certain degree of infection of the bladder epithelium, but a cystoscopic examination was not made. It is to be regretted that the series had to be closed before thorough bacteriological and cytological examinations of the urines in these cases could be made, because they seem to provide a peculiarly promising field for the identification of any infecting organism or other cause of this malady.

A peculiar feature of the centrifuged urinary sediment was the almost constant presence of polymorphonuclear leucocytes. In those where the hematuria was intense it was naturally impossible to make out whether or no they formed an unusually large proportion of the blood cells present. Where, however, fewer red cells were present the high proportion of polymorphonuclears was often very noticeable, and it was a common thing to see specimens under the microscope in which the field of the one-sixth objective showed everywhere from six to a dozen of these cells with only an occasional erythrocyte. In only one case was pus actually present to the naked eye, and this was the case of pyelitis already referred to. The microscopic picture was here quite different, the whole field being thickly crammed with leucocytes; large leucocyte casts were also present.

Salt Content.—Estimations of the salt content of the urine by Volhard's method were made in six cases, and, in every one it was found that this was low while the oedema lasted. With the disappearance of the oedema the salt content of the urine rose (fig. 7). During these estimations the patients were kept on a constant diet, low in, but not actually free from, sodium chloride. The exact amount ingested daily was not known but it was fairly constant. It had been intended to conduct some experiments on the power of excreting sodium chloride during the persistence of the oedema, but unfortunately observations had to be closed before this was done. Extra sodium chloride was fed to one case during the disappearance of the oedema and was found to be well excreted (Case 54, fig. 7).

The Blood.—Urea content: Determination of the urea in the serum or whole blood was carried out in nineteen cases. Either whole blood or serum was used as convenient, it having been found that the difference between the urea content of the two from the same case was so small as to be negligible. When whole blood was used it was laked by the addition of distilled water. The laked blood or serum was then treated with
metaphosphoric or trichloracetic acid to eliminate the proteins, and the filtrate then treated with sodium hypobromite. The amount of nitrogen liberated was measured, the result reduced to standard temperature and pressure and then expressed in terms of urea. The method is not absolutely accurate but nearly enough so for clinical purposes.

The highest reading obtained was 1.34 grammes per litre on the fourth day from the onset, the lowest 0.46 on the twelfth day. The case giving the reading of 1.34 was one showing marked oedema and intense bronchitis without any “uræmic” symptoms, except a high-tension pulse. Readings of 1.19 on the fifth day, and of 1.25 on the seventh were obtained in two other cases similar, except that bronchitis was not present to the same degree. In a fourth case admitted unconscious, but without oedema or any other symptoms of renal trouble apart from a moderate albuminuria, a reading of 1.20 was obtained on the fifth day.

That the urea content of the blood falls rapidly with improvement was shown in this last case. On the seventh day, with considerable decrease of the mental symptoms the reading was 0.97 grammes per litre, while on the fifteenth day, when the condition except for a slight headache and a trace of albuminuria was normal, it had fallen to 0.56. In the case in which the reading was 1.25 on the seventh day it had fallen by the twelfth to 0.79.

Two cases of great severity gave readings of 0.79 and 0.66 grammes of urea per litre of blood as late as the forty-seventh and fiftieth days of the disease respectively. The former was not free from oedema even at that time and the latter had only been free for a short time. Both had shown intense oedema, much haematuria, and were still passing casts in large quantities. The former case still showed six grammes and the latter four grammes of albumin to the litre of urine. Another similar case showed 0.77 grammes of urea to the litre of blood on the twenty-sixth day. These were all cases in which the symptoms pointed to a very high degree of damage to the kidney, and the high urea readings of the blood at comparatively late dates in the course of the disease merely served to confirm the general bad prognosis.

Other readings obtained were:

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**Acidity.**—With a view to ascertaining if the dyspnoea present in so many cases was attributable to an increased acidity of the blood, determinations of the degree of acidity were made in eight cases by Captain Wolf, R.A.M.C. These cases all showed a certain degree of dyspnoea associated in every case with some bronchitis. In only one was any increase in the hydrogen ion concentration found. This was the most markedly dyspnoeic of all the cases and bronchitis of some severity was present. The acidity reported here was p. H. 83, corresponding to thirty-five millimetres of alveolar CO₂. In all the other cases the reading was p. H. 85.

**Uremia.**—Actual "uræmic" symptoms were only seen in one case in the series. This patient was admitted unconscious from another hospital; he was apparently taken ill with great suddenness, for no history could be obtained from him, except that the last thing he remembered was disembarking from the leave boat, at which time he felt quite well. No œdema was to be seen in this case, albumin was present to the extent of only 05 per cent in the urine; no convulsions were observed. The patient slowly regained consciousness. Within a week of the onset he was perfectly rational and complained of nothing more than a slight headache. The findings of the amount of urea in the blood in this case have already been given.

The occurrence of "convulsions" was noted on the field medical cards of four of the cases. These patients were all admitted with œdema and albuminuria of varying degrees. Three of them cleared up with rather more than usual rapidity; the fourth was more resistant, but was ultimately evacuated free from œdema and with only 03 per cent of albumin in the urine. It is inferred that the occurrence of convulsive fits early in the disease is not an event of grave prognostic import.

As compared with the experience of others who have had charge of nephritic patients in this War, the incidence of "uræmic" symptoms in this series seems to have been unusually low. This was probably principally due to chance, but it may also have been partly due to the fact that a careful watch was kept for such symptoms of approaching uræmia as intense headache, drowsiness, increased blood-pressure, and diminution of urine. On the appearance of such symptoms recourse was at once had to blood-letting to the extent of from fifteen to twenty-five fluid ounces.

**Treatment.**—Treatment centred mainly around the provision of a favourable environment and suitable diet for the patients. Throughout the period of observation all patients were kept in bed between blankets, but they were permitted to sit up in bed when they felt so inclined. While the acute symptoms lasted it was found that there was no tendency to do anything but lie quietly—and this even though on inquiry no complaint of pain or discomfort was made. An inclination to sit up and read or talk with other patients was usually the sign of the approach of convalescence.
In no case did untoward symptoms result from this general freedom, and, that this was so was probably due to the fact that the wards were kept as nearly as possible at a uniform temperature of about 62° F., and free from draughts. The importance of the provision of a warm equable temperature for these patients cannot be too strongly insisted upon. It is more than probable that the relapses and sudden "uræmic" attacks which have been described as occurring with nephritis cases treated in general wards are solely due to chills acquired as a result of insufficient or irregular heating. The almost complete absence of such accidents in the present series was undoubtedly largely due to the success of the nursing staff in keeping the wards day and night at an almost constant temperature.

Three main diets were used in the wards—No. 1 consisting of cow's milk when procurable, or in lieu of it Glaxo or evaporated milk. No. 2, the same as No. 1, with the addition of one and a half slices of bread and butter and rice milk, and No. 3, comprising all of the above with the addition of milk puddings, custards and vegetables, excepting peas, beans, and lentils. Cases on No. 2 and No. 3 diets were allowed weak tea, coffee, and cocoa, and were encouraged to take as much sugar and butter as they wished. It was not found practicable to exclude the salt used in cooking the food, but no additional salt was allowed.

All cases on admission were placed on No. 1 diet; in the absence of much oedema or other severe symptoms they were soon put on to No. 2. In any event no case was kept on No. 1 diet for longer than ten days together. With the disappearance of the oedema and the reduction of albuminuria to below 0·25 per cent they were moved on to No. 3 diet.

It has been suggested that the fluid, or solid nature of the diet, is of more importance than its chemical constitution. With a view to deciding this point, a series of similar cases were kept on Nos. 1 and 2 diets, but no difference in their course was noticed. Similarly, a series of six cases, all running from 1·0 to 0·08 per cent of albumin in the urine, were placed half on No. 3 diet only, and half on a daily portion of chicken in addition. At the end of a week, of the three cases on the chicken, one suffered from a severe relapse, with temperature running up to 103° C., hematuria and uræmic symptoms—the only relapse seen in the series; the second showed a rise of the albumin to 0·12 per cent, while the third suffered from drowsiness and headache, passing off on a return to the simple No. 3 diet. This was taken as an indication for care in raising the protein content of the diet too early.

Barley water and imperial drink were freely given to all cases except those with persistent oedema. Patients were not made to drink any set amount, but were encouraged to drink as often as they felt inclined to do so. Where the oedema persisted beyond the third week, the patients were not allowed to drink between meals, and were encouraged to take as little fluid as they could manage without inconvenience with meals. Under this regime the oedema in ten out of twelve obstinate cases disappeared.
Packs.—Hot packs were given as a daily routine to all cases with œdema. The packs were given with hot-water bottles, six to a case, and seldom failed to produce an intense diaphoresis. In those cases where the reaction was not good, pilocarpine ¼ to ½ grain was given subcutaneously, but it was seldom necessary to have recourse to this measure. Pilocarpine was never given to bronchitic or dyspnœic cases, and no evil results were seen following its use.

Venesection.—The experience gained in this series seems to show that by far the most useful therapeutic measure was free blood-letting. This was practised to the extent of from ten to twenty-five fluid ounces, and was found most efficacious in relieving headache and dyspnœa. Its use in connection with threatened uræmia has been referred to above. The median basilic vein was usually chosen, and the blood withdrawn either through an open incision or by means of a cannula.

Drugs.—Of drugs citrates, acetates and carbonates were exhibited in various combinations. For the "lower tract" cases a mixture containing sodium bicarbonate, urotropine, and tincture of hyoscyamus, was found very useful. This never failed to relieve the most troublesome symptoms, such as pain in the loins and scalding micturition, but had no effect on the hæmaturia accompanying these cases. Tr. ferri perchlor., in combination with liq. ammon. acetat., was given to combat the anaemia which often appeared late in the course of the disease.

Bronchitic Cases.—The only cases presenting any difficulties in management were those complicated by severe bronchitis. Before the subsidence of the bronchitis, these patients were often reduced to an extreme degree of debility.

A diet of a more stimulating nature than that permitted to the uncomplicated cases was allowed to these patients. A raw egg beaten up in a pint of milk was given daily; small portions of chicken were allowed on every second or third day, and the patients were plied with oatmeal gruel and arrowroot. In spite of the raised protein content of this diet, no harm was seen to result from it. Whisky or brandy, to the extent of two fluid ounces daily, was also occasionally administered without harmful results. These cases took all the ordinary expectorant and stimulant drugs well. Digitalis to the extent of one fluid dram of the tincture daily was given over considerable periods, and with none but beneficial results.

Mortality.—No deaths occurred in the series during the period of observation.
S. C. Dyke

Fig. 1.—Apyrexial case.

Fig. 2.—Apyrexial case.
### Figure 3: Case with slight pyrexia.

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### Figure 4: Pyrexia of short duration and of unknown causation.

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**Fig. 5.**—Pyrexia due to severe purulent bronchitis.

| DATE  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| DAY of DIS. | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| GRNS | 104 | 110 | 96 | 100 | 96 | 100 | 104 | 120 | 112 | 100 | 104 | 96 | 100 | 96 | 100 | 104 | 120 | 112 | 100 | 104 | 96 | 100 | 96 | 100 | 104 | 120 |
| F°  | 104 | 110 | 96 | 100 | 96 | 100 | 104 | 120 | 112 | 100 | 104 | 96 | 100 | 96 | 100 | 104 | 120 | 112 | 100 | 104 | 96 | 100 | 96 | 100 | 104 | 120 |
| RESP | 24 | 28 | 26 | 32 | 36 | 28 | 30 | 24 | 26 | 28 | 26 | 24 | 26 | 26 | 28 | 26 | 24 | 26 | 26 | 28 | 26 | 24 | 26 | 26 | 28 | 26 | 24 |

**Fig. 6.**—Continued pyrexia without bronchitis.
Figs. 1 to 6.

Charts showing daily temperature, degree of albuminuria, and excretion of urine.

Thick broken line represents amount of albumin excreted daily, expressed in grammes. It is constructed from Esbach tube readings, and is to be regarded as only approximate. To be read by the scale to left of the sheet.

Thin unbroken line represents daily excretion of urine in cubic centimetres; to be read by scale to right of the sheet.

Excretion of sodium chloride.

Broken line represents daily excretion of sodium chloride, expressed in grammes; to be read by scale to left of sheet.

Unbroken line represents daily excretion of urine, expressed in cubic centimetres; to be read by scale to right of sheet.