then became quite clear, especially when it is remembered that the spectrum of haemochromogen will appear in dilution of 1 in 25,000, and that its formation is even a more delicate test for blood than the spectrum of oxyhaemoglobin itself.² The explanation of the loss of colour in the sealed tubes seems to be that the oxyhaemoglobin changes to haematin in time, and this in weak solution does not deepen the colour of the serum to the same extent as the haemoglobin does. This explanation I put to the test by unsealing an ampoule of serum which I had kept for a couple of months, and which, from being quite yellow and giving good oxyhaemoglobin bands when fresh, had become pale and showed no spectrum. On adding to this some ammonium sulphide I obtained a very clear absorption spectrum of haemochromogen, clearer than that of oxyhaemoglobin had originally been. The change to the cherry red in the ampoules is probably due to the oxyhaemoglobin being changed to haematin, and this body being further changed, probably by decomposition, to haemochromogen, which has a cherry-red colour in solution, haematin being in the same strength nearly colourless.

Professor Hijmans van den Bergh says that he has not paid much attention to the oxyhaemoglobin in pernicious anaemia serum, being chiefly interested in the haematin. It is possible, however, that the haemoglobin is the forerunner of the haematin and its presence in the plasma in the blood vessels the essential feature of pernicious anaemia. Some haemoglobin compound most probably does circulate in the plasma ready to be deposited as haemosiderin in the liver. An explanation of the difference in my results and those of other Continental observers may be that there is more than one variety of pernicious anaemia, and clinical appearances of the disease, in my opinion, support this view.

In two or three of my original cases in which the serum was rather orange-coloured I found the oxyhaemoglobin bands more distinct than usual, but only in one, which I met with quite recently, have I seen a band in the red. I did not try Professor Hijmans van den Bergh's method of getting the haematin bands until the last month because I did not know of it earlier. I failed to get haemochromogen by adding ammonium sulphide in the ordinary way.

The fact that oxyhaemoglobin occurs in the serum of cases of pernicious anaemia obtained from the vein of a living person and separated from the clot in a test tube is, of course, no proof that the oxyhaemoglobin is present in the plasma of the circulating blood. It is quite possible that in spite of every precaution taken to prevent it some haemoglobin escapes from the red corpuscles during the process of withdrawal of blood from a vein; but even if artificial haemolysis does occur this does not affect the fact that oxyhaemoglobin appears in the serum of pernicious anaemia, but not in that obtained by identical methods and with identical precautions from any other form of anaemia. There is, however, some reason to think that oxyhaemoglobin does exist in the plasma of the circulating blood. It is an unquestioned fact that the red corpuscles in pernicious anaemia carry, on the average, more than the normal amount of oxyhaemoglobin, sometimes as much as 1.5 times this amount; and it is quite possible that more oxyhaemoglobin is manufactured in pernicious anaemia than there are red corpuscles to carry it, and that some circulates free in the plasma. In pernicious anaemia there is not such a deficiency of oxyhaemoglobin as there is in an anaemia of low colour index and low blood count.

Is Pernicious Anaemia a Malignant Disease of the Blood?

Pernicious anaemia may be a form of malignant disease of the blood—that is, a reversion to embryonic type of blood and blood formation. The scarcity of blood plates with such evidence of red-marrow activity always strikes me as peculiar. At most, the blood plates number very few, as compared with normal blood, and are insignificant as compared with the enormous numbers found in some cases of secondary anaemia, such as that due to moderate haemorrhage, chronic nephritis, and cancer. In some cases of pernicious anaemia scarcely any can be seen. As blood plates contain nuclein and resist peptic digestion, they are probably the remains of the nucleus of the bone-marrow erythroblast. Their presence, and that of nucleated red cells, is, in my opinion, an indication of an attempt by the bone marrow to regenerate red blood corpuscles, and when they occur the prospects of improvement in pernicious anaemia, temporarily at any rate, are good. But their small number conveys the impression that with all its apparent activity, judged from its appearance, the marrow in pernicious anaemia is not pro-

ducing red cells well, and this raises the question, Are they being produced anywhere else? Some justification for this question is to be found in the resemblance which the megalo-cytes, microcytes, and poikilocytes of the disease have to similar forms met with in embryonic mammalian blood, as described by Emmel.³ His observations are striking, and in my opinion support the view that in pernicious anaemia there is a reversion to embryonic type of blood and blood formation. I hope at a later date to go more fully into this question and discuss the bearing which the scantiness of blood plates has on the nature of the disease.

Treatment.

In conclusion, I may refer briefly to the very remarkable improvement which generally takes place for a longer or shorter time when pernicious anaemia is treated by liquor arsenicalis in graduated doses. I always begin with 4 minims, three times a day after food, and increase the dose by one minim every forty-eight hours until 8 minims for each dose are being taken. Then by a similarly graduated decrease in dose the original 4-minim dose is reached. Forty-eight hours later the arsenic should be stopped altogether for a week and then the same graduated course of treatment carried out again. The patient should be kept in bed and in the open air as much as possible and have well-ventilated rooms. Arsenic should be given in this way on and off for several months. When there is any cardiac muscle failure, with dilatation of the heart and oedema, as there often is in pernicious anaemia, digitalis in doses of 1/240 grain digitoxin (Nativelle's granule) daily in addition to the arsenic soon brings about a wonderful improvement; and I have seen patients with both feet in the grave recover in six weeks comparative health and activity. They all tend to relapse, however. Very few patients suffering from pernicious anaemia cannot take liquor arsenicalis. Occasionally I have given it even when vomiting and diarrhoea were present when the case first came under observation, with improvement in the symptoms.

Conclusions.

1. The serum of pernicious anaemia is always definitely yellow and that of all other anaemias nearly colourless. The colour may be seen in two or three drops of serum in a small glass bulb.
2. Oxyhaemoglobin absorption bands appear in the serum of the great majority of cases of pernicious anaemia, and can easily be seen by a pocket spectroscope. They are not seen in the serum of other anaemias.
3. Continental observers have found haematin in the serum of some cases of pernicious anaemia, and they believe that bilirubin gives rise to the yellow colour.
4. There may be some free oxyhaemoglobin in the plasma of the circulating blood of the disease.
5. It is possible, judging from the serum, that there are at least two varieties of the disease.
6. Blood plates are generally very scanty or absent in the disease, but when present are a sign of potential regeneration of red cells by the bone marrow and indicate a good temporary prognosis.
7. The abnormal conditions of the red corpuscles suggest the possibility of pernicious anaemia being a malignant disease of the blood.

REFERENCES.

- ¹ *Diseases of the Blood*, p. 138. ² *Starling's Principles of Physiology*, p. 827. ³ *Amer. Journ. of Anatomy*, 1914, vol. 16, p. 127, on "The Origin of Non-nucleated Erythrocytes by a Process of Cytoplasmic Constriction."

HIGH PERCENTAGE OF ABNORMAL OBSTETRIC CASES IN GENERAL PRACTICE.

BY

J. WALLACE ANDERSON, M.B., CH.B. GLASG.

FROM January 1st to June 15th, 1922, the percentage of abnormal obstetric cases met with in my practice has been unusually high. Out of a total of 42 cases attended, 15 (45.2 per cent.) have presented some definite abnormality. These cases occurred in the ordinary course of practice, only one having been seen on the requisition of a midwife. The abnormal cases were as undernoted.

1. Primipara, aged 34. Great oedema of feet and legs for one week before confinement; very slight albuminuria. On commencement of labour great headache and flashes before the eyes. One

eclamptic seizure during late second stage. Anaesthetic immediately commenced and continued for two and a half hours, during which time forceps delivery was done. Complete recovery of mother and child, although the latter had icterus neonatorum for a time.

2. Primipara, aged 35. Hyperemesis gravidarum throughout pregnancy, and albuminuria for several weeks towards end. Two days in labour, which was practically painless; early rupture of membranes; uterine inertia. Forceps delivery; mother very toxic for three days afterwards, but completely recovered. Child apparently well for three days, then died in a convulsion.

3. Primipara, aged 29 (sister of No. 2). Hyperemesis gravidarum throughout pregnancy, but never albuminuria. Forty-eight hours in labour; slight general contraction of pelvis. High and difficult forceps delivery. Both well.

4. Multipara, aged 34. Persistent occipito-posterior delivery; both well. Eighteen months previously had suspension of the uterus (after Gilliam) with posterior colpo-perineorrhaphy and trachelorrhaphy.

5. Multipara, aged 32. Albuminuria, headaches, and oedema for three weeks. Breech presentation at term; four hours' labour. Delivery under anaesthetic accomplished in less than five minutes; no prolapse of, or pressure on, cord by head; asphyxia pallida. Prolonged artificial respiration and stimulation unfruitful. Recovery of mother, after being very toxic for first five days. At previous parturition, which was vertex, child was stillborn at term, without apparent reason.

6. Multipara, aged 26. Twins—one vertex, one breech. All well.

7. Primipara, aged 20. On first examination, os fully dilated, and flat pelvis discovered. No presenting part felt. Spontaneous rupture of membranes in a few minutes, followed by unaided and rapid delivery of an anencephalic monster, which survived for a few minutes only. Mother well.

8. Multipara, aged 29. Sudden haemorrhage without pain, at or near term. Marginal placenta praevia. Vagina packed twice under anaesthesia, with interval of twenty-four hours. Forceps delivery later. Both well.

9. Primipara, aged 26. Profuse haemorrhage at seven months, followed by labour. Central placenta praevia. Rapid delivery of stillborn foetus. Recovery of mother.

10. Multipara, aged 22. At six and a half months urine loaded with albumin, headaches, and sickness with flashes, but no oedema. Three weeks' rigid treatment, without improvement. Induction by bougies. Delivery in seven hours of a living child (breech), which, despite prematurity and icterus, has done well. Mother well, but still has some albumin.

11. Primipara, aged 22. Face presentation. Delivered herself in about twelve hours. Both well.

12. Multipara, aged 34. At six months, urine clear; at eight months, loaded with albumin, and very great oedema of face and legs. Abdomen notably enlarged. Rest and milk diet. Two days later, sudden large haemorrhage, followed by labour, and delivery of triplets, weighing 6½, 3½, and 3 lb. respectively. Mother and three children all well so far. At last parturition had placenta praevia, since when she has had an abortion, followed by dilatation and curettage.

13. Multipara, aged 25. Urine clear of albumin on several examinations before and at eight months. Natural delivery of living child at term. Oedema of legs and eyes noticed at labour. Child unnaturally quiet, and died twenty-four hours later. At previous confinement had a macerated full-time child.

14. Primipara, aged 39. Amenorrhoea for four months, with sickness for latter two months. Abdomen enlarged to above umbilicus. Profuse haemorrhage with colicky pains. Hydatidiform mole partially expelled, and partially extracted manually and by careful curettage. Second curettage nine days later, to complete the evacuation of uterus. Well to date.

15. Primipara, aged 30. Three weeks beyond calculated term. Intermittent labour for three days before being seen. Slight general contraction of pelvis (conjugate about 3½ inches). Large head felt, freely movable above pubis. Twenty-four hours later soft parts dilating, with finger-like membranes presenting, but still no attempt at engagement. Caesarean section. Living child weighing 9½ lb. Both well.

16, 17, 18, and 19 were cases in which delivery had to be completed by forceps and chloroform, owing to the length of the second stage.

Analysis of the Series of Cases.

1. As already stated, out of 42 cases, 19 (45.2 per cent.) presented some definite abnormality.

2. Of the 15 detailed cases, 9 (60 per cent.) were primiparae.

3. Of the 15 detailed cases, 7 (46.7 per cent.) were toxæmias of pregnancy (four were in primiparae).

4. Of the 15 detailed cases, the average age was just over 29.

Note.—One of the normal cases in the series was a patient whose first pregnancy was twins (with survival of both), whose second pregnancy was tubal, with consequent laparotomy and removal of one tube and ovary, and whose present (and third) was normal.

I wish to acknowledge my indebtedness to my assistant, Dr. P. B. Farrar, for his collaboration with me, both in the conduct of the cases and in extracting the details and statistics from my case-book.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

ALCOHOL IN ITS RELATION TO DISEASE.

THE facts here stated are the outcome of observations made on a series of 150 cases treated in the medical wards of the London Temperance Hospital; they include 75 non-abstainers and 75 abstainers.

In a series of 76 cases of acute lobar pneumonia it was observed that the number of deaths among the 38 non-abstainers was proportionately greater. In these also relapse was found to be more frequent, and the disease ran a much more severe course. The temperature reached a greater height, with a tendency to fall by lysis and not by crisis. There was either leucopenia or a very negligible leucocytosis, showing that the resistance of the tissues to the infection was poor. Dilatation of the heart was more frequent and supervened earlier. In several cases there was a tendency to complications (pericarditis, otitis media, and pneumococcal arthritis). In those cases which recovered the convalescence was slow, there were irregular rises of temperature during convalescence, and the heart remained irritable in response to effort.

In a series of 30 cases of influenza, the tendency to post-influenzal bronchopneumonia appeared to be more marked in the 15 cases that were non-abstainers, the heart was similarly more affected, and noisy delirium often supervened.

Of 20 cases of chronic Bright's disease, with high blood pressure, half were habitual drinkers, and in these damage to the kidneys appeared to be proportionately greater, and it was with difficulty that one could appreciably lower the blood pressure.

In a series of 24 cases of valvular disease of the heart, among the 12 who were non-abstainers it was found that failure of compensation ensued comparatively earlier, and there seemed to be a lack of the normal "reserve power" of the heart musculature, and hence dilatation, and in a few cases failure of the heart ensued before any evident muscular hypertrophy could take place, as was confirmed *post mortem* in the cases that reached a fatal termination.

One cannot help being convinced from these observations that there must be a substratum of truth in the oft-repeated statement that habitual indulgence in alcohol is demoralizing to the system, and tends to lower the normal powers of resistance of the tissues to microbial toxins. On the other hand, I have been equally impressed with the part alcohol has played in two cases of grave collapse and impending "cardiac distress" which I came across in private work. In these I found that hypodermic injection of 10 minims of brandy had an almost miraculous effect in reviving the patient after an injection of digitalin and strychnine had failed. Facts like these equally lead one to hold the view that, in the light of our present knowledge, the time for scrapping alcohol as a valuable therapeutic adjunct has not yet arrived.

P. GANDHY, M.B., M.R.C.S.,

Late Medical Registrar, London Temperance Hospital.

BUBONIC PLAGUE TREATED WITH NEO-SALVARSAN.

In India as a whole plague is endemic. In the North-Western and the North-West Frontier provinces it breaks out in the epidemic form, usually in the spring of every year, and lasts well up to the commencement of summer. If even in June or July there is a heavy rainfall, the epidemic has been known more than once to recur with a high mortality.

Prophylactic treatment by vaccines confers immunity for a very limited period, and even then the results are not very encouraging. Some years ago, in a small village in the Punjab, inhabitants were inoculated with vaccine, but unfortunately more than three-fourths died.

So far, we have no reliable serum for curative treatment, and in my opinion the failure is due to the fact that serum-yielding animals—namely, horses, cattle, and goats—are naturally immune to the disease. Plague being a disease of rats primarily, if amongst the rodent tribe we could find a big enough animal to yield an adequate amount of serum, it is probable that a serum as efficient as that for diphtheria or tetanus may be prepared.

Bubonic plague being septicaemic, it seems pathologically reasonable (in theory at least) to assume that if a drug were