CASE I.—Captain C., aged 33, who had been inoculated, was admitted on September 20th, 1900, suffering from enteric fever. He had been ailing for some weeks, and had been ill and delirious for four days before admission. He was given 10 grs. of urotropin in water three times a day. About two days later he complained of some pain and difficulty in micturition. On September 27th blood was passed in the last portion of the urine. On September 28th blood was seen oozing from the meatus; the urine was smoky in appearance and not scanty in amount. The administration of urotropin was stopped, and potassium bicarbonate and tincture of hyoscyamus given instead. A little more blood was passed the same evening. On September 29th there was no pain on micturition and no blood in the urine.

CASE II.—Lieutenant Y., aged 24, who had been inoculated, was admitted on September 21st, 1900, suffering from enteric fever. He had been ailing a few weeks, and had been ill in bed for two days prior to admission. He was given 10 grs. of urotropin in water three times a day. On September 27th he had some pain and difficulty in micturition. On September 28th blood appeared in the urine, actual clots being seen. The urotropin was stopped, and potassium bicarbonate and tincture of hyoscyamus were given instead. The next day the symptoms were much alleviated and soon disappeared.

The occurrence of hæmaturia in 2 cases admitted on successive days after urotropin had been given for eight days, and its rapid subsidence after the drug was stopped, is too striking to be a mere coincidence. Hæmaturia resulting from nephritis in enteric fever is not unknown,⁴ but in such cases urotropin appears to be beneficial. In my cases the bladder would seem to have been the source of hæmorrhage.

This untoward effect of urotropin cannot be common. Out of 82 cases of enteric fever treated at the Metropolitan Hospital during the last winter urotropin was given in 13. In one of these hæmaturia occurred, but the patient was taking turpentine at the same time.

Discomfort, which preceded the hæmaturia in both my cases, should be considered a danger signal when employing urotropin.

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A FATAL CASE OF HÆMATOPORPHYRINURIA.

By HENRY WALDO, M.D., M.R.C.P.,
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THE following case illustrates the necessity of care in the administration of sulphonal.

History.—A male patient, aged 33, single, one of those unfortunate people not obliged to do anything, consulted me for dyspepsia and giddiness. He fancied he could not sleep, and so had been in the habit for some years of taking hypnotics of different kinds, but chiefly sulphonal. A few days later he developed much pain and tenderness over the stomach, attended with nausea, vomiting, and constipation. He was at the same time slightly delirious at night (no drugs were taken), and he gradually passed into a condition resembling delirium tremens. The gastritis entirely passed off, and in ten days he was able to take a fair amount of food by the mouth. A few days from the onset of his illness it was noticed that his urine resembled port wine in appearance, and smelt like chlorodyne, while another specimen smelt like celery. The fœtor was most disagreeable and resembled that noticed in chronic renal disease.

State on Examination.—The urine contained no albumen, and the guaiacum test gave no sign of blood. The microscope showed nothing but a few crystals of uric acid. The spectroscope showed bands corresponding to those produced by hæmatoporphyrin. (See figure.) The radial artery was a little thickened, and the pulse, which was 80 per minute at the beginning of his illness, gradually increased to 180. He became tremulous, restless, and violent. This was succeeded by a vacant aspect and prostration, in fact, by general paresis, in which the sphincters participated. Although skillfully nursed, a bed sore formed over the sacrum. The temperature varied from 99° to 104°. The retina appeared to be normal. The patient could not swallow, but retained ample nourishment given through a nasal tube. The abdomen was sunken, and the diaphragm scarcely moved.

Four days before death general convulsions occurred, which were epileptic in character, and continued at short intervals till the end. During this time the patient was unconscious, quite pulseless, and a very feeble single heart sound, only audible at the lower part of the sternum, was all that indicated cardiac action. No urine was passed for forty-eight hours, and the bladder appeared to be empty. No headache was complained of all through the illness, which consisted of ten days of symptoms of acute gastric irritation, and two weeks with cerebro-spinal symptoms and progressive toxic paresis. No post-mortem examination could be obtained.

Hæmatoporphyrin has been observed in the urine in small quantities only where no sulphonal has been taken, as well as in the course of other diseases, namely, rheumatism, pneumonia, enteric fever, and peritonitis. In the sulphonal cases the symptoms are said to depend not so much on the direct action of the sulphonal itself as on chemical changes, almost certainly alimentary in the first place, and probably hepatic, of which the sulphonal has been the exciting cause.

Dr. Keith Campbell, who published a fatal case of hæmatoporphyrinuria in the *Journal of Mental Science* for April, 1898, where only 30 grs. of sulphonal had been taken in two doses, says that the pathological changes which produce this pigment are as yet obscure.

Professor Young, F.R.S., of University College, Bristol, and Mr. Stoddart, Public Analyst for Bristol, tell me that the spectroscope is the most reliable means of detecting hæmatoporphyrin in urine.

Dr. Stack, House-Physician to the Bristol Royal Infirmary, kindly undertook the investigation, and the accompanying chart (see figure) shows the result he obtained. Professor Stanley Kent, of University College, Bristol, and Bacteriologist to the Bristol Royal Infirmary, has kindly made the following remarks: "Hæmatoporphyrin as prepared in the laboratory exhibits two different spectra according to whether the solution examined is acid or alkaline in reaction.....When the bands of hæmatoporphyrin are visible in a pathological urine, the spectrum seen is not that of the acid modification of the pigment, such as would have been expected from the fact that the urine is an acid fluid, but that of the alkaline modification.....And a solution of the pigment showing the acid spectrum, if added to urine, at once changes its character, and shows the alkaline bands.....Another interesting point is that this pigment is iron-free, that it is probably produced from the pigment of the blood which contains iron, and that its appearance in the urine seems sometimes to be associated with derangement of the functions of the liver and spleen, organs normally concerned in the pigment metabolism of the body."

The epithelial cells in the cortices of the suprarenal capsules have been shown by Dr. W. F. Robertson to have undergone a marked degenerative change over numerous large areas, consisting of the replacement of the protoplasm by clear globules. These globules, which varied considerably in size, did not give a fatty reaction with osmic acid. There was no evidence of any tuberculous disease. These degenerative changes are evidently the same as those that are so commonly to be observed in the adrenal epithelium in various diseases. Yet it has been suggested that suprarenal extract should be given.

HIBERNATION OF ANOPHELES IN ENGLAND.

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SINCE the appearance of our *Studies in Relation to Malaria*,^{1 2} two publications have appeared relating to the hibernation of *Anopheles* in this country. I refer to the papers by Wright,³ and by Annett and Dutton.¹

That certain culicid larvæ are capable of living beneath the ice has already been noted by Gorham in the United States.

Gorham² writes: "Though ice of considerable thickness had formed above them, and they could breathe only the air collected beneath the ice," living larvæ were found beneath the ice in natural waters in December. Gorham does not state whether the larvæ belonged to the genus *Culex* or *Anopheles*.

Wright's observation is of considerable interest, it is nevertheless to be regretted that he does not state to which species of *Anopheles* the larvæ belong which he found hibernating beneath the ice at Torphins. Grassi³ (p. 47) claimed that there is a difference between the species of *Anopheles* in respect to the seasonal occurrence of the larvæ in natural waters, for he and Ficalbi found the larvæ of *A. bifurcatus* in Italy in midwinter, whereas none of *A. maculipennis* could be found by a trained assistant. Grassi considered that the larvæ of *A. bifurcatus* were hibernating. Though his observation suggested this possibility, they do not prove that the larvæ do actually hibernate, for it might very well be assumed that the larvæ he found had issued from eggs laid late in the season or during the winter.

Of the larvæ collected by us in various parts of England during the last year three lots hibernated:

1. Larvæ caught August 12th, 1900, at Gainsborough. Some of these lived until April 12th, 1901—that is, eight months. They were kept in tanks in the laboratory, but all of them died without having pupated.

2. Larvæ caught September 10th, 1900, on the River Ure. A number died during the winter. The first larva pupated April 18th, 1901, the imago appearing four days later. The larval stage in this case had lasted over seven months. Two other flies subsequently underwent successful metamorphosis.

3. Larvæ caught September 10th, 1900, near Garstang. Of this lot one survived, the insect pupating April 18th, the imago appearing eleven days later. The larval stage in this case had lasted over seven months.

Last autumn we had a large number of larvæ of *A. maculipennis* and *A. bifurcatus* in our tanks, mostly larvæ of the former species. As the winter progressed all the larvæ belonging to the former species gradually died off, whereas those of *A. bifurcatus* alone hibernated. These observations therefore prove for the first time that the larvæ of *A. bifurcatus* hibernate, the same insects being under continuous observation during the periods of time stated above.

Grassi has drawn attention to the differences existing between the larvæ of *A. maculipennis* and *A. bifurcatus*. We have been able to confirm his observations. I might in addition state that I have learnt to distinguish the two species of larvæ by naked-eye inspection alone.

Annett and Dutton do not state to which species the larvæ belonged which they obtained from Mr Theobald in December. The necessity of stating accurately on what species observations are made is evident from what I have just related.

Observations relating to the hibernation of the imago of *A. maculipennis* in England have already been recorded in the tables which accompany our "Studies"; it is interesting to have these observations confirmed by Annett and Dutton. During the past winter we have also had the opportunity of observing the hibernation of *A. maculipennis* and *A. bifurcatus* in cellars and out-houses.

We are continuing our investigations upon the biology and geographical and seasonal distribution of this genus in Great Britain as a part of the "Studies" which have appeared in the *Journal of Hygiene*. I might state that I caught a male *A. bifurcatus* on May 7th at Clonbrock near Ahascragh, co. Galway, this being the first recorded finding of a member of the genus in Western Ireland. There is but one record of its having been found in that country, that is, in Holywood, co. Down, by Haliday, in 1833. Whereas young larvæ of *A. maculipennis* were first caught on May 10th, 1900, we have found them numerous in pools about Cambridge on May 1st of this year.

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² Gorham, F. P. (January 15th, 1901), Notes on Mosquitos taken at Providence, Rhode Island, in 1900, *Journ. of the Boston Soc. of the Med. Sciences*, vol. v, p. 330-31.
³ Grassi, B. (1900), *Studi di un Zoologo sulla Malaria* (9 fig. e 5 tav.), R. Accad. dei Lincei, anno cxcvii, vol. iii, pp. 200.
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⁵ Nuttall, G. H. F., and Shipley, A. E. (January 11th, 1901), The Structure and Biology of *Anopheles* (2 plates), *Ibid.*, pp. 45-77.
⁶ Wright, M. J. (April 13th, 1901), The Resistance of the Larval Mosquito to Cold; Notes on the Habits and Life-History of Mosquitos in Aberdeenshire, *BRIT. MED. JOURNAL*, pp. 882-83.

ON A COMMON SOURCE OF DIPHThERIAL INFECTION AND A MEANS OF DEALING WITH IT.

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THE purpose of this communication is to illustrate the frequency with which children whose throats are presumably healthy may serve as sources of diphtheria. The appended tables show the number of children, male and female, admitted into the wards of the Victoria Hospital for Children during 1900. In every case the throat was swabbed on admission and the swab sent to the Jenner Institute of Preventive Medicine for examination. The results obtained are shown (see p. 1475). It will be seen that the figures support two statements which are commonly made, and that they suggest the importance of two procedures which are generally neglected.

The first statement is that the Klebs-Loeffler bacillus and pseudo-diphtheria bacillus exist in the throat in a large number of cases, especially in children, without producing any recognisable symptoms. Out of 385 children under the age of 14 admitted for operation or for some illness other than diphtheria, only 235 were free from both kinds of bacteria. In 92, or 24 per cent., the pseudo-diphtheria bacillus was found; in 58, or 15 per cent., the Klebs-Loeffler.

Neglecting for the moment the presence of the pseudo-diphtheria bacillus, the pathogenic power of which is uncertain, these figures suggest that 1 out of every 7 children, or at least 1 out of every 7 sick children, is a possible source of diphtheria infection.

The second statement is that the presence in a hospital ward of children under 2 years of age increases the risk of outbreaks of diphtheria. This assertion seems justified by the figures given. Of the cases (275) that had reached the age of 2 or upwards, there were only 60 per cent. whose throats were free from both kinds of bacilli; and of those cases (110) that were under two years of age, 64 per cent. were free. Of the remainder—that is, those from whose fauces either the Klebs-Loeffler bacillus or the pseudo-diphtheria bacillus was obtained, there was this remarkable difference. In the children 2 years and upwards, the pseudo-diphtheria bacillus was found in nearly 28 per cent., and the Klebs-Loeffler bacillus in less than 13 per cent.; while in the children who had not completed their second year, the pseudo-diphtheria bacillus was only found in 14.5 per cent., but the Klebs-Loeffler bacillus in 21 per cent. It thus appears that of children who have not completed their second year, 1 out of every 5 is a possible source of diphtheria infection, but that in children over that age only 1 out of every 8 is a source of infection.

The figures quoted are too few to establish with certainty either of these conclusions, but they seem of sufficient interest to merit publication, when considered in relation to other published results. It is of course possible that in some cases bacilli may have been present but yet have escaped detection. Any errors arising in this way can, however, only add to the importance of the conclusions. In view of this possibility it is interesting to note that in only 7 of the cases was there any clinical evidence in favour of diphtheria, and that, on the first examination, in 3 of these cases no Klebs-Loeffler bacillus or pseudo-diphtheria bacillus was found in the throat.

The morals deducible from these figures are almost too obvious to need detailed statement. It is clear that babies and young children are not the harmless and innocent creatures usually imagined, and that kissing and other similar artificial demonstrations of childish affection should be discouraged. It is, moreover, more important and perhaps more practicable that mouth cleaning in infants and teeth cleaning in young children should be insisted on more vigorously. It is remarkable that so many parents fail to realise the danger which may thus arise, and the ease with