

up for a time his accustomed daily dose of quinine. Dr. Crosse, formerly P.M.O., Royal Niger Company, who has spent as many years in Africa as Professor Koch has spent months, says: "My experience is that those who take quinine, and take it freely, do not get blackwater fever. In my own case I attribute my attacks—and I have had at least ten severe ones—partly to my neglecting to take quinine, which I dislike very much, and to the fact that very often when unwell I had to be about attending to others who were more ill than I was myself." Dr. Crosse refers to Mr. Stanley's opinion, one founded on personal experience of the disease. Mr. Stanley considers that blackwater fever yields to quinine; in his own attack he did not get well till he took 60 gr. of quinine in a single dose. I would not go so far as to say that this, in my opinion, unjustifiably large dose cured Mr. Stanley's attack; but, as he got well after taking it, it is evident that it was not the cause of blackwater, in his case at all events. Equally emphatic is Dr. Moffatt, P.M.O., Uganda Protectorate, in condemning Professor Koch's sweeping assertions about the pernicious effects of the free use of quinine. Dr. Moffatt "has never seen a man die of malaria when quinine has been given early"; and he adds, "fatal cases, whether complicated with hæmoglobinuria or not, have been those in which quinine has not been administered, or was given in very small doses, or else resorted to only when the case was practically hopeless." Of nine cases of blackwater fever treated by him, two were fatal, the administration of quinine having been neglected until too late; the cases which recovered were all treated with quinine, six of them with heroic doses, 60–120 gr. in twenty-four hours.

Drs. Crosse and Moffatt deplore the effect that Koch's statements about the danger of giving quinine is having on the public, many people now absolutely refusing to take quinine under any circumstances.

It seems to me that Koch would have been wiser had he said that although, in some instances, quinine may have seemed to provoke blackwater, yet this drug cannot be held to be the cause of blackwater; and that as neglected malaria is a much more powerful provocative of the symptom than any other known agency, it is good and proper treatment to give quinine to all patients who are the subjects of active or latent malarial infection, unless in cases in which a blackwater idiosyncrasy in regard to quinine had by past experience been ascertained to exist.

## PUBLIC HEALTH AND HYGIENE.

By EDWARD F. WILLOUGHBY, M.D. LOND., D.P.H. LOND. and CAMB.

**1. Legislation.**—Except so far as the Local Government (Ireland) Act (1898) may be considered as bearing on the public health of that kingdom, the session of 1898 was unusually barren in sanitary legislation. The long-cherished hopes of a consolidation and revision of the laws relating to adulterated and unwholesome foods have again been doomed to disappointment, though in Mr. Kearley's Bill of the previous session there were ready to hand all the materials of an almost perfect statute; and the sanitary administration of the whole of England and Wales outside the metropolitan area is still carried out under the imperfect provisions of the Public Health Act of 1875, with the Public Health (Amendment) Act of 1890, and the Infectious Diseases (Notification) Act of 1889 and (Prevention) Act of 1890, the optional character of which creates local anomalies that ought long since to have been removed by consolidation and incorporation, as they have been in London in the Act of 1891.

The Royal Commission on Vaccination having completed its labours and issued its report, the Government introduced a Bill for the amendment of the laws relating to vaccination, which in its original form was, to say the least, disappointing, since the only amendment really needed was the legal enforcement of re-vaccination, as has long been the practice in Germany and Scandinavia, and is now adopted by Austria, Hungary, and Servia. The Bill, however, raised the age for the primary operation to six months, as in Scotland, abolished repeated convictions in respect of a single offence, and made provision for the performance of domiciliary gratuitous vaccination—matters of minor importance, though not without some advantages. But when the Bill reached the stage of being committed, the Government—who up to that time had firmly resisted all attempts at tampering with the principle of compulsion, and in so doing had had the hearty support not only of their own party but of many Liberals, as well as of the Irish Nationalists, and could easily have overpowered all opposition in the Commons and have relied on the unanimous votes of the Peers—surprised both sides of the House by a sudden



surrender to the prejudices of the anti-vaccinators, introducing with the aid, *mirabile dictu*, of one or two of the leading medical members of the Liberal party, a conscience clause exempting from prosecution any person who should make before a magistrate a statutory declaration of his "conscientious" objection to the vaccination of his children, and compelled their supporters to accept it against their own conscientious convictions. The Peers rejected the clause by a majority including nearly everyone who was not officially connected with the Government. But the Commons, resenting this action of the Upper House, "disagreed"; and the like pressure being put on the Peers, it was at last accepted by a very narrow, and for the most part reluctant, majority. The worthlessness of the plea that the abolition of compulsion, to which the conscience clause really amounts, will tend to weaken opposition and render vaccination more popular, is shown by the example of Holland, where it is optional and generally neglected, the result being a mortality from small-pox more than six hundred times as great as in Germany. Already a large number of boards of guardians had assumed a right of local option, and overridden the authority of Parliament by refusing altogether to prosecute, until in some unions, especially in the towns of the North, Midlands, and in the east of London, 80 to 90 per cent. of the children born escaped vaccination. Such an accumulation of susceptible material must lead some day to an epidemic of unprecedented severity, but the plea of neglected sanitation will always be available as an explanation.

The report by Sir E. Thorne and Dr. Copeman on the vaccine institutes of France, Switzerland, and Germany serves to bring out in strong relief the apathy of the British authorities and the backward state of public opinion in Great Britain on all matters of a scientific character, unless a direct pecuniary advantage can be shown. But the munificence of Lord Iveagh will, it is to be hoped, enable England to rival, in respect of perfectly equipped laboratories, Berlin, Dresden, and Köln.

**2. The East London Water Question.**—A drought of unusual severity following on a succession of years of deficient rainfall, especially over the eastern and naturally drier districts, has to a greater degree than ever taxed the resources of the East London Water Company, which is largely, and was at one time wholly, dependent for its supplies on the River Lea, and on that only after the New River Company had drawn its 22½ million gallons daily. The East London Water Company have the right of drawing 10 million gallons daily from the Thames, and they have pumped a like amount from the deep wells that they have for

some years been sinking through the London clay into the chalk beneath. With these subsidiary sources, and what they could purchase from other companies, they were just able to hold on, giving a restricted and intermittent supply, for the Lea itself almost entirely failed them; the flow over Feild's weir, which had for ten years (including some droughts) averaged 140 million gallons per diem, was during the preceding twelve months but 27 millions, and in August and September fell to 12 and for one week to 8 millions! The Company had therefore been unable to fill their storage reservoirs, the capacity of which they had raised from 600 million to 1,200 million gallons, and intend to increase by another 1,000 millions. The annual recurrence of these so-called "water famines" clearly points to the inadequacy of the Lea to the demands made on it, but does not justify the hard things said of the Company by almost the entire Press and at public meetings, an agitation evidently worked in the interests of the London County Council's purchase schemes and contemplated recourse to the Welsh mountains. There was not any appreciable effect on the general health of the district: the total death-rate was below the average, and the rise in the mortality from diarrhoea was but what one would have expected with the thermometer in September standing over 80° F. day after day. The real cause of the discomfort, perhaps even distress, consequent on the suspension of the constant service, was the absence of cisterns, for which the builders, not the Company, were responsible. Cisterns as commonly constructed and fixed are more or less objectionable, but it is perfectly easy to arrange a cistern to hold one, two, or three days' supply so that no dirt can enter or deposit form in it, when unavoidable interruptions would be unfelt.

**3. Phosphorus poisoning in match factories.**—The occurrence of a death from phosphorus necrosis of a young man who had been employed as a "dipper" at Bryant & May's match factory, and certified by the medical man attached to the works as "abscess in cheek and cellulitis," but reported by the Registrar to the Coroner, led to an inquiry which elicited the fact that a large number of similar cases had occurred during the last ten years, which the proprietors had failed to notify to the inspector or the Home Office. These revelations caused considerable excitement; the subject was taken up by the Press, and public meetings were held. In the course of these discussions Messrs. Bell & Black declared that there had not been more than one case of phosphorus poisoning in their establishment during the last 38 years, and that was caused by the indiscretion of the man himself. The Home Office turned its attention to the question, and



instituted an inquiry into the regulations in force in the match factories of Paris, which they found more stringent than those in Great Britain. Messrs. Bryant & May were convicted of failure to notify, and fined in respect of the cases of default within the last six years, prior offences being beyond the limits of time laid down by the Factory Act. These investigations have given a fresh impetus to the problem of the possibility of altogether dispensing with the use of white phosphorus in matches striking anywhere.

**4. Dangerous trades.**—A Royal Commission appointed to inquire into and report on the conduct of all trades the conditions of which involve special danger to life or health, the nature and extent of injuries effected, and the means of avoiding or minimising the same, has issued three reports; but the consideration of its work, which is far from completed, will be better deferred to another year.

**5. Typhoid at Maidstone.**—After much delay the Report of the Local Government Board Inspectors appeared, and cleared away the mists raised by the attempts at self-exculpation of the Town Council and Water Company respectively, and by the special pleading of the experts engaged by each party. Dr. Th. Thompson—for the work is virtually his alone—finds in the Farleigh springs and gathering ground the *fons et origo mali*, but divides the blame impartially, censuring the Company for collecting the drainage of heavily manured lands, on which a numerous and filthy population encamped for several weeks, and for neglecting the protection of their reservoirs and springs; and the Town Council for their apathy in the matter, even to the extent of reducing the examination of the water itself to an occasional form, as well as their gross default in respect of the sewerage and sanitary arrangements of large parts of the town.

**6. Typhoid in Belfast.**—Typhoid fever, which in 1897 had attacked over 3,000 persons, and caused more than 350 deaths, as against an average of under 200 annually, broke out again in 1898, on a scale rivalling that of 1897. Until an official investigation has been made, and the conclusions of the inspectors have been published, or at least until the outbreak shall have run its course, it would be premature to discuss its origin and the efforts, if any, made for its repression; but we have no doubt that a long story of culpable negligence will be brought to light. This much we know: that the beautiful land-locked lough is well nigh as foul as the harbour of Valetta, that the water supply is contaminated, that the sewers are defective, and the soil everywhere sodden with the soakage from cesspits and organic refuse; while, beyond contemplating a better water supply from the

Mourne Mountains, the municipal authorities have not shown themselves ready to ascertain the causes that have led to it or to undertake the necessary measures for preventing a recurrence of the disaster.

**7. Aërated butter.**—Good margarine is certainly preferable, both as regards taste and wholesomeness, to bad butter; but a patent has been taken out—or, more correctly, a company has been formed—for working Andrew's patent, hitherto employed in the purification of other commercial fats, and adapting it to the conversion of inferior and rancid butter into butter of the best quality and of a character to command a high price in the market. It has appropriately commenced its operations in Ireland, where, notwithstanding the natural advantages of rich pastures and a population almost wholly engaged in farming, the want of care and cleanliness in the making of butter has caused the Irish product to rank far below those of other countries. The repulsive taste and odour of bad or rancid butter are due to the formation by extraneous microbes of by-products from the butyric and other volatile acids and ethers; and it has been found that these can be entirely removed and dissipated by passing through the melted mass, mixed with a certain proportion of butter-milk, currents of superheated steam and air, leaving a pure butter of high quality, free alike from dirt and disagreeable flavour. It is no question of sophistication or imitation, but one simply of purification, the conversion of a bad article into a good. Alike on sanitary and commercial grounds it deserves every success.

**8. Poisonous meat extracts.**—Sausages, and potted meats and pastes highly spiced, present exceptional facilities for the utilisation of unsound meat, but the activity of some London sanitary inspectors has revealed an unlooked for and possibly greater danger in the "meat extracts" used in making "beef tea" for invalids. At a London factory the products of which would probably be preferred by many persons to those "made in Germany" a quantity of livers imported from abroad was seized in so advanced a stage of putrescence as to be semi-fluid. No doubt the heat employed in completing the "extraction" would kill the bacteria, but such materials are the best that could be found for the production of the cadaveric ptomaines of Ferni.

**9. True scarlet fever in swine.**—A remarkable report by Behle, too minute to be based on misobservation, brings one more specific disease into the number of those of which man and some of the lower animals are alike susceptible, and of which these may therefore act as carriers. He describes how, while an epidemic of scarlet fever of a severe type prevailed among



the children in a village, the pigs were attacked by a very fatal disease, the phenomena of which, pyrexia, erythema, desquamation, angina, œdema, albuminuria, uræmic coma, and acute nephritic lesions, were identical with those of the disease in the human subject, and were experimentally induced in a previously healthy animal, on a farm where no other cases had occurred in man or beast, by inoculation with the blood of a child suffering from an attack of severe scarlatina. We know that cats are liable to contract diphtheria from and to communicate it again to children, though in them it assumes a somewhat different character, and there is little doubt that the Hendon or Cameron's disease was scarlatina in a peculiarly modified form, which resumed its normal character in the consumers of the milk from the infected cows. Physiological and histological differences may so change the appearances of a disease as to elude recognition, without any essential alteration in its nature; the phenomena, for instance, of rabies in the dog, man, rodents, and birds are diverse and characteristic of each class.

**10. Tuberculosis in fish.**—Another interesting discovery in this field is that of the susceptibility of fish to tuberculosis. Carp, in a fish-pond into which the sputa and dejecta of a woman in an advanced stage of pulmonary and intestinal tuberculosis were thrown, died in two or three weeks of this disease. They were found experimentally to be infected by the ingestion of tuberculous matter from man, rodents and fowls, as well as from one another; but rodents and fowls ate, and were inoculated with fish tubercle with impunity, owing evidently to the attenuation of virulence induced by the cultivation of the bacilli at the lower temperature of the fish's body.

**11. Tuberculosis in cattle.**—Slow as the average Briton is to grasp and act on a new idea, the labours of the Royal Commission on Tuberculosis, and the untiring insistence of men like Dr. Niven of Manchester, seem to have begun bearing fruit. The prevalence of the disease is admitted, and some large dairy companies, together with a few private firms, assure the public that their own herds have been subjected to the tuberculin test. Doubtless in most cases this is done chiefly by way of advertisement, but that which is already looked on as a meritorious act—a work of supererogation, so to say—will before long be felt a moral duty. Still, there will always be a residuum of the less intelligent, prejudiced, and incredulous, whose herds, though in themselves small, collectively constitute the larger part of the stock of the country; and until these are brought under the control of expert veterinary inspectors appointed by the county

councils *throughout* the kingdom, the action of individuals will be of little avail, save so far as it may have the effect of leavening public opinion. The active interest taken in the movement by the late Lord Vernon, who placed his stock at the service of science, and of other leading agriculturists, will, we hope, hasten this consummation.

The Royal Commissioners, in their report, recommended the grant of powers to all municipal authorities to establish public slaughter-houses, with laboratories for meat inspection, and to require that all meat slaughtered elsewhere should be brought thither for inspection; and that in rural districts the county councils should provide for the best practicable inspection. Their recommendations as to milk, cowsheds, and the terms on which the distribution of tuberculin by the Board of Agriculture should be conducted were excellent; one especially, "That tuberculin be supplied only to such owners as will undertake to isolate reacting animals from healthy ones," guarding against its formal use as an advertisement, with the neglect of the subsequent precautions necessary to give it any practical value.

It is well known that tuberculosis is far more general among cows in the northern and north-midland counties of England than in the south; and the returns of the municipal slaughter-houses of Prussia show a percentage of carcasses (mostly oxen) affected, ranging from 40 in Schleswig, 30 in Stralsund and 20 in Aachen, to 1.5 in Köln, Minden, Münster, etc., and 0.7 in Osnabrück. An inquiry into the causes of these astounding differences would be interesting.

It is scarcely necessary to remark that municipal slaughter-houses must be wholly controlled and conducted by the authorities, the butcher bringing the live animal and taking away the dressed carcass, or so much as has been passed by the examiner. Commodious buildings like those at the Metropolitan Cattle Market, though preferable to backyards in small crowded streets, are none the less private as being rented by the butcher from the authorities. In the municipal slaughter-houses at Berlin and other German cities the authorities provide, for a small charge, refrigerating-rooms, where the butcher may keep under lock and key the whole of his stock not wanted for exposure in his shop, a great boon, especially in hot weather.

**12. The International Congress of Hygiene** was held early in 1898 at Madrid under unfavourable circumstances, the attention of the authorities being occupied by the rebellion in Cuba and the impending war with the United States, as well as by domestic unrest. Nor was Spain a country that could offer



any object-lessons in scientific hygiene or practical sanitation; though the Government did mark the occasion by the introduction of a Bill for compulsory vaccination of infants and, in the event of small-pox breaking out in any town or district, for revaccination of adults under 60 years of age who had not had small-pox or been revaccinated within ten years.

**13. The Plague** still continues to rage in India, especially in Bombay, where the stringent measures enforced with a view to its repression have not met with the success that was expected. Calcutta has remained practically free, and the epidemic has almost disappeared at Karachi, but it has become more widely diffused, though with less severity than at Bombay. An outbreak of plague at Vienna, caused by the careless handling of cultures of the bacilli by a laboratory attendant when somewhat the worse for drink, and involving the death not only of the man himself, but of his chief, Dr. Müller, a young and promising bacteriologist, who had been a member of the Austrian Commission to Bombay, and of two nurses, not unnaturally created a panic in the city. But the spread of infectious diseases by fomites, though of daily occurrence, is not a whit less culpable than this, the first instance of its kind.

**14. The war in the Sudan.**—The campaign ending in the capture of Omdurman and the recovery of Khartoum has been essentially an achievement of engineering, the advance of the army proceeding *pari passu* with the construction of the railway. But the health of the troops, thanks to the efficiency of the medical department, the confidence reposed in it by the Sirdar, the absolute prohibition of alcohol in any form, and their splendid systematic training, has been unprecedented under the trying circumstances of a campaign conducted in the hottest season in one of the hottest regions of the globe, and the ratio of sickness was actually less than on home service. Only towards the end did enteric fever, consequent on the use of unfiltered water, make its appearance, accounting for the few deaths not caused by the bullets of the enemy.

A striking contrast was presented by the utter breakdown of the medical service in the war in Cuba, and the gross mismanagement of the entire military arrangements of the United States army at home and abroad.

**15. Bacteriology.**—No striking discovery, as that of the bacillus of the plague by Kitasato or of that of yellow fever by Sanarelli, has marked the year just ended, though it was but twelve months ago that the young Italian completely satisfied the scientific world as to the accuracy of his conclusions as to the efficient cause of that

disease, and the success of his prophylactic serum injections. So, too, it was within 1898 that Memmo of Rome published in the *Centralblatt für Bakteriologie* the experiments, amply satisfying the most stringent requirements of the critic and the sceptic, as to the identity and pathogenic character of the bacteria of rabies. Pasteur had worked at his attenuations of the virus in the spinal cords of rabbits, and the perfecting of his methods on purely empirical lines, leaving to others the discovery of the hypothetical bacillus. Accordingly several bacteriologists, as Ferran, Spinelli and Rivolta had in their researches, conducted independently, recognised one and the same form constantly present in certain tissues in cases of rabies and hydrophobia, but in no other disease; which form they therefore assumed to be pathogenic. Sanfelice by a special staining process demonstrated its presence in enormous numbers in the cord of a boy dying of hydrophobia, and found it to be highly virulent. Memmo, following his procedure, confirmed his observations. But he went further, and having succeeded in cultivating the bacillus in artificial media, inoculated dogs, rodents, and birds with pure cultures of the fourth or later generations. The results were absolutely conclusive, the incubation periods and the characteristic types of the disease peculiar to each class being reproduced, and exactly the same as after the bite of a rabid animal. In dogs the symptoms appeared between the thirtieth and sixtieth day as typical rabies; in rabbits and guinea-pigs between ten and twenty days, and assumed the paralytic form, while pigeons died from syncope or collapse. The bacillus was found in the cerebro-spinal fluid, the substance of the brain and spinal cord, the saliva and the parotid glands, and in the aqueous humour, whether the disease were acquired in the usual way or from artificial inoculations. He failed to detect it in the blood, spleen, or liver.

Memmo does not appear as yet to have turned his thoughts to prophylaxis; but if some means could be devised for attenuating and accurately standardising the cultures, they might possibly be substituted for the crude pulp used by Pasteur and his followers. The risk of septicæmia and the local irritation would be lessened, and living rabbits would be required for testing only, as the guinea-pigs are for diphtheria antitoxin.

**16. Precaution in using Widal's test.**—The importance of an early diagnosis of typhoid fever, the insidious character of the onset, and the obscurity attending some cases throughout their entire course have been so long felt by medical practitioners and by Officers of Health that Widal's test was at once received with something like enthusiasm. But when it was found that the



positive reaction was exhibited by the blood of persons who had gone through an attack many years previously, and even by that of persons suffering from febrile attacks of a non-typhoid character, the "test" appeared to have lost all practical value. But the labours of G. Fraenkel, C. Stern, O. Förster, and above all of Scholtz, have shown how these sources of error may be avoided and the test rendered conclusive. It is, in fact, simply a question of dilution; for though the blood of non-typhoid cases will react with culture fluids in dilutions of 1 : 10, or even 20, though very faintly; the lowest dilution at which that of a typhoid case, mild in type and at an early stage, has ceased to re-act is 1 : 45, while the great majority will easily bear dilution to the extent of 1 : 50, or more; indeed, a positive result has been obtained with 1 : 200. The line of demarcation may therefore be put at 1 : 30 or 1 : 40. Scholtz, experimenting with the blood of persons in good health, who had had typhoid eight, ten, twelve, and fifteen years previously, obtained reactions with dilutions ranging from 1 : 25 to 1 : 12. This reaction is evidently connected with the persistence and degree of immunity conferred by the previous attack. Scholtz uses a capillary pipette graduated to 0.01 c.cm., with which he mixes blood taken by a needle puncture on the ball of the thumb with a broth culture of the bacilli (kept for the six hours preceding at 37° C.) first in equal proportions, when if the result be negative nothing more is needed; but if a reaction occurs he next tries 1 : 50, in which proportion a positive reaction is decisive of typhoid. Should it, however, fail, he tries 1 : 20 and 1 : 30; with the former a positive reaction is compatible with typhoid at some previous date, or with non-typhoid febrile state; the latter indicates past or present and incipient typhoid, and calls for another observation after the lapse of a week, when, if the present illness be really typhoid, a positive reaction is sure to be obtained with a 1 : 50 dilution, whereas the energy of the serum resulting from a past attack will remain the same. In one case in which during life all clinical evidence of typhoid was wanting, the first and only observation made after death gave an unmistakable positive reaction, which was fully confirmed by the lesions found in the subsequent autopsy.

## MEDICAL JURISPRUDENCE.

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### **I. The fatal use of diachylon (lead plaster), taken with the object of procuring abortion.**

In certain parts of England, notably in the Midland districts, the practice of taking diachylon in the form of pills, to bring on miscarriage, is by no means uncommon, and is far more prevalent among the working classes than is generally supposed. Apart from the criminal element of the procedure, the practice is a most dangerous one to women taking such a preparation, since marked lead poisoning must result before an abortion is likely to occur. The connection of lead poisoning with abortion has frequently been noticed. In the potteries, women who have become the victims of lead poisoning have frequently been known to abort. During the outbreak of lead poisoning some years ago in Sheffield from contamination of the water supply, it was noted that pregnant women who became affected either aborted or had premature labour. G. F. Crooke (*Lancet*, July 30, 1898), describes an instructive case of poisoning by lead, contained in diachylon, taken with the object of procuring abortion. A young married woman, twenty-three years of age, took diachylon plaster in the form of pills for some weeks (the exact amount taken was not ascertained), and aborted about the third month of pregnancy. Before and after the abortion she suffered from lead poisoning, the symptoms being intense headache, colic, anorexia, thirst, attacks of diarrhoea and vomiting, numbness and loss of power in the left arm and hand, and general weakness and prostration. She continued to take the diachylon for six days after the abortion, under the impression that there was something more to come away, so that the lead accumulated in the system, and finally manifested its effects with great violence. On the sixth day after the abortion she was seized with paroxysms of intense pain, apparently abdominal, and when seen was in a condition of maniacal delirium. Along the free border of the gums there was a distinct slaty-blue line. A small quantity of urine drawn off by the catheter was found to contain albumin and a few red blood corpuscles. During the attacks of eclampsia the left arm was practically passive, and appeared to be paralysed