

has come under the notice of the Committee during the years 1905, 1906, and 1907, notwithstanding the large number of correspondents and keepers who have helped them in their work. The bacteriological work was intrusted to Dr. C. G. Seligmann; he had to leave for Ceylon during the past winter, but the work has been carried on by Dr. Louis Cobbett and Dr. Graham Smith.

Good work has been done in the investigation of the chronic form of the disease and the pathological symptoms of those birds that have been found dead or dying on the moors have been carefully recorded. It is, of course, impossible to give final results in an interim report, while the subject of inquiry is still under investigation. Even if what may at first appear to be final results have been arrived at they could not be published before the finished report appears in order to give ample time for verification. But there is reason to believe that the committee may have already discovered more than they at present think themselves justified in placing before the public without being satisfied that those results are correct. The bacteriological research has been hampered by no case of the acute disease having been noticed during the last three years. But investigation has shown (1) that Professor Klein's organism belonged to the widely distributed colon group, and according to the limited cultural and morphological tests then used differed in no way from other organisms of the colon group found in the grouse; and (2) members of the colon group, apparently culturally and morphologically identical with Professor Klein's organism, can be isolated from the heart, blood, lungs, and liver of both healthy and emaciated grouse that have been dead for a period of from 12 to 24 hours, the actual time varying with such factors as temperature and moisture.

The examination and the pathology of the birds dying from the chronic form of the disease has engaged and is still engaging the careful attention of the committee, as is also the manner in which the disease is believed to be spread. This work has been the care of Dr. A. E. Shipley, F.R.S., and Dr. E. A. Wilson, and in their appendices to the report a fuller description of the work done will be found than would come within the scope of this article. Dr. Wilson deals at first with the life-history of the grouse and describes the different variations in the plumage of the bird according to its geographical distribution, the moulting of the two sexes at different periods of the year, and the various plants and seeds eaten by the grouse. Dr. Wilson has had opportunities of examining many hundreds of grouse shot at all times of the day and is therefore able to go a long way towards settling the vexed question as to whether grouse feed all day or only towards evening, his evidence being in favour of the former theory. The whole of Dr. Wilson's work is not yet published, but anyone who reads the report will see from his published tables what a vast amount of ground has been covered by him.

Dr. Shipley's paper is very interesting and deals with both the entozoal parasites and the ectoparasites of the grouse. He enumerates and describes the insects, flies, ticks, and mites found on the grouse. He also describes the worms found in grouse, both cestodes and nematodes, especially the *Trichostrongylus pergracilis*, the worm to which Dr. Cobbold attributed the mortality in grouse as far back as 1873. A great deal of combined work has been done by Dr. Shipley and Dr. Wilson and Mr. J. C. Fryer searching for the intermediate hosts of the parasites that infest grouse, but unfortunately up to the present no definite results have been obtained.

A paper is added by Mr. H. Hammond Smith describing the work carried out on the experimental area in Surrey, where grouse have been kept not only in health but where the committee have been able to hatch, and it is hoped will be able to rear, birds bred under very artificial conditions. With this paper is published an account of a collection of the grits found in gizzards of game birds, made by Mr. Hammond Smith, and this is accompanied by a valuable report on their petrology by Mr. R. H. Rastall of Christ's College, Cambridge. At present the investigation is not complete but is being diligently carried on; but as the secretary in his report points out funds are urgently needed to bring the work to a successful termination. No help is given from public funds and all the money expended has been found by those who are specially interested in the subject. But the matter is one of such general importance to the public that there should be a generous response to the appeal made for help in the secretary's report.

OCCUPATIONAL MORTALITY.¹

III.²

EVEN a cursory reading of those portions of Dr. Tatham's report which have already been reviewed in THE LANCET will suffice to show that a large proportion of the loss of life sustained by industrial workers is due to a group of conditions which, although etiologically dissimilar, have unavoidably been grouped together for present purposes under the head of "pulmonary disease," because of the impracticability of discriminating among the various types of such conditions, and, in particular, of distinguishing tuberculous from non-tuberculous affections of the lungs.

From the point of view of the public health it is important that special preventive measures should be applied to those occupations in which these diseases, or either of them, cause exceptional fatality. Reference to the tables in this report shows that pulmonary tuberculosis and diseases of the respiratory system, taken together, account on the average for more than a third part of the total mortality of men in the main working time of life, and that, as will hereafter appear, the proportion in some industries is much greater than this. That pulmonary diseases as here defined are largely preventable may be gathered from the fact that the mortality occurring therefrom has fallen very substantially in recent years. That this is the case may be seen by reference to the successive reports of the Registrar-General during the last quarter of a century, and there is little doubt that the saving of life thus secured is the direct result of sanitary improvement generally and especially of the amendment of the conditions of labour which has been brought about by factory legislation.

In the present report there appears a section in which account is given of an attempt to ascertain the effect of continuous labour under adverse sanitary conditions of various kinds. In the first place, the injurious effects are set forth of inhaling an atmosphere laden with irritating particles of dust or otherwise seriously contaminated, "pulmonary disease" having been chosen as the criterion of the relative degrees of unhealthiness suffered by the workers in those industries that are specially prejudicial to health. Before entering into details on this subject Dr. Tatham invites attention to some of the difficulties that apparently are inseparable from investigations of this kind. Prominent among these is the difficulty of apportioning to each cause its true share in producing the aggregate of ill health and loss of life in a given industry.

As regards the stated causes of death, certain inaccuracies are known to exist in the registers which impair the value of occupational statistics. It must be remembered, in the first place, that medical certificates are available respecting only a portion of the recorded deaths, about 6 per cent. of them being registered on the authority of coroners and an additional 2 per cent. being uncertified; secondly, that in the compilation of vital statistics only one cause can be tabulated respecting each death; and thirdly, that even in cases where a medical certificate has been obtained the language therein employed does not always determine the etiology of the condition causing death. As regards the inquiry in hand, it is obviously necessary to know how much of the loss of life referred to diseases of the lungs depends on tuberculous infection, and yet on this important point the information derivable from the death certificates is in great part defective. Whilst duly appreciative of the great improvement that has recently taken place in the certification of causes of death, Dr. Tatham is still confronted with the difficulty of classifying deaths which are referred to such conditions as "abscess of the lungs," "congestion of the lungs," "pleurisy," "hæmoptysis," or to other indefinitely described lung diseases. From inquiries addressed to medical practitioners he learns that a considerable number of the deaths so returned are tuberculous in origin, although the original medical certificates had contained no intimation of the fact. The appendix to this report contains a table in which the chief industries are arranged in graduated lists with reference to their mortality from "pulmonary disease" and also

¹ Letter to the Registrar-General on the Mortality in Certain Occupations in the Three Years 1900, 1901, 1902. By John Tatham, M.A., M.D., Fellow of the Royal College of Physicians. Darling and Sons. 1908.

² Previous notices of this report appeared in THE LANCET of August 8th, p. 408, and 15th, p. 497.

a series of tables in which the mortality of the several workers is compared with that of agriculturists taken as a standard. The mortality from phthisis is shown separately from that attributed to other diseases of the respiratory organs, but the mortality from both causes together is also given for each occupation in proportion to that of agriculturists, the latter being taken as 100. One of these tables contains a list of 35 industries in which the workers suffer more or less seriously from inhaling particles of dust. At the bottom of this list there are five industries—viz., file-makers, potters, cutlers, copper-miners, and tin-miners—in which the combined mortality from phthisis and respiratory diseases is from four times to nearly ten times as high as that of agriculturists. It is impossible to determine how much of this excess is caused by a dusty atmosphere and how much by other unhealthy conditions in the workrooms; but it is noteworthy that in 1900–02 also these five industries had occupied similarly unfavourable positions in the scale of dust-producing occupations. Iron-stone-miners, carpenters, and coal-miners appear to suffer less severely than the above from pulmonary disease, their mortality figure exceeding that of agriculturists by not more than from 56 to 67 per cent. Agriculturists experience almost the same rate of mortality from respiratory diseases as they do from tuberculous phthisis, but in the list just mentioned there are 18 occupations (nine of which are among the least healthy of the series) in which the workers sustain greater loss of life from tuberculous phthisis than from other diseases of the lungs. On the other hand, the list contains 17 occupations in which the loss of life from respiratory diseases is less than from tuberculous phthisis. Among these may be mentioned copper-miners, potters, copper-workers, manufacturers of iron, steel, and lead, coal-heavers, chemical manufacturers, and coal-miners—in all of which occupations the workers appear to die from non-tuberculous affections of the lungs much faster than from tuberculous phthisis. Within the last 20 years there has been a decline in phthisical mortality in all the occupations in the last-mentioned list except those of cutlers and tin-miners, and a decline in respiratory mortality in all occupations except those of tin-miners and Lancashire colliers. As already remarked, however, the figures for tin-miners must be used with caution owing to paucity of data. It is worthy of notice that the increase of mortality from tuberculous phthisis has in most cases been balanced by a corresponding decrease in mortality from respiratory diseases.

In yet another table a list is given of 19 industries in which the workers suffer in various degrees from breathing foul, though not necessarily dusty, air in the course of their employment. Among the workers included in this list 14 succumb to pulmonary disease more than twice as fast as do agriculturists generally, whilst general shopkeepers succumb to it nearly four times as fast. In the latter occupation the mortality from pulmonary disease is actually higher than that from all causes together among agriculturists. In almost all the occupations in this list the workers die from tuberculous phthisis more rapidly than from respiratory diseases other than phthisis; the excess of phthisical over respiratory mortality ranging from 13 per cent. in some occupations to 139 per cent. in others. The workers in this list who suffer most severely from pulmonary disease are general shopkeepers, whose mortality figure is 662, against 171 for agriculturists; hatters, whose mortality figure is 528, musicians 502, bookbinders 449, and printers and hairdressers 430. At the other end of the list come scientific instrument makers, drapers, and artists, whose mortality figure does not greatly exceed the average. Since 1890–92 the mortality from pulmonary disease has declined in each of these occupations except that of general shopkeepers, concerning whom there is some doubt as to the trustworthiness of the data.

In each of the two previous supplements investigation was made of the mortality due to lead poisoning in certain of the occupations in which the workers are brought into contact with lead. In the present supplement Dr. Tatham gives a list of 12 occupations in which the mortality from plumbism was double, or more than double, the average among occupied males in the aggregate. Cutlers and wool manufacturers, who were included in this group in 1890–92, do not appear in the present list, nor do lead-miners, although they obviously handle lead ore in the course of their work. In the following five industries the workers still suffer

inordinately from lead poisoning. Taking the standard mortality as unity, leadworkers experience a mortality which is 103 times the standard; filemakers, 57 times; plumbers and painters, 22 times; potters, 9 times; and glassworkers, 8 times the standard. But high as these proportions are it is satisfactory to observe that they are now, with only one exception, much lower than those which prevailed ten years ago. The mortality from plumbism among plumbers and painters has shown no decline since the previous record. These trades are carried on for the most part by small employers, and the exercise of needful precaution against attack probably depends largely upon the care of individual workers, in spite of which the risk of lead poisoning has remained practically constant. On the other hand, the operations of glass and hardware making, lead-working, and file-cutting are conducted generally on a large scale under the supervision of the factory inspectors, and in each of these the reduction in mortality from plumbism has been remarkable, amounting to more than 50 per cent. in the case of lead-workers and potters.

In each of the two preceding supplements statistics were given of the mortality ascribed to alcoholism in the several occupations; although it has always been recognised that the mischief resulting from intemperance cannot be accurately gauged by the number of deaths directly attributed to alcoholism. The remarkable disparity observable in the fatality of alcoholism as compared with that of hepatic cirrhosis would seem to suggest that, in consideration for the feelings of relatives, medical attendants not infrequently state in their certificates only the pathological condition of the organs affected, without reference to the cause of such condition. It will hardly have escaped notice that among men-servants, for example, the mortality from alcoholism alone is higher by one-sixth part than among innkeepers, whereas the mortality from liver disease, chiefly cirrhosis, among the former is only one fourth part of that among the latter.

In a table in the present report a list is given of the occupations in which the workers appear to be most seriously addicted to intemperance, as proved by their mortality from alcoholism and liver disease combined; additional columns are also given showing the mortality from other affections most commonly associated with alcoholism, such as diseases of the nervous system, phthisis, and gout. The mortality of all occupied and retired males being taken as a standard, the table shows that innkeepers and their servants, costermongers, dock labourers, and chimney sweeps die of alcoholism at a rate which is from three times to more than eight times as high as that standard; and further, that in addition to these there are 14 other occupations in which the mortality from alcoholism is very seriously in excess. Comparison of this table with the corresponding table in the preceding supplement reveals the fact that with a single exception all those occupations in which the workers appeared from the earlier records to be addicted to alcoholic excess are included in the present table also.

The practicability of investigating the question of occupational mortality among women industrially employed was seriously considered in the General Register Office so long ago as the year 1890, but the attempt on that occasion had to be abandoned because of the uncertainty attaching to the statement of female occupations, both in the census returns and in the death registers. It frequently happens that the industrial occupation of a woman is only temporary and ceases at marriage, so that any injurious effect of occupation would hardly be felt by her so acutely as it would be by a man. Since the date referred to evidence of inaccuracies and omissions in the returns both of the living and the dead among women has accumulated so fast that no reliance can be placed on them for statistical purposes. The following instance may be taken as a type of the kind of inaccuracy to be found in the records. A. B. is a domestic servant—say, the daughter of a bricklayer living in the country. The girl cannot remain at service in town because of her inability to discharge her duties. She develops tuberculous phthisis and returns to her father's house permanently invalided. She is thenceforward regarded as unoccupied, and in the event of decease her death will be recorded as that of a bricklayer's daughter, no mention being made of her previous occupation. In the case of a married woman there would be a similar inaccuracy in the records, the deceased woman

being described simply as a wife or widow, with mention of her husband's occupation but without mention of her own.

In making preparations for the present supplement it was decided to make another attempt to investigate the question of female occupational mortality. But although much labour has been devoted to the subject, including the critical examination of the particulars of more than half a million female deaths, the attempt has again proved fruitless, mainly for the reasons above alluded to. It is hoped, however, that the instructions under which the registrars now work will produce more trustworthy records of occupation, and that it will be possible in 1910-12 to produce more accurate statistics as to female occupational mortality than has been possible on the present occasion.

Looking Back.

FROM

THE LANCET, SATURDAY, August 21st, 1830.

Edinburgh Medical and Surgical Journal.

(Concluded.)

The following notice is so extremely interesting that we shall quote it at length; it exemplifies admirably the valuable assistance which chemistry affords in the development of medico-legal investigations. Had the accident occurred before Orfila reduced toxicology to a science, it is more than probable, that the unfortunate pastrycook would have been condemned as a felon and sent to the guillotine. The statement of the case and the chemical evidence are worthy of the deepest consideration, and afford to the medical world a practical lesson of the most valuable kind.

ON THE POISONOUS EFFECTS OF CERTAIN SPOILED ARTICLES OF FOOD.

It is well known that certain articles of food have been frequently observed on the Continent to acquire poisonous qualities of a peculiar kind, and in a way which chemists and physicians have not hitherto been able to explain very satisfactorily. Among these articles the most frequent are a peculiar variety of sausage, and a particular kind of cheese used in Germany; but both in France and Germany, bacon and ham have been also several times found to acquire poisonous qualities analogous to those which characterise the sausage-poison and cheese-poison. A very elaborate inquiry into an accident supposed to have arisen from spoiled ham has just been published by M. Ollivier in the *Archives Générales de Médecine*. His investigations set completely at rest the common notion that such cases arise from the accidental impregnation of the meat with metallic poisons; but he has not succeeded in discovering the real cause.

In the instance which gave rise to his investigation, the master of a family purchased a ham-pie at a pastry-cook's in Paris, and the whole family ate the meat of the pie the same day, and the crust on the following day. Three hours after dinner the master of the house was seized with general uneasiness, followed by cold sweats, shivering, violent pain in the stomach, and frequent vomiting; then with burning thirst, extreme tenderness of the belly, so that the weight of the bed-clothes could scarcely be borne, profuse purging, and colic of extreme violence. His daughter, twenty-seven years of age, and a child nine years old, were similarly attacked. A physician, who was called to their assistance soon after they were taken ill, drew up a minute report of the symptoms in each of his patients, and declared that they had a violent inflammation of the stomach, which he was inclined to ascribe to natural verdigris, or the carbonate of copper having been communicated by the pastry-cook's moulds. In a few days all the three individuals recovered under an antiphlogistic treatment. About the same period several accidents of the like nature occurred among the customers of this pastry-cook; and, in consequence, a judicial investigation was ordered. The shop being properly inspected, it was found that every operation was conducted with due attention to cleanliness. MM. Ollivier and Barruel were appointed to analyse the remains of the meat which produced the cases first mentioned, as well as the alvine discharges of the child. The alvine discharges had a leek-green colour, and were not fetid, but of a sour smell.

Sulphuretted hydrogen did not induce any change in colour, neither was any change of colour produced by the same reagent after the fluid was filtered. The remains of the pie had become mouldy. The meat and paste were separately examined. The contact of sulphuretted hydrogen did not produce any change of colour in either. When they were incinerated in a crucible and the residue treated with diluted nitric acid, the filtered liquid on being neutralised with ammonia did not give any precipitate with ferrocyanate of potass, or with sulphuretted hydrogen, and did not become blue with ammonia. Another portion of the remains of the pie was treated with alcohol and a few drops of acetic acid, and the alcoholic solutions were evaporated to the volume of half a drachm. The residue was agitated with four times its volume of distilled water, filtered and evaporated, and dissolved again in water. This solution was not affected by sulphuretted hydrogen or by nitric acid. These experiments furnish ample proof that the pie did not contain a trace of arsenic, copper, antimony, or lead. The only conclusion, therefore, which M. Ollivier conceived it possible to draw was, that the ham had, in some way or another, acquired the poisonous properties sometimes remarked in German sausages, cheese, and ham.—*Archives Générales de Médecine, Février, 1830.*

Public Health.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

City of Bristol.—Dr. D. S. Davies, in his current annual report, furnishes an instructive chart relative to the behaviour of infantile mortality in Bristol and Huddersfield respectively. There is, in a sense, a great similarity between the two curves, each having recently reached a lower level than ever before. Dr. Davies points out the fallacies which are liable to attend an inference that in Huddersfield the fall which has taken place is to be attributed to the special measures which have been taken against infantile mortality in Huddersfield. He does not think that the facts adduced support the view that the Huddersfield fall is due either entirely or in any large degree to the measures in question, an opinion which seems to be borne out by the fact that during the three years in which special measures have been taken in Huddersfield there has been a reduction of 18 per cent. in the infantile mortality, while in Bristol, where no such special measures have been taken, there has been a reduction of 15 per cent. Certainly, great caution should be exercised in drawing inferences from data which are not sufficiently numerous to afford a proper basis for inferences. But there can, we think, be no doubt that the methods adopted at Huddersfield are on right lines, and even if, as is not improbable, they as yet show no effect upon the death-rate curves, they might show some result were it possible to construct a curve as to physical conditions. Dr. Davies, who, as is well known, has devoted special attention to the subject of chronic carriers in enteric fever, gives a brief but interesting account of current knowledge as regards carrier cases as well as a synopsis of the outbreak of enteric fever at the Brentry Reformatory, Bristol, which was attributed by him to the specific contamination by a carrier case of milk which had been already sterilised. An account of this outbreak was given in our columns at the time. It appears that possibly this same woman, who is held responsible for the Brentry outbreak, may have been also the cause of enteric fever at another establishment in 1904 and of a commencing outbreak in another in 1905. At any rate, the carrier-case theory was found to fit in with the facts as regards the Brentry outbreak in 1906-07. There is, however, need for great caution in working with this carrier-case theory, as it is a very tempting one to employ and one which may possibly result in shutting our eyes to other causes. A considerable number of people who have reached middle life have suffered from a definite or suspected attack of enteric fever, and having regard to the fact that in carrier cases there may be numerous and long intervals between the bacilli-bearing periods there is the danger of assuming that, even in the absence of demonstrated enteric fever bacilli, everyone who has had enteric fever is a carrier case. We shall doubtless hear much of carrier cases in the near future because in epidemiology