in the North of England, no fewer than 615 of the highest monthly figure of 675 in January, 1926, having been reported from Durham and West Yorkshire. Possibly the lower winter temperature and absolute humidity in the North may be one factor in this distribution. The data are not yet sufficient to afford scope for forecasting the probable incidence some months ahead, as in India, but it may be significant that the less marked summer decline in 1924 than in 1923 and 1925 was associated with lower summer absolute humidity in 1924, as I should expect a cool summer to produce less reduction of the disease, and a cold winter and spring should favour an increase.

The immediate outlook is complicated by twenty-four counties reporting cases at the end of January, 1928, against nine at the same period in 1927, but against this is the fact that the great rise early in 1927 was largely due to small-pox getting out of control in Durham, with nearly half the total January cases in that one county, which is not the case this year. The recent very mild January and early February is unfavourable to the rapid increase of the disease, but in view of the maximum occurring as late as April in two years with especially low spring absolute humidity, it is too early to say whether the high small-pox rate of last year will be exceeded this year or not, but a cold spring is likely to result in some increase on the 1927 figures. A few more years of neglected vaccination and we are likely to possess better data for forecasting the epidemics here, as in India.

Nor should we forget that the present widespread mild small-pox is a reliable measure of what is likely to happen when the fatal African and Indian form once more gets a firm footing in the country of Jenner, as it nearly did in May, 1927, with five deaths among eleven cases in London, when a serious disaster was only staved off by the fine team work of the medical profession in tracing and vaccinating contacts.

Conclusion.

The mild type of small-pox now endemic in England and Wales has increased each year for the past four seasons at an average rate of 160 per cent. on the previous year. Its seasonal prevalence is closely related to the absolute humidity, as I have previously shown to be the case in India. Low absolute humidity favours and high checks the disease, and in this country the mean temperature curve closely follows the absolute humidity one, although this is not the case in India, where the yearly epidemics can be foreseen several months ahead. In England the probable course can only be forecast at present for the succeeding month. A cold winter and spring are likely to result in increased small-pox.

ERGOT POISONING AMONG RYE BREAD CONSUMERS.

BY

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AND

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ATTENTION was first drawn to the prevalence of symptoms suggesting poisoning by ergot by one of us (J. R.) some eighteen months ago. An increase in the number of cases showing symptoms has led us to investigate the condition thoroughly.

In the first place it was noticed that the disease is confined to the Jewish population of the city, and it is found that the symptoms are only met with in that portion of the Jewish community which uses rye bread as an article of diet. In no case is the condition met with among those who eat white bread.

We have carefully collected and recorded cases, and have had analytical and physiological tests made on the rye in order to prove the cause of the symptoms met with.

Early in the investigations it was observed that the general symptoms complained of were coldness in the extremities, numbness and lack of sensation in the fingers —a sensation like an insect creeping over the skin— headaches, depression, gastric disturbances, shooting pains, twitchings in the limbs, and staggering gait. It was further observed that the patients who complained of these symptoms were Jews and later that these Jews ate black or rye bread. On the other hand, none of the symptoms complained of were observed among that portion of the Jewish population who ate white bread. It was then suggested that the rye bread might be the source of the trouble. From this it was concluded that the symptoms were due to ergot, which, as is well known, so readily contaminates the rye. It was also noticed that the symptoms were much more pronounced in the Russian, Polish, and German-born Jews than in English-born Jews. This is explained by the fact that black bread is the bread commonly used on the Continent, whereas in this country its place is taken by white bread. Further, on account of its slightly bitter taste the black bread proves more palatable than the comparatively tasteless white bread. In addition to this, black bread is found to be more satisfying and is a little cheaper than white bread.

In some households it is found that one member may show no symptoms of ergotism whatever whilst all the other members of the family are variously affected. Questions elicit the information that the unaffected member does not eat rye bread. In many of the cases first seen rye bread was stopped as an article of diet; this was followed by an early diminution in the symptoms, and a complete disappearance of them in most cases.

Rye is by far the most susceptible grain to infection by the parasitic fungus *Claviceps purpurea*. The grain is infected just as the flowers are opening, and the fungus enters at the end of the grain. The infection is only possible at this time, as the shell later becomes too hard for the fungus to penetrate. This most commonly occurs during a spell of sunshine following a cold, damp period, and the fungus can more readily be detected and demonstrated after a cold, damp raising and harvesting season—for example, that of autumn, 1927. Grain that is infected with ergot is seen to be black in colour, and when the cereal has been ground it can be observed as small black specks in the flour. It is probable that some consignments of rye grain are ergotized and some are free from the infection.

In the ordinary course of events precautions are taken to prevent infected grain from passing to the consumer. This is accomplished by a process known as "screening," whereby the grain is passed through a sieve and the large infected grains are eliminated. If a sufficient proportion of infection is demonstrated in this manner, then the rye so contaminated is classified as unfit for use. This method of detection, however, is inefficient, as it does not prevent the small infected grains from passing through. Thus all the small infected grains are passed on as fit for use. All infected rye grain eventually becomes black in colour. It is therefore easy to identify with the naked eye. The grain is then ground and, after passing through the hands of various middlemen, is bought by the baker for bread-making.

Rye flour has very poor keeping qualities, and therefore, as far as possible, it is only ground to meet consumption. Old rye is the best for use; freshly ground rye deteriorates in twelve hours, when it gives off a peculiar fishy odour. When this is smelt the baker invariably takes it as an indication that the flour must be used up quickly; otherwise it will be unfit for use. The rye used is home-grown when available, although lately a large percentage has been imported from Canada. In the baking warm water is added to the rye, and it is then allowed to "sour"; this takes about twelve hours. The last batch may be eighteen hours old before baking. The bakers get twice the wage of ordinary bakers, and no machinery is used in the process.

Samples of the grain, rye flour, rye meal, and the bread were submitted to Mr. H. Heap, the Manchester city analyst, who reported that the grain submitted showed 1 per cent. of ergotized rye.

On cutting sections of the infected grain the fungus

Claviceps purpurea was at once seen invading it, and the fungus showed up well after staining with methylene blue and eosin. Sections of grain were also stained with iodine and potassium iodide for starch, none of which was seen in many sections, owing to its having been replaced by the fungus. Extracts from the rye were also tested physiologically for ergot, and the results were positive. Mr. Heap has, moreover, been able to grow the fungus from the rye.

The three chief constituents of ergot are sphacelinic acid, cornutine, and ergotine. However, ergot is not as yet definitely split up into its component parts or active constituents, and little is at present known of them specifically.

It is found that the average Jewish person consumes about 1/2 lb. of rye bread per diem, the flour of which contains 1 per cent. of ergot. Now 1/2 lb. of bread will contain about 5 to 6 oz. of flour, the rest being the water, which is added before baking; 5 oz. of flour equals 2,285 grains, of which 1 per cent. is ergotized. Each person is thus consuming 22.85 grains of ergot daily. The ordinary medicinal dose of ergot, taking the liquid extract of ergot as a sample dose, is 10 to 30 minims, which equals 10 to 30 grains. Thus each individual is taking rather more than the average dose of ergot each day. On account of freshness the ergot is also likely to be more potent than the medicinal ergot which has been kept for a time; also grain harvested during last autumn, if infected by ergot, is likely to contain fresher principles than that of the ergot from the previous harvest. It is found that rye bread takes time to rise before baking, especially in the winter months, when it is colder; and the flour mixed with water is allowed to stand for a time to "sour," during which time it is likely that the fungus may increase in quantity.

The symptoms observed in these Jewish patients correspond very closely with those produced by chronic ergot poisoning. The severity of the symptoms produced seems to increase with age, children being slightly and elderly people more acutely affected. This may be due to the elderly people having taken rye bread for many years. The foreign-born Jews, who have always eaten rye bread, are the most affected.

The first symptoms observed are coldness of the extremities combined with numbness. These symptoms are especially observed in tailors, buttonholers, etc., who find that their fingers are numb, and they have difficulty in keeping up with their work. They often notice that they prick their fingers without feeling it. Raynaud's disease amongst the Jews during this winter would appear to be more prevalent than heretofore. We have also come across a man, aged 47, who has a definite dry gangrene of both hands. The gangrene of this man is not associated with diabetes or any similar condition, and it is possible that, as a rye bread consumer, his gangrene is due to ergot poisoning.

A very typical sensation, which is found in all marked cases, is that of an insect creeping under or over the skin. This sensation is volunteered by the patients in most cases. Itching is also a common symptom. They also suffer from nervousness and depression, whilst headaches are well marked. Pains in the abdomen are frequently complained of, whilst among the more severe cases staggering gait and ataxia may be found. In most of the long-standing cases the blood pressure is definitely raised—for example, a woman aged 44 had a systolic blood pressure of 174.

It has been observed that these cases quickly improve when rye bread as an article of diet is discontinued.

A large number of the symptoms are due to general contraction of the arteries all over the body, and it is probable that if the poisoning should become more severe such serious conditions as Raynaud's disease and gangrene will become more frequent. Ergot has the power of contracting the pregnant uterus, and it is likely that chronic ergot poisoning may cause many abortions in early pregnancy. Unfortunately no record is available of these cases, as the Notification of Births Act only applies to children born after the expiration of the twenty-eighth week of pregnancy.

Treatment consists in stopping the consumption of the contaminated bread at once, and it is remarkable how quickly patients recover when this is done. They should be kept warm, and drug treatment is necessarily only palliative.

We are much indebted to Mr. H. Heap, M.Sc., F.I.C., the city analyst, for his careful analysis of the samples sent, and for his help and advice.

THE INFLUENCE OF PARTURITION UPON INSANITY AND CRIME.

ABSTRACT OF A PAPER READ BEFORE THE MEDICO-LEGAL SOCIETY ON FEBRUARY 23RD, 1928.

BY

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IN 1922 the Infanticide Act relieved the courts from the painful task of finding a verdict of murder against a woman, mentally deranged by childbirth, who kills her newly born child.

The records of Broadmoor show that of the total female receptions from 1900 to 1924, 42.8 per cent. were in respect of child murders due to insanity associated with childbirth, the majority being crimes committed during lactation. To escape punishment a woman pleading puerperal insanity must prove (*a*) that she was suffering from the disease when she committed the offence; (*b*) that she was incapable of distinguishing right from wrong, or was under the influence of a delusion which prevented her from understanding at the moment the nature of the act which she was about to commit. The law assumes the delusion to be a fact, and if the fact would justify the act of violence then the prisoner would be entitled to a verdict of "guilty, but insane." This is provided for by the Criminal Lunatics Act, 1884. As many critics have pointed out, it is difficult to see how a person can be both insane and guilty. Before the Infanticide Act was passed the practice was for the jury to bring in a verdict of "not guilty, on the ground of insanity," which seems more logical. It should be borne in mind that a verdict of "guilty, but insane" can be passed upon a person sane at the time of the trial. A prisoner who is admittedly insane when about to be tried is, of course, unfit to plead, and is therefore detained during His Majesty's pleasure—that is, until he recovers his reason and becomes fit to plead.

From this it is plain that a woman suffering from puerperal insanity who murdered her child knowing that she was doing wrong would be liable to be convicted and sentenced to death for murder unless she were able to avail herself of the Infanticide Act, which makes an exception from the general law. On the other hand, if she established a defence of insanity she would be found guilty of murder, but insane, and locked up during His Majesty's pleasure, so that even in these circumstances she would suffer punishment of no light order.

The Infanticide Act provides (Section 1):

"Where a woman by any wilful act or omission causes the death of her newly born child, but at the time of the act or omission has not fully recovered from the effects of giving birth to such child, and by reason thereof the balance of her mind is disturbed, she shall, notwithstanding that the circumstances were such that but for this Act the offence would have amounted to murder, be guilty of felony, to wit, infanticide, and may for such offence be dealt with and punished as if she had been guilty of the offence of manslaughter of such child."

As a corollary, Section II entitles a jury to find a verdict of infanticide where the charge is one of murder. To put the matter in a nutshell, in respect of a newly born child the mother has a period of absolution under the Act. When that period has expired she is dealt with on the same principles as other persons charged with murder. It is obvious that the Act requires two things—the woman must be mentally unbalanced and the child must be newly born. The absence from the Act of any definition of the term "newly born" has occasioned some discussion.

In a case relating to a young woman named Mary Donoghue, heard last November (1927), the Court of