Clinical Observations

ON

THE PRODROMAL PERIOD OF SOME OF THE ACUTE INFECTIOUS DISEASES.*

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In this paper it is my intention to deal chiefly with cases in which the initial symptoms are either unusual or not in my opinion sufficiently emphasized in the ordinary textbooks. Except in a few instances, which I have mentioned, the cases with which these remarks are concerned have come under my own observation.

In writing an account of an infectious disease it is customary and also convenient to divide its course into several stages. There is first the "incubation period," then the "prodromal period," next the "eruptive period," and so on. The prodromal period is that with which I intend to deal this evening, the stage, that is, that intervenes between the first symptoms of illness, and the rash or some other characteristic sign. But I will pause for a moment to ask whether now and then there may not be symptoms even before the prodromal period, especially at the beginning of the incubation period, at or immediately after the time when the attacking micro-organism obtains an effective entrance into the patient's body. Such an occurrence could be well observed only in diseases with long incubation periods; in those with short, the symptoms of the entrance of infection would probably merge into those indicative of the general invasion.

In measles I have seen one or two cases like the following: A child, Louisa W., was admitted into a certain ward, in which there were some eighteen or nineteen children, at about half an hour after midnight on January 31st; thirty-five hours later, on February 1st, she was found to have measles and was removed. On February 14th, one child, and on February 16th another, Mary Ann H., failed with measles; also on February 16th, but about nine hours later, a third child, Elizabeth H., had pyrexia and was noticed to be frequently sneezing; in consequence she was thought to be sickening for measles and was removed to another ward with the two children just mentioned. But the febrile disturbance was slight and lasted for a few hours only. On February 22nd, however, the symptoms of an undoubted attack of measles showed themselves. Was Elizabeth H. infected with measles on February 16th by Mary Ann H., or was the slight febrile attack she had on February 16th a primary abortive attack of measles due to infection by Louisa W.? These cases occurred in the days before I was acquainted with Koplik's spots.

In typhoid fever I have seen what I may call the symptoms of infection in several cases. A nurse who was working in a typhoid ward had an attack of tonsillitis, and was kept in bed for a few days, after which she went away for four days' holiday. The day after she returned, eleven days from the commencement of the tonsillitis, the first symptoms of an attack of typhoid fever began. Again, another nurse, also engaged in a typhoid ward, suffered from headache and pains in the back on January 13th, her temperature being 99.8° F. The headache persisted and she was warded on January 15th. After January 16th she was free from headache, and on the 18th was allowed to get up. She remained well till January 24th, when the headache returned and the temperature, normal since January 13th, rose. These proved to be the initial symptoms of an attack of typhoid.

Such "illnesses of infection" are, however, uncommon, and in our present knowledge quite impossible to diagnose. In some instances, doubtless, the patient is simultaneously infected with two diseases, one with a short, the other with a long, incubation period. Thus some years ago, when typhoid fever was prevalent at Hamburg, owing to the drinking water being contaminated by sewage, some persons were attacked by choleraic diarrhoea almost immediately after drinking the water, while two or three weeks later they fell ill of typhoid fever.

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SCARLET FEVER.

In a large majority of the cases of this disease the prodromal period is short; consequently there is not the same room for variation in the initial symptoms as there is in diseases the prodromal periods of which are long. In adults there is not infrequently a slight sore throat for two or three days before any pronounced symptoms of illness make their appearance. But usually the rash comes out within forty-eight hours of the onset, and very often it is discovered as soon as any other symptom. Occasionally, however, it is delayed till the third or fourth day, and even longer; thus in the case of a boy, aged 3 years, in whom an attack of scarlet fever began with repeated vomiting, a rise of temperature, and a frequent pulse on December 26th, the rash did not come out till December 30th. As a rule, when the appearance of the rash is delayed, the case is one in which the throat symptoms are marked (scarlatina anginosa); but it was not so in the case I have just mentioned. It will be seen from the chart (Chart 1) in his case that the temperature fell to normal on the morning of the third day, rising again later. This is an unusual circumstance in scarlet fever, for in this disease the temperature seldom falls before the rash comes out, so that you do not meet with remissions as in measles. If the temperature goes up, it remains up till the rash is well out.

The cases of scarlatina anginosa in which the rash is delayed are frequently diagnosed as diphtheria, and this error is the more likely to be made the later the rash is to appear; and it is most likely to be made in those cases where there is no rash at all. For it is to be remembered that the rash is occasionally wanting or very fleeting in very severe as well as in very mild cases of scarlet fever. The symptoms that serve to distinguish the disease from diphtheria are continued pyrexia, restlessness or delirium, acute and extensive faucial inflammation with much swelling; usually no definite false membrane, but patches of inspissated mucus, or cheesy excretion with abundant flow of mucus; the throat is very painful, which is not the rule in diphtheria; diphtheria antitoxin has no effect on this condition of the fauces; often the patient wastes rapidly.

Chart 2 is that of a case of this kind. The patient was a boy, aged 13 years, who was sent to hospital certified to have diphtheria. For the first few days the case looked very much like one of diphtheria so far as the fauces were concerned; but when the thick, membrane-like exudation had cleared off it was ascertained that the fauces were considerably ulcerated. There was a thick, purulent discharge from the nose. On admission to hospital a very slight rash, consisting of fine red papules, was noticed on the trunk; this had almost gone next day. Subsequently there was free general desquamation, and also left otitis media and pleurisy. The bacteriological examinations were negative as regards diphtheria bacilli. Three or four days after the admission of this patient his brother and sister were sent to hospital with well-marked attacks of scarlet fever. Continuous pyrexia for nearly three weeks, such as is shown by the temperature chart, is quite unusual in diphtheria.

Vomiting is a very common early symptom of scarlet fever; usually the patient vomits once or twice; very frequent and severe vomiting as a rule will usher in a severe attack; but I have on more than one occasion seen a quite mild attack in a young child commence with vomiting so violent and frequently repeated as quickly to induce a state of serious collapse, from which the patient emerged only when the vomiting ceased and a reaction set in.

Prodromal rashes are extremely rare, if they ever occur. In a woman, aged 23 years, who was convalescent from an attack of diphtheria for which she had been treated with antitoxin, I saw an attack of scarlet fever preceded for twenty-four hours by erythema nodosum of the legs; and in another case, a boy aged 3, also convalescent from diphtheria, the rash of scarlet fever was preceded by an erythema consisting of large, irregular blotches on the trunk, buttocks, and thighs. In both these cases, however, the question of an antitoxin rash had to be considered. But though there is no prodromal rash, you will often find that the punctate eruption is preceded by a diffused, simple, non-punctate erythema, which I take it, is part of the rash of scarlet fever itself. For the rash in this disease is made up of two main elements, the one being a

simple erythema, the other consisting of minute spots or puncta. Usually these elements are present together and compose the rash as it is seen ordinarily; but one may be absent or show itself earlier than the other; and I have, over and over again, in adults as well as in children, observed the rash of scarlet fever begin as a simple, non-punctate erythema, equally diffused over a large area and not patchy. As a rule the rash begins about the trunk, especially the chest. But exceptionally it may commence on the extremities. In patients who have within a few days been injected with serum for diphtheria, the rash may begin at the site of injection. Usually the temperature rises with the first signs of the disease, but occasionally not till after the rash has come out.

The only sign of an attack of scarlet fever may be a punctate eruption.

Leonard C., aged 3, was admitted on July 29th, on the third day of an attack of diphtheria. His temperature was a little raised. He was treated with antitoxin. By the evening of July 30th the temperature was normal; it was subnormal during August 1st to 3rd, rose to normal on the evening of the 3rd, remained so on the 4th, and dropped to 98.8° on the 5th. On August 4th there was a scarlet punctate rash all over the trunk and thighs; no vomiting. On August 5th the rash was fading. I hesitated to diagnose scarlet fever. On August 12th to 14th there was a papular and blotchy erythema due to antitoxin, with a temperature of 101° on August 12th. On the 21st desquamation was observed on the trunk and hands. Scarlet fever was diagnosed, and the patient was removed to the ward that is set aside for cases of concurrent diphtheria and scarlet fever. On August 25th—that is, three weeks after the appearance of the scarlatiform rash—acute nephritis set in. This I took to be fairly conclusive evidence that the boy had had a mild attack of scarlet fever. He was discharged well on October 11th.

I have seen other cases of a similar nature, but none in which the diagnosis was cleared by the occurrence of nephritis at the end of the third week, an event which is characteristic of scarlet fever. In these cases of apyretic scarlet fever the pulse-rate is raised; this is a valuable sign when it is a question of the diagnosis of scarlet fever on the one hand, and German measles, an enema rash, or a prodromal chicken-pox rash on the other. But an increase of the pulse-rate out of proportion to the temperature is of no value in distinguishing from one another the early stages of scarlet fever, diphtheria, measles, typhoid fever, and, in short, of most of the serious infectious diseases of this country.

DIPHTHERIA.

Of this disease I have but little to say except to emphasize the fact that it is so insidious in its onset, that it is often well advanced before it betrays any sign of its presence. I have on more than one occasion had a child presented to me as being recovered from scarlet fever, and fit to be

discharged from the hospital, on whose tonsils I have found patches of diphtheritic membrane, and yet these children have declared that they did not feel ill and had no sore throat. I have seen a discharge from the nose, slight enlargement of the cervical lymph glands, and moderate pyrexia precede the formation of exudation on the tonsils. Rarely is vomiting an early symptom. Two or three times I have known the disease to begin with a rigor.

"Croup," by which term I mean the symptoms indicative of laryngeal obstruction, may be the first sign of diphtheria, even though the fauces have been affected slightly for two or three days.

RUBELLA (GERMAN MEASLES).

Of the prodromal period of this disease I have also very little to say. In the vast majority of cases the rash appears synchronously with any other symptom. But in a few cases I have known a moderate rise of temperature, sometimes with headache and giddiness, precede the rash by twenty-four hours. In 2 cases the cervical glands were enlarged the day before the rash came out, and in 1 case (an adult) all the superficial glands were enlarged.

MEASLES.

The initial symptoms of measles are notoriously variable, but there are four important events commonly to be met with during the prodromal period—events which it is very necessary to bear in mind. They are:

1. The prodromal rashes.
2. The remission.
3. Acute laryngitis.
4. The Koplik's spots.

1. The Prodromal Rashes.

These are common; the most frequent is a punctate erythema, which, though in some cases very vivid, is usually restricted to the trunk; rarely it spreads to the limbs; still more rarely is it confined to the limbs; it does not appear on the face; usually it is diffused equally all over the trunk, but it may occur in patches. In consequence of this rash cases of measles are often mistaken for scarlet fever. I have known experts to fall into this error.

The next most common early rash is an erythema consisting of very small discrete papules, with blotches and irregular patches of confluent papules. This rash affects chiefly the skin of the trunk, head, and face, but not infrequently of the extremities also. Its aspect is suggestive of the commencement of the proper rash of measles, but it often disappears completely before the proper rash comes out.

A third prodromal rash is urticaria. This is usually universal. Lastly, you may very occasionally see an ill-defined erythematous mottling, especially noticeable on the trunk.

Of 38 cases of prodromal rashes of which I have made

Chart 1.—Scarlet fever; late appearance of rash.

Chart 2.—Scarlet fever; rash very scanty and atypical; sent to hospital as diphtheria.

detailed notes, 18 were cases of scarlatiniform erythema, 12 were of the papular and blotchy rash, 6 were of urticaria, and 2 were of the mottled erythema. In 1 other case I saw an attack of measles commence with erythema nodosum and a rise of temperature, followed two days later by a scarlatiniform rash, and in another two days by the proper eruption of measles.

The prodromal rashes come out most often on the first day of illness, but they may come out on the second; not often are they delayed till the third. Usually they are accompanied by a rise of temperature, and often, though not always, by the catarrhal symptoms. As a rule they disappear before the proper rash comes out, but they may persist and become merged in it.

2. The Remission.

This is also fairly frequent. A patient presents all or many of the early signs of measles, which continue for twelve to twenty-four hours. Then, within another twenty-four hours, the temperature falls to normal, and the other symptoms, such as coughing and sneezing, lacrymation, and prodromal rash, entirely disappear, and the child seems to be quite well again. As the first signs of measles are often those of what is termed a "cold in the head," the practitioner may easily be deceived into thinking that after all the patient is not suffering from the more severe illness, and may allow the isolation he had in the first instance insisted upon to be relaxed, with disastrous results to any susceptible children with whom the patient may be brought into contact. I have on many occasions seen patients who during this stage appeared to all intents and purposes to be in normal health. I subjoin some charts which show this remission, so far as the temperature is concerned. In a few rare cases there may be more than one remission. The remission lasts from twelve hours to four days; when there are more than one, the remissions are short. At the end of the remission the constitutional symptoms recur and the rash comes out.

Chart 3.

Albert N., 2½ years.
First day.—Prodromal scarlatiniform rash; lacrymation; pyrexia in evening.
Second day.—Rash gone; child fretful.
Third day.—No further signs; child appears quite well.
Fourth day.—Coughing and sneezing in the morning; eyes watery; measles rash coming out.
(Koplik's spots not looked for.)

Chart 4.

Annie I., 6 years.
First day.—Pyrexia, and a dull red, papular rash on extremities (prodromal).

No further sign till the fifth day, when a troublesome cough set in. The prodromal rash had disappeared. The proper rash of measles came out on the evening of the sixth day. (Koplik's spots not looked for.)

Chart 5.

Ethel B., 3 years.
First day.—Coughing; in the evening pyrexia, and a few small pink spots in groups on the chest. One Koplik's spot on left side of mouth.

Second day.—Still coughing; spots fading; eyes watery; more Koplik's spots. By the afternoon the rash had quite gone, and the child appeared to be quite well.

Third day.—Still Koplik's spots; some macules on the chest, which lasted a few hours only; coughing.

Fourth day.—More Koplik's spots; no other symptom.

Fifth day.—A number of Koplik's spots; no other symptoms in morning; pyrexia in evening.

Sixth day.—Measles rash out all over.

The Koplik's spots had disappeared on the eighth day.

Chart 3.—Measles with prodromal remission.

Chart 6.

Mabel L., 2 years.
The attack began in this case with a rise of temperature; next day there was coryza, which persisted. The child was known to have been exposed to the infection of measles, and Koplik's spots were looked for daily. They did not appear till the tenth day, and the patient was then noticed to be very irritable. The rash did not come out till the twelfth day.

Chart 7.

George A., 3 years.
The disease began with pyrexia, coughing and sneezing, and malaise. The rash of measles did not come out till the sixth day. During the first four days measles was suspected. Every evening there were pyrexia, coughing and sneezing, and the child seemed ill; but next morning all these symptoms had disappeared, and the child seemed well again. (Koplik's spots not looked for.)

3. The Laryngitis.

An attack of measles may commence with catarrh of the upper part of the respiratory tract, the nose, pharynx, and larynx; and the laryngitis may be so intense as to give rise to obstruction, with all those symptoms that are conveniently grouped under the term "croup." I have known such a case to be sent to hospital as a case of diphtheria, in which the patient had been sent home from school on the morning of the previous day because of "croup." The temperature is nearly always raised, and usually there is coryza and lacrymation. The two latter signs may, however, be absent; but even when they are present the laryngitis is looked upon as a manifestation of diphtheria, and still more is this the case when "croup" and pyrexia are the only symptoms. The diagnosis is made accordingly. If the patient is admitted into a ward full of children, the results to some of them may be very serious. This early laryngitis is by no means uncommon. It usually passes off when the

Chart 4.—Measles with prodromal remission.

rash comes out. Rarely is it due to the diphtheria bacillus.

4. Koplik's Spots.

I have left these to the last, but they are the most important of the early signs from the point of view of diagnosis. By the timely discovery of these spots the nature of the disease may be recognized at once, and the pitfalls set by the prodromal rashes, the remission, and the laryngitis, may be safely avoided. These spots are to be found on the buccal mucous membrane at about the

middle of the cheek. In size they are minute, in colour whitish. They vary in number considerably in different cases, and in the same case from day to day. There may be half a dozen or so, or there may be crowds. I have seen the whole of the buccal mucous membrane covered with them. When they are numerous on the inside of the cheeks, they are often found also on the mucous membrane of the lips, just where it is reflected to join the gums, especially on the lower lip. They may be, and often are, arranged in clusters, and occasionally in a streak or streaks opposite the edges of the upper molar teeth. When numerous they may become confluent. In a few instances they are surrounded by a narrow red zone, and I have seen their appearance preceded by small red spots, as described by Koplik. They are to be found in nearly all, but not quite all, cases of measles. They usually come out early, on the first or second day; sparse at first, they increase in numbers daily till the rash appears, when they rapidly vanish. But sometimes they do not appear till the third or fourth day, or even later. In such cases the rash is tardy. I have notes of one case which was under my own observation, in which they came out after the rash. On the other hand, in three cases I have seen them several hours, twelve to forty-eight, before the temperature rose, the only other signs of measles being slight coughing, sneezing, and lacrymation. The number of the spots does not depend upon the severity of the attack

the prodromal rash, the remission, or the laryngitis are doing their best to lead us astray.

While these are the most important facts to be borne in mind concerning the early stage of measles, it is well to remember certain others. Doubtless an attack of measles usually begins with feverishness and catarrh of the upper respiratory tract, with occasionally vomiting; yet in many cases I have seen it ushered in with a rise of temperature alone. On the other hand, the patient may cough and sneeze and present Koplik's spots, and yet the temperature may not be raised the fraction of a degree. In a few mild cases of measles, indeed, the temperature remains normal all through the attack. Not infrequently the tonsils and palate are inflamed, as in mild scarlet fever. In one case, that of a girl aged 1 year, the disease began with pyrexia, followed two days later by inflammation of the left parotid gland and profuse rhinorrhoea. The rash came out on the sixth day.

The length of the prodromal period varies considerably. Most often the rash comes out on the third or fourth day, but it may appear on the first, or be delayed till the sixth or later. In the case from which Chart 6 was taken the rash did not appear till the twelfth day.

I think that sometimes measles aborts or is modified; at any rate, I have seen several cases where a child who has been exposed to the infection has been seized about fourteen days later with slight premonitory symptoms,

Chart 5.—Measles with prodromal remission.

Chart 6.—Measles with prodromal remissions; Koplik's spots and rash very late.

nor the vividness of the rash. They are stated to consist of minute collections of epithelial cells undergoing fatty degeneration; but whatever their nature, they may appear very rapidly. In one case under my observation they came out in considerable numbers within three to four hours.

So far as my experience goes these spots are not to be found in any other disease. In order to see them it is absolutely essential to examine the patient's mouth in a good light, bright daylight being the best. I have known air bubbles, minute fragments of food or inspissated mucus, the mucous glands of the mouth, and very small ulcers to be mistaken for them. The bubbles, food, and mucus can be easily moved, whereas the Koplik's spots cannot; indeed, it is with difficulty only that they are to be scraped off the mucous membrane. The smallest ulcers are larger than the spots, unless the latter are confluent; but even then discrete spots are always present as well. Occasionally in children you will see spots which appear to be mucous glands that have undergone some change. They are to be found low down on the buccal mucous membrane, opposite the posterior molar teeth; they are of a faint orange colour. The posterior ones are much larger than Koplik's spots; but the anterior ones are exceedingly like them. They remain unaltered from day to day.

From what I have said I think it will be clear that these spots are of the greatest value in diagnosis. They are pathognomonic, and it is their presence which enables us so confidently to pronounce the disease in cases where

including a presumably prodromal rash and Koplik's spots; but after two or three days these symptoms have disappeared, and the patient has quickly got well. The following are the notes of such a case:

Chart 8. The patient was a girl (Susan B.) 18 months old. Fifteen days after exposure to measles she vomited, had a temperature of 99.6°, and came out in a rash. This rash was on the whole papular, and affected the trunk and neck. The face was slightly mottled; the eyes were suffused, and there were a good many Koplik's spots in the mouth. The rash lasted till the end of the next day; there were no other symptoms. Another little girl and a wardmaid caught the disease from this patient, and the little girl died. The first symptoms in the case of the wardmaid were headache and pains in the limbs for forty-eight hours before any other signs arose. In the case of Susan B. I had diagnosed measles with a prodromal rash, and I believe that that is what the rash I saw was. It might, I think, be fairly argued that in all cases of measles in which the rash appears on the first day of illness, the rash is really prodromal, and that the case is either an abortive one, or an instance of measles without the proper eruption (*morbilli sine morbillis*). Susan B. had hardly any rise of temperature; but I have seen cases where what appeared to be the proper rash came out on the first day, and at the same time the temperature went up to 104°.

It is seldom, according to my experience, that the disease proves fatal within a week. I have never had the opportunity of seeing a patient die before the appearance of any rash. The following were very unusual cases. The temperatures are represented in Charts 9 and 10:

The first patient was a boy, aged 3 years, who was known to have been exposed to the infection of measles. The first

symptoms were drowsiness, lacrymation, a faint mottling of the back, and a slight rise of temperature, to 100.6° F. The same evening the temperature rose to 102.8° . Next day there was a slight measly rash on the forehead, back, and abdomen. Between 10 p.m. on the previous night and 10 a.m. the temperature had dropped to 98° , and the child was markedly collapsed and cyanosed. Vomiting and diarrhoea set in, and continued off and on till death, which occurred at 6 p.m. on the fourth day of the illness. On the fourth day the rash came out more fully. During the third and fourth days the

Chart 7.—Measles with four prodromal remissions.

patient was very restless. Two children caught the disease from him.

From the chart it will be seen that the temperature was very low during the last day. The case appeared to be one of malignant or toxic measles—a rare form of the malady.

The second patient was a boy $2\frac{1}{2}$ years of age, who was convalescent from diphtheria, for which he had been admitted on November 9th. On the evening of December 12th his temperature ran up to 104° , and a general punctate scarlet rash was noticed. There was coryza and some discharge from

Chart 8.—Modified measles.

the right eye. The case was thought to be one of scarlet fever. The scarlatiniform rash was still present the next day on the trunk and thighs. The tonsils were swollen, but there was no faucial exudation. A general morbilliform eruption appeared at 1 a.m. on December 14th; both eyes were then discharging, and there was a frequent cough. On the morning of December 15th he was seized with convulsions, which lasted half an hour. The rash had become haemorrhagic in several places. The patient became cyanosed and died at 1.30 p.m., sixty-seven hours from the beginning of the illness. Several children caught measles from this case.

VARICELLA.

Usually there is no prodromal period, and the eruption is the first or among the first signs. But in a few cases I have observed a prodromal period of one to three days,

during which the patient was out of sorts, the temperature being raised 1° to 4° above the normal. Chart 11 is from one such case.

The patient was a boy aged 2 years, who was known to have been exposed to the infection of chicken-pox. He did not appear to be at all ill while the temperature was up. The eruption came out on the afternoon of the fifth day, and was not abundant. The chart in this case is unusual; for the rule is for the temperature to rise, if it

Chart 9.—Malignant measles.

rises at all, after the eruption has come out in chicken-pox; whereas in small-pox the temperature is raised before the eruption comes out, and falls more or less on its appearance.

I have also met with a prodromal rash one to five days before the proper eruption. This rash consists of a punctate, scarlatiniform erythema, affecting the trunk and limbs, but especially the trunk. It comes out very quickly and disappears within twenty-four hours. For-

Chart 10.—Malignant measles.

tunately it is not common, nothing like so common as is the initial rash of measles; but it may be mistaken for scarlet fever. There may or may not be pyrexia with this rash.

Occasionally there are prodromal symptoms which suggest small-pox. This is especially the case in adults.

Thus a young man, aged 23, had pain in the lower part of his back and felt cold on a Thursday. These symptoms continued, but were slight, till the following Monday, when the backache became worse, and a plaster was applied to relieve the pain. On this day he also had headache. He kept about his work till mid-day on Wednesday, when he felt too ill to continue, and so went home. In the evening spots appeared on the arms and back, but not till the next morning did any appear on the face. The eruption continued to come out till Saturday, when

the temperature was 102°. I saw him on the Sunday, and he then showed a fairly copious eruption, characteristic of varicella in its features and distribution.

I have once seen a case of chicken-pox in which the attack began with a well-marked rigor twelve hours before the eruption.

Typhoid Fever.

Of all the acute infectious diseases, except, perhaps, influenza, this is the most protean in its modes of onset. I have in my mind and I intend to deal with those cases

Chart 11.—Varicella, with prodromal pyrexia.

only in which the common intestinal lesions are present as proved by *post-mortem* examination, or presumably present as shown by clinical signs. The date of onset of the illness can nearly always be fixed to the day by most adult patients. The most common symptom is frontal headache, but it may be one of the following: Aching pains in the limbs, pain in the back, tonsillitis, shivering (which rarely amounts to a well-marked rigor), diarrhoea, lassitude, a rise of temperature. But any one of these symptoms is nearly always followed in a day or two by

Chart 12.—Typhoid fever; gradual onset.

headache, so that it is exceptional to meet with a patient who has not been troubled with it during the early days of his illness. On the other hand, where headache has been the first sign, it is in most cases accompanied in a day or two by one of the symptoms just mentioned or by abdominal pain, nausea, or vomiting. Most patients will struggle on with their daily toil or pleasure for several days before seeking medical advice. They will then be found to have a furred tongue, a heavy, dull expression of countenance, a rise of temperature, and a soft, frequent, and sometimes dicrotic, pulse. The headache usually persists for a week or ten days, passing off as the disease becomes

established. During the initial period slight bronchial catarrh is not at all uncommon; indeed, there may be well-marked bronchitis and, especially in children, bronchopneumonia.

I have stated above that while the date of onset is known to most patients, yet the symptoms are not as a rule severe for the first few days. This period of slight symptoms may be of considerable length, even two or three weeks. On the other hand, in a few cases the symptoms are severe from the commencement, the patient

Chart 13.—Typhoid fever; gradual onset.

being compelled to take to his bed within a few hours of the onset. I have noticed this to be the case in several instances of the disease occurring in nurses and ward servants employed in the typhoid fever wards. Indeed, when I have had the opportunity of observing the disease from the beginning, as in members of the hospital staff, it has usually commenced much more abruptly than it is generally described as commencing; and seldom have I seen the initial temperature curve gradually ascend in the step-like manner described by Wunderlich. But I have

Chart 14.—Typhoid fever; step-like curve of onset (from a relapse).

several times seen a relapse begin in this way. Charts 12 to 17 are given as examples.

As I am dealing only with cases that are to be diagnosed clinically, I say nothing of those aberrant forms of the disease in which the temperature all through is very irregular and often low—cases in which the diagnosis is usually made by bacteriological examinations or serum reactions.

The date of the appearance of the characteristic spots varies extremely. I have seen them come out within twenty-four hours of the first symptom. They may be

delayed in appearance even for six weeks. Commonly they are first observed during the second week.

Some writers have described forms of typhoid fever in which at a very early stage the brunt of the disease falls on special organs—the lungs, the brain, or the kidneys; so that the diagnosis of pneumonia, meningitis, or nephritis is made, and the real nature of the disease is overlooked. At the Eastern Hospital such cases have not been common, doubtless because a definite certificate of illness is required before a patient is removed to a fever hospital, and few

Chart 15.—Typhoid fever. Initial symptoms slight; sudden severe symptoms on fifth day.

practitioners will write such a certificate, unless the patient exhibits some of the common signs of typhoid. Cases of anomalous onset, therefore, will be met with in private practice, and in general hospitals and infirmaries rather than in fever hospitals. I have already mentioned that an early bronchopneumonia may mask the real nature of the disease; I have known such cases to be mistaken both for simple and tuberculous bronchopneumonia. Again, the abdominal symptoms may be of such a nature as to obscure the diagnosis. Thus, in a boy aged 10 years,

Chart 16.—Typhoid fever; sudden onset.

admitted on the third day of his illness, the abdomen was very distended and tympanitic, having been so for two days. The condition was more like that of tuberculous peritonitis than typhoid fever. In a case recorded by Mr. W. G. Spencer in the last volume of the *Clinical Society's Transactions*, of a boy, aged 12, the initial symptoms were acute pain in the abdomen, followed by vomiting and abdominal distension. On the third day of the illness there were signs of acute peritonitis with resistance and impaired resonance in the right iliac fossa. The case was thought to be one of peritonitis secondary to appendicitis,

and laparotomy was performed. Peritonitis alone was found. The subsequent course of the case showed that the disease was typhoid.

The following are instances of departure from the usual mode of onset:

A young woman, 22 years of age, employed as a wardmaid in the hospital, having complained for a week of pains in the hands and arms, was admitted to a ward and found to have swelling of the right wrist, tonsillitis and pyrexia. Her temperature remained raised, though the other symptoms disap-

Chart 17.—Typhoid fever; very abrupt onset, with severe symptoms.

peared, and it was not till fourteen days after admission that the rose spots of typhoid came out. She died subsequently, and the usual lesions were found in the small intestine.

In a nurse, aged 26, the symptoms were those of purpura; bleeding from the gums, uterus and kidney, and cutaneous haemorrhages. The diagnosis was not cleared up till after her death a fortnight later.

A young man of 24, within four days of the onset of his illness had various delusions, that his food was poisoned, that he was going to be shot, and so forth. In a few days his mental condition became normal, and he passed through a well-marked attack of the fever with a relapse.

I have recently seen a similar case, a young man of 28, who in consequence of such ideas was trying to commit suicide, and had to be closely watched.

In another patient, a man about 30, the symptoms were those of meningitis from the beginning. He died after two to three weeks' illness of peritonitis following perforation.

For the notes of the two following cases I am indebted to my friend, Dr. W. J. Potts, of the Bethnal Green Infirmary, into which institution the patients were admitted.

A woman, aged 35, was in her usual health early on the morning of September 2nd, 1905. Later in the day her husband had to be called from his work because of his wife's curious behaviour. On September 3rd she was sent to the infirmary as a case of "mental debility." She was found to have the usual signs of fever; she was also in an apathetic state, had a pleased, though vacant, expression, and in answer to questions would say no more than "Yes" or "No." The urine was passed involuntarily. The knee-jerks were absent. She became worse; more apathetic; would not speak at all; had difficulty in swallowing, and groaned as if in pain; temperature rose every evening to 103°; there was much diarrhoea. There was also some retraction of the head. She died on September 6th. At the *post-mortem* examination typhoid ulcers in the sloughing stage were found in the small intestine; the spleen was enlarged; there were infarcts in the lungs; and there was an excess of fluid in the cavities of the brain and cord.

A boy, aged 13, was admitted to the infirmary on the sixth day of his illness. The first symptoms had been vomiting followed by pain in the chest and cough. On admission he was found to be suffering from right basal pneumonia, which daily became worse and proved fatal on the eleventh day of illness. The autopsy revealed, besides consolidation of the whole of the right lung, many ulcers, with sloughs, in the lower 2 ft. of the ileum, exactly like those which occur in typhoid fever. It was ascertained that this boy's brother was being treated in the London Hospital for typhoid.

Perhaps this was a case of double infection, in which the symptoms of pneumonia obscured those of typhoid fever.

In some cases during the first few days an erythematous rash occurs. The following are notes of such cases, so far as this rash is concerned:

Female, aged 12. On about the tenth day of illness there was a blotchy erythema on the face, forehead, and arms; patches of a scarlet colour, not raised, and not fading altogether on pressure. It lasted two to three days. The patient stated it itched very much.

Female, aged 18. A general eruption of which the appearance differed in different regions. It was present on almost the whole of the face, on the abdomen and chest, on the whole of upper and lower extremities. On the legs, hands, and feet it appeared as bright, red, slightly raised spots of small size, and slightly coalescent. On the forearms there was a confluent bright scarlet rash, slightly raised, fading on pressure. On the face and part of the abdomen it was confluent, of a dusky purple, and fading on pressure; but there was one large brownish patch, which did not fade. There was no marked rash on the back, only a faint mottling. This was about the eleventh day of illness. Next day the eruption had the appearance of erythema marginatum. The rash lasted six days; it itched very much.

In these two cases the proper spots of typhoid came out after the other rash had disappeared.

In a third case—a girl of 5—on the eighth day a papular and macular rash came out on the thighs and extensor surfaces of the knees and elbows; next day the rash was more extensive, though still confined to the extremities. The rash lasted four days altogether.

In the case of a man aged 45, a Russian Jew on his way to America, there was a rash consisting of faint pink macules, with a few petechiae, probably flea bites. The rash disappeared on pressure, and was most abundant on the back, being scanty on the limbs. There was none on the face. Rose spots were not seen. The patient died about the fourteenth day of his illness. From the account given he had evidently been infected before he left Russia. I strongly suspected typhus, in spite of a positive serum reaction (1 in 60), and especially because at the autopsy only slight swelling of one or two Peyer's patches were found. But shortly after his death his daughter and niece were admitted suffering from typhoid fever with all the common symptoms.

In none of these cases was the rash due to an enema or drugs.

ON BOTTLE-MAKERS' CATARACT.*

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IN the BRITISH MEDICAL JOURNAL of January 24th, 1903, appeared a paper written by me on Bottle-finishers' Cataract, in which I described in some detail the process of making ordinary heavy-metal (but not flint) bottles (for example, wine, whisky, and beer bottles) and showed that cataract was very frequent in ordinary bottle finishers, was posterior cortical in its early stages, was due to the excessive heat to which the eyes of the bottle finisher were exposed whilst at work, and could be prevented by the men wearing goggles.

In December last I gave evidence on this subject in the House of Commons before a Departmental Committee of the Home Office entrusted to draw up a schedule of diseases due to certain occupations, in connexion with the Workmen's Compensation Act, 1906.

The statistics I drew up for this purpose I was about to publish, when, on January 5th of this year, a paper appeared in the JOURNAL by Professor S. Snell, of Sheffield, in which he stated, as the result of some inquiries he made from certain flint and ordinary glass bottle-making firms, and of a visit to certain ordinary glass bottle works and flint bottle works, that "there is not sufficient evidence to show that they (that is, bottle makers) are liable to the affection (cataract) to such an extent as has been asserted."

I therefore extended the field of my inquiries, the results of which are given below and fully confirm my first statements. Here it is necessary to point out that, unlike Professor Snell, my investigations were restricted to ordinary bottle makers only—that is, those who made bottles of heavy metal, such as whisky and wine bottles—for an inquiry I made four years ago led me to believe that cataract is not specially frequent among flint bottle makers (who make medicine and other lighter and better-class bottles). Ordinary bottles are made at huge tanks which are heated with coal gas and are excessively hot (2,500° F.), and into the fierce heat of these tanks the

"founder," the "gatherer," and the "finisher" (otherwise called the bottle maker) must look.

The "founder" feeds the tanks with metal and looks into them at infrequent intervals, and he is provided with a square of glass to look through; I have seen only one cataract in a founder, whom I operated upon, and he came from an ordinary glass works where sugar basins and tumblers were made.

The "gatherer" looks into the tank each time he "gathers" the metal for every bottle, and were it not that nearly all gatherers are apprentices or young men who are generally promoted to be "blowers" after a few years, they would undoubtedly develop cataract to the same extent as the finishers. Some of those who are not fortunate or skilful enough to be promoted do develop cataract (vide infra).

The "finishers," or bottle makers, are the men who suffer most, because they are the older men, having worked their way up through the grades of "taker-in," "wetter-off," "gatherer," and "blower," and because they look into the furnace each time they gather sufficient metal to form the neck of the bottle, which necessitates exposure of their eyes to the fierce heat for at least sixty-six minutes a day, or five and a half hours a week (see my previous paper).

The "blower" turns his back to the "hole" of the "tank" whilst at work, but as his eyes were exposed to the heat whilst he was a "gatherer," he, too, occasionally develops cataract.

In flint bottle works the mode of working is quite different, and the heat is not nearly so great, being generated by coal fires. "The flint bottle finisher sits, in many cases, ten yards away from the furnace, and works at a small 'glory hole,' into which he need never look." The bottle makers in flint bottle works, therefore, are not prone to cataract. In January last I operated upon a cataract in a finisher from an ordinary glass works, where he finished "sugars" (that is, sugar basins), as many as 800 a day; his was probably an ordinary senile cataract, as the men are not required to look into a hot furnace. In these works the metal is "gathered" from "pots"—little troughs by the side of the furnace—which is also the case in flint bottle works.

In my investigation I applied to the local secretaries of the men's societies to which the bottle makers belong, these officials having a more intimate knowledge of the men than the members of the various firms. There are three ordinary bottle works in this district, and I wished in the first instance to make a personal examination of all the men employed at the factory which I visited and described in my previous paper, and those who had been previously employed there and were now disabled, but a difficulty presented itself at the outset, for the men's officials could not induce the workmen to submit themselves for examination, because (1) they dreaded they might be told they were beginning to have cataract; and (2) if their sight was at all defective they did not wish their condition to become known, fearing loss of work.

It is the duty of the "finisher" to see that the bottle handed to him is without flaws and properly made, and when his sight begins to fail he has been known to trust to another man (a "gatherer") to tell him of defects. Should he overlook many defects he is liable to dismissal. Hence an inquiry among the men now working would be valueless unless it included them all, as those with defective vision were those most likely to avoid examination. This feeling on the men's part may partly explain Professor Snell's failure.

With the exception of the men now employed, some of whom I examined, I made a full examination of those men who are now disabled from working through cataract at this factory, with the help of Mr. F. Heptinstall, who has been Secretary of the North of England Glass Bottle Makers' Society for fifteen years, and who recently left the trade as a bottle finisher for fear he should develop cataract, as his uncle and father had done (see First Factory).

In addition to the factory referred to above, I made inquiries of the two local secretaries of the men's societies at the two other works which are situated in this district, and their figures are given below.

The result of my inquiries of the Yorkshire Bottle Makers' Society is also stated.

* A paper read in the University of Oxford at the Congress of Eye Surgeons, July 26th, 1907.