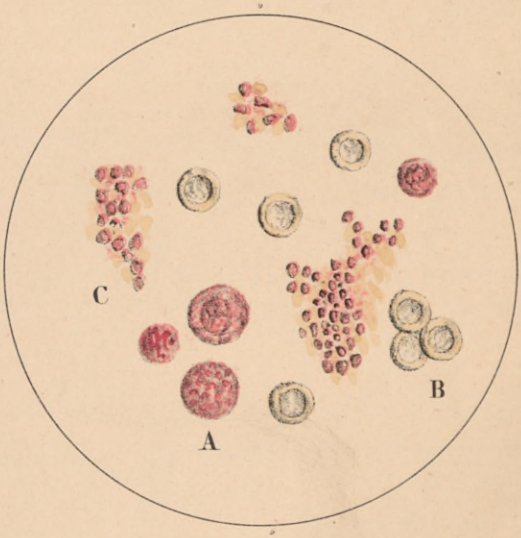
CLINICAL LECTURES
ON
DENGUE.

DR. T. EDMONDSTON CHARLES.

BLOOD IN DENGUE.



A. White corpuscles—B. Red corpuscles—C. Masses of Bioplasts.

With Kind Regards

CLINICAL LECTURES

ON

DENGUE.

BY

T. EDMONDSTON CHARLES, M.D., M.R.C.P.,

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EDINBURGH AND LONDON.

DELIVERED BEFORE THE STUDENTS ATTENDING THE MEDICAL COLLEGE.

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5, COUNCIL HOUSE STREET.

MY DEAR SIR,

IN sending you an interleaved copy of some observations on Dengue, which were addressed to my class, may I ask for your assistance and co-operation in an attempt to make a full use of the present epidemic in collecting as much material as possible for a more thorough account of the disease.

Should you consider I am wrong on any of the points I have brought forward, and find that your experience does not tend to corroborate my observations, a pencil note to this effect will be sure to meet with attention from me.

Should you not intend to publish your own views on various points of interest other than those referred to in these pages, may I request the favour of your allowing me to make use of them, in order to make my own account as complete as possible.

The shortest pencilling in the margin, alluding to the forms of death which you have witnessed or heard of, or an allusion to any circumstance which I have not alluded to, would aid me in an endeavour to supply a more perfect clinical record of the present epidemic than that which we possess of previous ones.

Yours very truly,

T. EDMONDSTON CHARLES.

10, HARRINGTON STREET.

May, 1872.

PREFACE.

THE observations contained in the following pages were delivered in December last, to my class in the Medical College, from carefully arranged notes.

In a rash moment they were promised to the *Indian Medical Gazette*, and had to be written during the few minutes which could, day by day, be stolen from other urgent duties.

As they appeared sufficiently early in the epidemic to attract the notice of other observers, if the published results of my own experience have served in any degree to assist my co-labourers in procuring a more exact knowledge of Dengue than that possessed by the profession previously, or have assisted to any material extent in enabling practitioners to mitigate the pain and distress caused by the prevailing epidemic, the drudgery of writing lectures while subject to constant interruptions will have been amply repaid.

A few copies have been bound for transmission to my friends in England, to save the chromolithograph of the blood from being injured in the Post Office.

Calcutta, May, 1872.

CONTENTS.

CLINICAL LECTURES ON DENGUE.

DELIVERED AT THE MEDICAL COLLEGE,

By T. EDMONDSTON CHARLES, M.D, M.R.C.P., London.

(*Re-published from the "Indian Medical Gazette."*)

GENTLEMEN,—I wish you to study along with me, to-day, the case of the little girl with dengue, who was seized with the disease while in the hospital. Many of you have watched this case with interest, from the first day of her illness, and as you have seen the case at a more early stage than you have often opportunities of seeing similar ones in hospital, I think the occasion for speaking more at length about it is favourable.

The present epidemic is the first one which has occurred in Calcutta since most of you have commenced to study medicine, and as you will doubtless have many facilities for further making yourselves acquainted with this disease before the epidemic is over, I hope the remarks which I will have to make may aid in placing you on vantage ground, from which to make the most of such chances as may fall in your way. Those of you who are at all regular in your hospital attendance are already familiar with the term 'dengue.' It sounds rather uncouth to unaccustomed ears, but as it has been adopted in the nomenclature of the Royal College of Physicians, and is also recognized by medical men in other countries, I will not detain you by attempting to substitute any other name for it.. Many of you ask me the derivation of the term. I have never heard of so plausible a solution of this difficulty as the one which recognises in the word the corruption of the word "dandy." This affection was jocularly termed "dandy fever" by the negroes in certain parts of the West Indies, owing to the erect or stiff carriage assumed by their companions while the subjects of the aching joints common in this disease; and the Spaniards seem to have modified the term into dengy, or dengue, which has somehow or other crept into our

nosology. The term 'scarlatina rheumatica' has also been rather widely accepted since Copland adopted the name. I mention this now to guard you against assuming that this disease has any pathological kinship relating it to scarlatina more closely than to measles or any other eruptive disorder. To avoid confusion, perhaps it would be better to discourage the use of this designation. In Calcutta we often familiarly style it "Goodeve's red fever," as my late colleague wrote the last account of the disease while describing the epidemic of 1853. It bears many other names, popular as well as classical, for which I must refer you to Dr. Aitken's monograph, which you will find in the first volume of Reynold's System of Medicine, and which is the most complete account of the diseases that has yet appeared. I almost owe you an apology for entering into these details, as well as for further trespassing on the domain of the Professor of Medicine in my subsequent remarks, but I only last night learned from Dr. Chevers that he had not yet lectured to you about this disease, so perhaps you will hold me justified if I credit you with some ignorance of the subject, and attempt even in a clinical lecture to make good the deficiency. Without further delay then allow me to read to you the particulars of this child's illness.

The Statement of the Case.—Eliza Macqueen; age three years; was in hospital ten days ago with some slight complaint. Went home to Boitakhana, a part of Calcutta, where there are a great many people who have dengue. Her mother came to hospital to nurse a sick friend, and brought the little girl with her on the 18th December. The child was in perfect health, and played about with her old acquaintances in hospital. She had a good appetite, and ate heartily. About 5 o'clock in the afternoon she stopped in her play, and running up to the matron of the hospital, complained of severe pain in the ring finger of the right hand. Her play was resumed, and in about an hour after she again went to the matron, complaining of pain in all her bones. A report was now made to the House Surgeon that the child was getting dengue.

At this time she had no fever, but later in the evening the skin became hot, and the child vomited up the last meal which she had taken. On being put to bed the child became very

restless, waking up frequently and starting in her sleep as if frightened, and in the intervals murmuring almost constantly. At 7 a. m. in the morning of the 19th, her pulse was 112 and her temperature was 100° F.

The face was covered with red patches, but was not noticeably swollen. (The initial rash). At 4 p. m. the patches on the face had coalesced, giving it a uniform red appearance, and the whole surface of the body was of a homogeneous dull red colour. It had not a faint approach to bright scarlet, but was of a dingy crimson tint. The colour disappeared on pressure with the finger, and though it was not bright, it could be seen at a distance in a comparatively dim light, constituting a very noticeable characteristic.

There was faint redness of the fauces and slight enlargement of the tonsils, but the child made no complaint of sore throat and could swallow easily.

The tongue was white, with the edges and tip of bright red. Near the tip the reddened and enlarged papillæ gave it a strawberry appearance.

The palpebral conjunctivæ were much congested; the eyes looked heavy, but were not much injected.

The child made no complaint of pain, but cried when an attempt was made to move the joints.

On the morning of the 20th the redness of the surface had entirely disappeared. The child was found not to have slept during the night, but to have been very thirsty and restless, and to have vomited two or three times about 3 o'clock.

The highest temperature noted was at 7 p. m., when it had reached 105°F. It began to fall after this, and during the next twelve hours, the thermometer ranged irregularly between 105° and 100°5, on three occasions marking 102°.

At 4 o'clock p. m. the child's eyes still had a heavy look and it was dull and listless, otherwise it seemed well. From 101.°5 at 9 a. m., the temperature fell steadily, till at 3 p. m. it stood at 97° F.

On the morning of the 21st it was noted that the child had passed a good night, having slept well.

The temperature had ranged between 97° and 99° F.

There was no eruption on the skin. The red papillæ at the tip of the tongue were still very evident, and the rest of the tongue was covered with a yellowish fur.

Rather before 3 o'clock a very distinct measly eruption began at the root of the neck and upper part of the chest. (The terminal rash). The child was covered up in bed with the view of making it perspire, hoping that the rash would extend and be vivid at the time the students were to see the case an hour later. At four o'clock the rash, though still well marked, was much less distinct, and in the course of the evening had almost entirely disappeared. On the 22nd there was no eruption; the child had slept well and had begun to eat, and the skin remained quite cool. On the 23rd the child seemed well and played about as usual, but the tongue was a little foul; she had lost her appetite again, and refuse to eat. At 2 p m., with a temperature of 97°, a measly eruption appeared on the palms of the hands and on the legs a short distance above the ankles, (the terminal rash), and the child seemed very cross. At 9 in the evening the temperature had fallen to 96°5 F.

On the 24th I did not see the child, but in the morning it was reported that the forearms and hands, legs and face were a little swollen, and the rash was very distinct at all these points. The temperature was 98°. Now the eruption was no longer like that of measles, but little prominent wheals of urticaria well raised above the surface, and surrounded by a red blush, were exclusively met with. At 3 p.m. the temperature had risen to 100°; the urticarial rash remained on the face, hands and legs as before, and was now evident on the chest, abdomen and back, which were covered by it. At this time the rash had so completely covered the body that there was no portion of the surface of the size of the palm of the child's hand that was free from eruption. There was no itching present.

On the morning of the 25th not a trace of the rash remained: it had not faded gradually, but completely disappeared. No swelling remained at any point. The temperature was 96°, and the child seemed in every way well.

The child was kept under observation in the hospital till the 3rd January, 1872, and remained in good health, no abnor-

mality being noted, except that on the 28th, at 5 p.m., the mother noticed the child's face a little flushed and its hands were slightly warm. At 3 p.m. of this day the temperature was 97°, and at 9 p.m., 98°.5.

The next day the thermometer rose at 9 p.m. to 99°, and on the 31st to 98°5 at 3 p m. No other symptoms of fever were noticed on these occasions, the child being apparently in perfect health.

Throughout the whole course of the disease the bowels were regular, the evacuations being natural.

The urine was tested daily for albumen, but none was found. Its specific gravity was steadily 1014. It was abundant and clear, no sediment was noticed in it. On this last point, though instructions were issued, they were misunderstood, but nevertheless it seems tolerably certain that on no day was there much sediment, and on some days none at all.

The treatment.—The child was put on two minim doses of tincture of belladonna three times a day on the 19th, and this was continued till the 22nd.

On the 23rd ten minims of compound tincture of gentian were ordered to be given thrice daily. This was continued till the 1st January, when all medicines were stopped.

The Invasion.—Dengue attacks suddenly. You have usually no history of a day or two, or even of a few hours' previous departure from a perfect standard of health. A person in perfect health is struck down suddenly, and can often tell you the minute that he began to feel ill. A merchant goes to the opera, and during the performance is obliged to leave the house. A lady at her devotions in church is seized while kneeling during a short prayer. Two young women jump into a swimming bath; they both are in their element and experience much enjoyment; they leave the bath, and both of them go direct to bed in the tortures of dengue. Another lady goes into her own bath-room quite well, and after bathing cannot dress again as the disease is upon her. A young delinquent falls under the chastisement of his father, and is carried to bed with dengue. In the case of the child who forms the subject of to-day's lecture, while in perfect health and busy with its play, it left its toys abruptly and complained of the pains of

dengue. Such are instances of what I have met with in this epidemic, and well exemplify the peculiar suddenness of the attack. As in this child, very often the first symptom is pain; even if its true significance is not at first understood, you are not left long in doubt as to what is coming. When your patients cannot express themselves more exactly, they can tell you very decidedly that they "feel ill." The usual sensations which precede fever are now present in more or less distinctness; a general feeling of malaise, faintness, giddiness, a tendency to sigh or yawn, with weariness, aching in the bones, and a desire to lie down, sufficiently indicate the nature of these sensations. A feeling of coldness in the spine developed into more general chilliness is usually complained of. A tendency to shiver rather than a well-marked rigor, ushers in the disease. I have hardly ever seen what I would designate a regular rigor, though at times there has been a very close approach to it. I do not regard even this as usual, but both in the present and in previous epidemics, regular rigors have been seen by other medical men. Several times in young women I have seen an attack of hysteria to be the first symptom. In children I have seen a tendency to convulsion, and in more than one case a violent convulsion mark the advent of dengue. I have also had occasion to see such convulsion repeated once and again. Even when this does occur it need give you no cause for anxiety. In children it is not usually of more serious import, than the other disordered nervous phenomena which you see in those of more advanced age.

In other epidemics, towards their close, persons have been described as not having been attacked so suddenly, but having for a day or two before the attack shewn symptoms of being out of health, by being listless and languid, having white tongues and being off their food. I saw none of these cases till lately, and in the few cases which I have seen such symptoms would, in all probability, not have attracted my attention, unless I had known that the same observation had been previously made by Twining in the epidemic of 1824, and by others.

The Initial Rash.—In this child you have had an opportunity of seeing one of the best marked forms of this occurrence which I have ever met with. It is not seen in every

case of dengue; but when it does occur, it is one of the more special characters of this disease, and serves at once to distinguish it from any of the other eruptive fevers which are common in India. Unfortunately it is very often absent. I have no record which would enable me to tell precisely in what proportion of the cases which I have seen it has been absent, but I think in fully one-third of the patients I have not been able to satisfy myself of its existence.

In the present instance it began in a very characteristic way on the face. It was fully developed on the body before it was noticed, and so I cannot say how it began there. The entire surface of the body was covered by it, and you will rarely meet with it in such an extensive and complete form. Often the face alone is affected, at other times the abdomen, chest or knees may be the points at which you see it. In one case in which the rash was a most marked one, the face was of a bright, vivid red, almost scarlet, colour, and there was an irregularly rounded patch of a similar colour on the lower part of the abdomen, of about the size of a soup-plate. I could not discover a trace of the rash on any other part of the body. In the same case the face was so swollen as to be quite disfigured.

This swelling of the face and eye-lids to a less extent is very often met with. In the child whom you saw it did not exist, and even when it is present, it quickly subsides as the rash disappears.

Probably one reason why I have failed to see the initial rash in so many cases is that it does not last long and leaves no mark behind it. In many cases it has not lasted for six hours, and I do not remember ever having seen it remain in a well-marked form so long as twenty-four hours.

In speaking of the initial rash, I always call it the scarlatinal rash, as this is the only form in which I have seen it. It is a diffuse uniform redness of the surface—erythema if you will—and even when it occurs in separate patches on the face, I have not noticed any special character which would enable you to recognise it as differing from any other large red blotches. As in other transient hyperæmic conditions of the skin, when you press with the finger, you can obliterate all trace of colour for the moment, but it instantly returns on removing the finger.

I have never seen it in such an intense form as to leave staining of the surface behind, or to be followed by desquamation. I can quite understand however that both of these effects might follow. I do not think this symptom has attracted the special notice it deserves from the earlier observers. That they noticed it in their cases is very clear from their writings. Thus, in a case which Cavell saw two hours from the commencement of the disease, he says, "the skin was covered with a bright scarlet blush." Mouat in describing the early symptoms writes —"The whole surface became suffused or flushed, the face scarlet." Again Twining mentions that "the whole countenance appeared bloated and swollen;" and while describing the rash at a later period of the disease, expressly mentions parenthetically its being "seemingly quite distinct from the bloated suffusion of visage attending the first day of the disease."

You must have already gathered that the initial rash is met with at a very early period in the disease. You will in fact often find it fully developed the first time you see your patient, even an hour or two after the illness began. In rare cases it has not attracted attention till the second day. In a few instances it has seemed to fade a little, and again become more vivid. I have seen it quite disappear and then return, but this does not often occur.

The Pyrexia.—You may regard the fever in this child as a very typical example of what is usual in this disease. In fact the febrile stage in dengue is one of the only stable elements of this disease. In many points one case of dengue varies greatly from another, but they all agree very closely in the similarity of their attendant fevers. There are exceptions to this rule, but they are very rare. In the child, several of the characters of the fever cannot be so well studied as in the adult, as there is difficulty in getting it to express its feelings. When an adult is seized he usually complains of coldness, and at once his temperature begins to rise. He experiences great distress, and, as a rule, he is very restless. The febrile anguish is out of all proportion greater than is usually experienced, with an equal elevation of temperature, in other fevers. Quite independently of any special suffering which may be present the general distress constitutes the case a perfect picture of misery. Thirst is often much complained of.

Sleep is not often obtained, and in those cases in which the patient is not altogether wakeful, his sleep is broken, troubled, and not refreshing. This child did not sleep on the second night, but in many cases I have seen comparatively good sleep obtained at this time. Delirium in the adult is rare, but in the child its dreams make it start up, and even when it is not so violently affected, it mutters often incoherently.

Perspiration occurs at intervals, and is at times very profuse and necessitates a changing of the clothes. The evidence on this point is somewhat contradictory, but, as a rule, I think relief is experienced by the sufferer on these occasions.

As in this child, if a patient is overtaken with dengue soon after a full meal has been taken, vomiting may occur. This is not at all a constant symptom in dengue. After the fever has lasted for some hours vomiting may more or less disturb their comfort, but patients with this disease do not usually suffer much in such a way. In some cases, however, I have seen vomiting give much trouble, and prove a difficult symptom to control.

The fever is distinctly remittent. By this I do not mean that you will find the usual evening exacerbation, and morning remission of other febrile states, but distinct periods of increase and decrease, during indefinite periods both of the day and night. In this the pyrexia of dengue is singular, and the older observers were struck by this peculiarity. When you see a patient he may tell you he feels better now, but two or three hours ago he had very intense fever. If you congratulate him on such a marked improvement and lead him to suppose the fever will soon now be at an end, you will cause disappointment, for if you see him again in three or four hours you will find the improvement has not continued, that the remission has again been followed by increased heat of skin. These alternations in temperature may occur three or four times in the twenty-four hours to a well-marked degree, and in a minor extent much oftener than this. We can judge of such changes much more accurately now than they could do even a few years ago, and our clinical thermometers aid us much in dengue and give us confidence by accurately registering the rise and fall of the temperature of the body.

To illustrate this point and others in connection with the

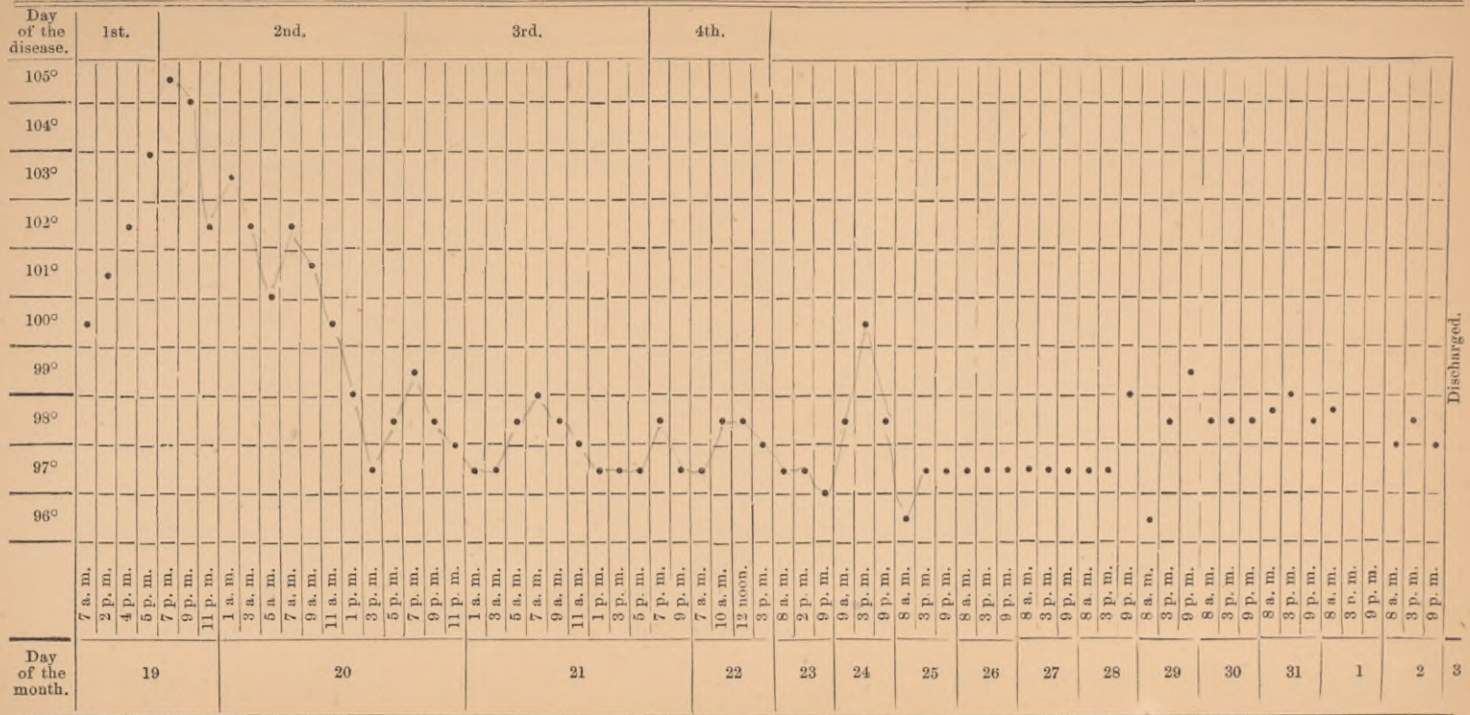
temperature, I have had a chart prepared to show you in a consecutive form the range which is usual in such cases. This child's temperature was taken for some time every two hours, and subsequently, when this was not necessary, at more distant periods. By looking at this one record, you will obtain a very good idea of what you will afterwards see in practice, and you may accept it as a good model for study.

Often at first very little rise of temperature takes place. We have no record of what occurred during the first twelve hours, but I have no reason to believe that there was then a higher temperature than that noted at our first observation. The thermometer then showed only 100° F. at 7 a.m., and 101° at 2 p.m., while during the next three observations it steadily rose one degree or one degree and half, during each period of two hours. The maximum temperature reached was 105,° and it was attained by a steady progressive rise. After this the thermometer at once sank again, and rose and fell twice within twelve hours, 102° having been three times noted during the night. About 36 hours after the first symptom of the disease was noticed, the thermometer began to decline steadily, and before the expiry of forty-eight hours from the moment the child attracted attention by complaining of her finger, not only had a normal temperature been regained, but the heat of the body was very decidedly below the normal standard, having fallen to 97° F.

After this the temperature remained normal or depressed, the only occasions on which it rose above 98°·5 being at 7 p.m., on the 20th to 99°, at 3 p.m. on the 24th to 100° F., and on the 29th at 9 p.m. to 99°.

I have already dwelt as long as time will permit, on the frequent remissions met with in this fever, and now I have only to direct your attention to two or three other points which the chart teaches you. The maximum temperature reached was 105°. I attended many cases of dengue before I knew the temperature rose so high, while a little above or a little below 103° was a temperature often met with. There are two reasons for this :—*First*, in many cases the temperature does not quite reach 105°F.; and *secondly*, even when it does do so, it never remains long at this point, but quickly begins to descend If your thermometer is not applied during the short period of such a high temperature, you are left in ignorance of its hav-

Temperature in Dengue, case of Eliza Macqueen.



ing occurred. In general terms it may be said that the highest temperature occurs about twenty-four hours after seizure, while before twenty-four hours more have expired, the whole of the pyrexia is at an end. Such a complete crisis may be delayed for a day, but I have not seen many cases when such a departure from the standard I have laid down for you has taken place. On the other hand I have seen a normal temperature gained some hours earlier than it was in this child.

The depresion below a normal temperature is a very usual occurrence. You know that this is common after other severe diseases, and in dengue I have often seen it more marked than in the case which we have been studying to the extent of one or even two degrees.

Take note then that within two days all trace of fever was gone. This is the rule in dengue; but the rule is not without exceptions, for when speaking about relapses I will have to tell you that the fever may return again, not only once but oftener. For the present, you will get a much better idea of the disease if you leave this occasional event in its natural history out of consideration, and regard this case as a type, as it assuredly is, of a disease with a sharp febrile period, terminating abruptly, not to return again. Though I wish to impress this fact on you, I cannot ask you quite to lose sight of the other fact, that the thermometer on six occasions marked slight rises of temperature over 98°. In most of these the rise was only half a degree or a degree; once only was the rise to 100°. It was chiefly when the child was asleep that this slight elevation was noted, and the manifestation was only a passing one. There was no regularity shewn in the recurrence of these events, and, but for a careful use of the thermometer, we should have remained in ignorance of their existence. Nevertheless, if these are looked on in the light of abortive relapses of the pyrexia, as representatives, in fact, of what in other cases constitute true relapses in dengue, it will give additional interest to such trifling indications, and will not, I trust, lead to any confusion in your minds. You all however are familiar with the fact that a temperature of 99° is a perfectly normal temperature for a child, and one which you often find in a child in typical health; so, possibly, you may be disposed to regard the supposed analogy as a fanciful one, and to look on the comparison as overstrained. Without attaching too much

importance to it, I must confess my leaning for the present to look on these manifestations in the above light, as some weight is due to the fact that this slight rise was from an abnormally low temperature.

The Pulse.—In many cases the rapidity of the pulse is comparatively little affected, and this want of relation to the severity of the other symptoms will strike you, if you examine with care, as not a familar circumstance in other diseases.

In some few attacks, even when the case seems otherwise urgent, you will find the pulse under a hundred;—108 is a very common pulse even in a patient who suffers much. You may consider it exceptional to see the pulse rise above 120 in the adult. I have, however, counted it over 140, and in fatal cases it becomes so quick that you can hardly count it. This comparative slowness of the pulse presents a great contrast to the habitually quick pulse in scarlatina.

In the early days of the disease, when you find the pulse quick it need not cause you anxiety; it does not denote any undue severity in the case, and portends nothing important in the issue. It is chiefly in children that you will observe such quick pulses as 130 or 140, and unless you were aware of this peculiarity in them, you might justly look anxiously to the future. Even when the pulse beats thus, it quickly approaches a more natural standard. Such a pulse in the later stages of the disease is a very serious matter, and when the pulse remains thus high, or increases in frequency beyond the first two or three days, your fears will not only be properly excited, but a fatal issue will too often justify your apprehensions. You seldom find the pulse hard: it may be full, but there is always a want of power about it, which in days gone past used to teach that such patients could not bear bleeding well. When the temperature falls the pulse usually goes down, but in those cases especially in which there is much prostration, it may be some time before it becomes quite natural. You often find it for long a weak feeble pulse, and its rapidity is easily increased by the least excitement or exertion.

The Pains.—This symptom in the child was well marked at the commencement, but later on in the disease it did not

constitute the very prominent affection which it often does. Even when the child made very little complaint of suffering, we were easily able to satisfy ourselves that very considerable tenderness of the joints existed. On moving the elbows, or knees, with extreme gentleness, the child cried bitterly. In this way you can often elicit unmistakeable evidence of the presence of this symptom even long before the child can talk. Infants in arms thus tell their own tale of suffering joints, and older children, when they cannot or will not understand what you want of them, can be forced to take you into their confidence. Some of you seemed rather taken with this method of extracting an unwilling confession, and had I not pointed out to you that it was not warrantable to put our little patient through such an ordeal, simply to gratify idle curiosity, I am sure every joint in her body would have been thoroughly investigated.

In more than half of the cases of dengue which I have seen, this pain of the joints has been a symptom so well marked as to distinguish it from all other eruptive fevers. The term 'scarlatina rheumatica' sufficiently shows that the older observers regarded this as being a distinctive manifestation of the disease. The pain in many cases during this epidemic has been of such intensity that the most superficial observer could not help having his attention at once arrested by it.

In a few cases its exceptional severity has reminded me of the suffering caused by a bad attack of gout, and even when the intensity of suffering has fallen far short of this, it bore no resemblance to the pains complained of in any other form of fever which I have seen, except the very severe form of ephemera termed 'ardent,' or sun fever which is so common among Europeans who have recently arrived in India. and attacks them during their first experience of the hot winds in Northern India. In this fever, the intense pain in the back and head is very similar to the pain of dengue when it affects similar situations.

Both the head-ache and back-ache at times are the cause of extreme anguish, but pain attacking the joints is much more characteristic of dengue. From the cases of this disease which I saw in another epidemic, and from sporadic cases which I

had seen from time to time, I used to regard the pain in the small joints as quite pathognomonic of the disease, and as one of very general occurrence. An enlarged experience, however, has taught me that in many instances the small joints are not affected. In many cases in which their implication is not very evident by making the patient move the terminal phalanx of the fingers, you will find that pain, or at least stiffness, will be complained of. When you can gain such information, in a doubtful case it will aid you in diagnosis. I have seen slight swelling of the joints both large and small, but you may regard this as rather exceptional. Some times, but more rarely, pain in the muscles is complained of, and this form of suffering may be met with when the joints remain free. Weakened joints and tissues suffer out of all proportion to those whose nutrition has not been previously impaired. A medical man whom I attended loudly demanded relief for an ankle which had been sprained some time before, but which had given him no trouble for two months. A sprained wrist in the same way seemed in one case to monopolize the pain to itself, though before the attack of dengue it had attracted little notice. A hyperæmic uterus by reflecting its agony to the back, enlisted very special attention. In a chronic case of ophthalmia tarsi, the eyelids proved the source of much trouble. In the same way, I have seen overtaxed brains, especially those much worried with figures, give evidence of anguish out of all proportion greater than that experienced in other parts of the body. In all these cases not only did the pain in the weakened tissue overshadow that at other points, but it seemed almost to give comparative exemption from suffering elsewhere.

A very curious feature in connection with pain in the joints consists in its shifting nature. It flies about from one joint to another, apparently without any reason. Now, a little finger is the cause of your patient's lamentations; at your next visit, or even before you leave the house, an elbow or a toe may constitute the chief subject for complaint, and so on through almost endless variety. The pain usually begins suddenly, in many cases it ends in the same way, while in others it declines more gradually, or before the suffering finally subsides the joint may oscillate between periods of repose and those of more or less uneasiness.

I have alluded to the fact that such pain is not present in all cases. It is seldom entirely absent, but from its comparative slightness it may cease to attract special attention, and you may be unable to distinguish it from the suffering attendant on other cases of fever. This observation is much more applicable to other recorded epidemics than to the one now raging.

I had almost forgotten to tell you that I have seen abdominal uneasiness complained of so often, especially by children, that I do not consider it as an accidental circumstance, but one which deserves to be noted in connection with the pains of dengue.

The Catarrhal Symptoms.—In this child the catarrhal implication of mucous membranes was very slight. In fact, the throat affection was so insignificant as not to require any treatment; and with the exception of redness of the palpebral conjunctivæ, there was no evidence of the other mucous membranes being involved. It is not at all unusual for you to meet with such slight implication; even when you have well-marked symptoms of catarrh at various points, it is very seldom indeed that you will have to resort to remedial measures on their account. The chief interest in such symptoms lies in the fact, that by their occurrence they may lead you astray if you are not well versed in the different forms they may assume. Thus, when the Schneiderian membrane, or the mucous membrane of the bronchi, are so much affected as to attract prominent attention, if you give undue weight to this symptom alone, you may look on the case as being one of measles. So also when the throat symptoms are urgent, scarlatina may be uppermost in your mind. Again, when the disgestive tract is extensively affected, your thoughts may be turned away from dengue, unless you have prepared yourselves beforehand to meet with such cases. The chief point for you to bear in mind is, that all the mucous membranes at these points may not only be affected, but that the symptoms caused by such implication may be severe, and that it is dangerous for you to attempt to found a differential diagnosis, between dengue and other diseases, on the presence of any catarrhal condition.

I believe that the catarrh under such conditions is a specific one, but that it is usually determined to one or other point, by

the general conditions which prevail at the time, quite independant of the dengue poison.

Thus, at the end of the rainy season, when diarrhœa was prevalent, I did not see any case of dengue with bronchial catarrh or sore throat, while more or less bowel affections was very usually met with. Immediately after this, when all one's friends were sneezing and having colds of sorts, our dengue patients joined in the chorus of coughs. Just before this child came into hospital, sore throats were very prevalent, in some cases constituting a very serious affection, and many of our dengue cases complained of difficulty in swallowing and gave other evidence, of throat implication.

Dr. E. Goodeve describes very clearly the condition of the throat which he saw. The passage is too long for me to read to you, so I must satisfy myself with the remark that you might almost transcribe his descriptions and apply them to a case of slight scarlatina. He had not himself seen ulceration of the tonsils, but I have seen them thus affected several times and well-marked implications of the lymphatic glands at the angles of the lower jaw. I have also seen the irritation spread from the fauces, and troublesome laryngeal complications arise.

Many more of my patients have had bronchial catarrh than sore throat. When this is present, you at times have coryza combined with it. Sneezing has been a rare symptom. Bowel complaint has not been so frequent a symptom as either of the other two, but in two or three cases the profuse watery discharges have been so abundant and frquent as to cause much more anxiety than that caused by the catarrh of other mucous membranes. In some cases the large rather than the small intestine has been the part implicated.

The Tongue.—As in this child, so in most cases the state of the tongue is such as to aid you in recognising the disease. A white tongue with an angry red tip and edges, and some bright-red enlarged papillæ anteriorly, contrasting with the white ground is sufficiently often met with, to justify you in missing it when it is absent. When such appearances are not present, the tongue may be natural, or simply white, or slightly loaded over the entire surface. If you examine sufficiently far back, you will

not unfrequently find the large papillæ at the root of the tongue enlarged and of a bright-red colour, standing up prominently amidst the more heavy coating which is generally seen at the back of the tongue. The tongue is usually moist, and I have never seen it of the bright-red colour it assumes during scarlatina.

Usually on the second or third day the tongue is more thickly coated than at first, and the papillæ may not then be so apparent. The tongue frequently becomes clean very quickly, and ceases to present any characteristic appearances.

When the tongue has been thickly coated, especially in cases which have much tendency to relapses, it may not resume its natural appearances rapidly, and in doing so, owing to its cleaning irregularly, large bright-red patches may give it a startling mottled appearance.

The Urine.—In this case the rough examination of the urine was somewhat neglected, but having paid very considerable attention to the point, I can to some extent make good the deficiency to you. In most cases there is little about the urine to attract your attention. Its specific gravity is often natural, as it was in this case, but may also fall below a normal standard. During the febrile paroxysm you would naturally expect to find the urine scanty, and of high color, but in very many cases which I have examined I did not find this to be the case. In several instances the urine presented very marked characters of quite an opposite sort. It was very abundant and limpid, resembling the urine of hysteria. In the cases in which this seemed best marked very considerable nervous disturbance was present, and probably this condition of the nervous system may have led to a relaxation of the blood vessels in the kidney, as it does in epilepsy and hysteria. I have so frequently noticed this condition of urine, and so habitually noticed the absence of febrile urine, even with comparatively high temperatures, that I wish to impress this fact on you as having special relation to dengue. It is no accidental circumstance that I have noted, in fact, Twining mentions expressly that in 1824 "the urine was copious and pale coloured." Other observers, curiously enough, are at direct variance on this point. Cavell describes it as "scanty and high coloured:" Mouat as "high coloured:" E. Gordeve as "scanty." Occasionally I have seen cases which

would have borne out their opinions, but I am sure that such cases are not nearly so frequent as those in which an extra amount of particularly clear urine is passed. I have, however, noticed cases in which, though the urine was very clear and abundant in the commencement, it gradually changed its character and became more scanty, high coloured, and inclined to deposit at a later stage. This observation may, perhaps, in some measure serve to explain the discrepancies in the recorded experience of different observers. On cooling, the urine usually shows very little tendency to deposit. I have often kept it for 24 hours, and at most found only a little cloud of epithelia. It has been singularly free from deposits of all sorts, but when these have existed I have met with them of all shades, from the almost snow-white urate of ammonia to the darkest shades in which urates occur through red to brown. You must not conclude from this that sedimentous urine is common, for though I have seen some very extreme instances of it, when such fall under my observation, I regard them as curiosities in dengue. In one or two cases I have found the urine turbid, even on being passed. In the later stages of the disease, or after it is over, deposits of triple phosphate are rather common just as they are in other low states of the system. The urine is generally neutral, or, perhaps, rather oftener slightly acid. In a few specimens the acidity has been more marked.

Both during this epidemic, and on previous occasions, I have paid particular attention to having the urine examined for albumen. This child's urine was examined every day with great care for it, and none was found. In a few cases I have met with albumen in the urine of dengue patients, but it has been almost exclusively found in the urine of those persons who were known previously to have had kidney affections. In no case have I yet found more than a doubtful trace of albumen in the urine of a person in whom I knew the kidneys to be healthy. Previously to my recent opportunities, I only examined for albumen in the later stages of the disease, expecting to find it as we do often after an attack of scarlatina. On the present occasion, I have not been so exclusive in confining myself to this period of the disease. You know both in measles and scarlatina, on the appearance of the eruption, albumen is now and then present in the urine. In some epidemics of these diseases the

frequency of the occurrence is very much increased. In this epidemic of dengue, I made sure I would find it as the secondary eruption appeared, but have been completely balked in my expectation. I looked for it even earlier than this, hoping to find it occasionally taking the place of other forms of catarrh, which are the accompaniments of the first days of the disease, but have been no more fortunate. Throughout my investigations I have been aware that Goodeve on four occasions has detected albumen in the urine during this disease, and that its occasional occurrence has been noted by others. I have appealed thus to the test tube on hundreds of occasions, having watched the urine in several cases steadily from day to day, besides having made numerous less systematic examinations of it, and confess my disappointment at the result. I am aware that others even during this epidemic have been more fortunate, but my mass of observations have completely satisfied my own mind that the occurrence of albumen in the urine in dengue, at least in some epidemics, is an extremely rare and exceptional occurrence: so rare, indeed, that I would feel inclind to ask for proof that the kidneys had not previously been disordered, before I would regard its presence as an indication of the working of the poison of dengue.

The Blood.—I invited Dr. Douglas Cunningham to assist me in examining the blood of this patient day by day with the microscope. The method of preparation employed was that of exposing the blood as soon as it was drawn over a solution of osmic acid, then moistening it with a nearly saturated solution of acetate of potash. In this way the movements of the white cells are suddenly arrested. They remain petrified, as it were, in the condition they were in at the time they were subjected to the influence of the re-agent, and can be examined some time after to great advantage. The only appearance observed in the specimens of dengue blood which were examined, differing from those to be found in specimens of healthy blood, was a considerable relative increase in the numbers of minute bioplastic bodies normally found in small numbers in every specimen of blood. In the specimens in question they were present in abundance, occurring either solitary and free, or in small masses, the individual bioplasts in which appeared to adhere to one another by means of some gelatinous molecular investment.

These appearances were only met with during a few days, and the blood rapidly assumed its normal characters. I cannot tell you exactly the period at which these changes begin, but from this as from other cases of dengue in which the blood has been examined such changes seem to become noticeable as early as the third day. They have also been seen to continue to as late a period as the sixth day of the disease. In more than one case of suspected dengue which has been subjected to this test, no changes in the blood have been noticed. In these cases, however, the symptoms have proved so mild that a doubt exists as to whether they were genuine examples of this affection.

The action of the osmic acid does not prevent the protoplasm, from taking up carmine, and some specimens of blood have been beautifully coloured in this way. I am indebted to Dr. Cunningham for a sketch of the appearances observed which will, doubtless, give you a much more correct idea of the changes which have been seen, than any description I could give you would convey. The illustration has been drawn to a scale of 700 diameters.

Similar appearances in the blood have been met with in other eruptive disorders; for instance, in varicella, and in vaccinia, so I do not wish to give you the idea that the appearances are in any way peculiar to dengue. This is not the place for me to speculate as to the origin of these bioplasts, whether free or collected together in masses. The temptation to regard the minute bioplasts present in the blood, as resulting from the proliferation of those larger bioplasts which we are in the habit of designating white blood-cells, is very great. At the same time you are already well aware that Dr. Beale regards similar bodies as the result of living material extrinsic to the organisms which has in some way found its way into the system.

These bodies appear to be identical with those described by Hallier, as existing in the blood of every specific disease. He regards them as the ultimate elements of the individual fungi peculiar to the blood of each such disease.

Occasional symptoms.—There are other occurrences which are sometimes met with in the course of the disease, which you ought to know of, and though none of them were met with in the case of this child, I think it right, nevertheless, to draw your attention to them.

The most common of these is the utter prostration that some patients complain of. You are all, in the daily routine of the hospital, brought in contact with patients who tell you they are very weak after a short attack of fever; it is nothing new for you to know that many diseases produce a very debilitating effect, but the way that many patients urge on your attention the fact that they have been absolutely prostrated by an attack of dengue, is not a circumstance that you meet with in other diseases. None of you have seen an epidemic of influenza, so my referring to the debility which is early felt in that disease will not help you much to understand the extreme degree to which this symptom is carried. My impressions on this point, however, are so vivid, that I cannot help drawing your attention to the fact in passing, that I never come in contact with a well-marked instance of this excessive debility without my mind being carried back to similar phenomena which I have witnessed when influenza was prevailing in other latitudes. You often see a strong man reduced at once with very little apparent cause to a state of abject helplessness—a condition of which he is painfully conscious, and to which he is ever ready to direct your attention.

A medical man, on becoming aware of this for the first time in his own person, expressed to me the greatest surprise, how without any very high temperature, a few hours of fever should have so reduced him. Intelligent sufferers have again and again dwelt on the fact that they had previously often had fever, but they had never known the misery of such a feeling of helplessness as that brought on by dengue. Previous observers seem all to have recognised the symptom which I have been attempting to describe to you, but I do not think that I have met with anything in their writings which would have led me to expect that I would encounter such exaggerated instances of this prostration as I have seen during this epidemic. It is rare to see this weakness passing on to collapse, but I have seen the lesser degrees of that state, though never occurring to such an extent as to prove fatal.

Another form in which the nervous system shows that it is overpowered by powerful influences consists in well-marked drowsiness and tendency to stupor. I cannot for the moment recall any instance in which I have observed such a symptom

developed to any well-marked extent in an adult. I think it has been almost exclusively in children that this drowsiness has been observed, and, fortunately, it is far from being a common occurrence, for it is a symptom of very evil omen, the insensibility gradually deepening till the child dies comatose.

Epistaxis can hardly be said to be a symptom of dengue, but I have so often seen it occur during the epidemic, that I think it deserves mention in this place. I have seen it take place to a troublesome extent, and to be repeated more than once, but though it has alarmed relatives. I have never seen it so profuse as to call for treatment. I think I have more often met with it after all fever had gone, than during the continuance of the pyrexia.

Mellis mentions one case in which there was affection of the testicle, and very considerable pain was complained of in that organ. Dr. Aitken also alludes to the fact of the testicle becoming swollen to a great degree. I think I have elsewhere met the statement advanced that the testicle is implicated in dengue. At all events, I used to have a very distinct impression that such was the case, and often wondered why I never had met with such complication. In this epidemic, as well as during my previous opportunities of watching the disease, I have had my attention directed to this point, and have never met with any well-marked instance of it. It is true patients have admitted, under cross-examination, that they think they may have felt something more or less wrong with the testicle, but even such an admission was made with so much hesitation, that it did not convey a satisfactory idea to my mind that they had suffered in reality, and I think I could obtain just as good evidence regarding any imaginary symptom, on which I wished to fix the attention of patients. I do not wish to cast any doubt on the single fact noted by Mellis, or to deny that swelling of the testicle has been seen by others, but simply wish to guard you against believing that you will often meet with this symptom in dengue.

In the same way, I have not met with the well-marked ptyalism, described by many good observers. The saliva has in some instances been secreted in increased quantity, but unless the writings of previous authors had prepared me to look out for this symptom, I am pretty sure it would not have attracted

my attention, as in no case have I witnessed its existence in any remarkable degree. In several cases I have seen enlargement of the parotid and sub-maxillary glands, but even when this caused considerable inconvenience, I have not seen true salivation take place. Mouat states that in this disease very small doses of calomel salivate. Perhaps, when this drug was in more general use, some of the cases of ptyalism attributed to this disease may have resulted from the use of calomel, without the causation being traced to it as clearly as it was by Mouat.

The lymphatic glands, in like manner, are sometimes the seat of great irritation, and you may find chains of enlarged glands in various situations, as in the groins or neck, or you may meet with tender spots just below the skin at any point of the surface, at which you may recognise a minute gland enlarged to the size of a split pea.

The Terminal Rash.—The terminal rash in this case has in various ways been very instructive. It appeared rather more early than usual, and at first occupied a not unusual site at the root of the neck and upper part of the chest. Had it been delayed for two to six hours it would have more clearly resembled the standard which I would propose for your adoption. It is usual for the terminal rash to appear during the course of the fourth day, and not at the end of the third. I was disappointed in my endeavour to make it more general at the hour at which the class was to see the case, and so far from being a better example of the eruption, it was not half so distinct as it had been nearly an hour before. You may justly regard this fugacious character of the eruption as one of its special characteristics. It is quite the rule for it to be fugitive, and in this way it often evades detection. Had it taken place during the night, we would in all probability have remained in ignorance of the fact that it had appeared. In many cases it appears thus suddenly between the visits of a medical man, and disappearing leaves no trace behind. Very frequently an attentive nurse or observant mother will tell you that your patient was covered for a few hours with an abundant rash, without your being able to confirm her assertion. In no other eruptive fever is this the case. In measles, for example, even when the rash does recede suddenly, it leaves well-marked appearances on the skin; and, besides this, recession of the eruption is attended

with the most alarming symptoms, such cases almost always ending fatally. In dengue, when the rash recedes thus, nothing noticeable occurs, the child remains perfectly well. I beg you to note also as a very prominent peculiarity which at once distinguishes the affection which we are studying to-day, that the rash appeared while the temperature of the body was natural.

In the great majority of the cases which you will see, you will find this to be the case. In a few instances the thermometer will mark 100°F. at the time the terminal rash appears, but this is so exceptional an occurrence that I am by no means prepared to say, whether in such case even this slight rise of temperature is caused by the disease, or whether some trivial accidental circumstance may not have led to the slight elevation of temperature.

Dengue is the only fever that I am acquainted with which possesses the peculiarity of the eruptive period being habitually without fever. The rash of scarlatina appears during intense pyrexia. Though, as the eruption occurs in small-pox, a fall in the temperature takes place, the high temperature when the rash begins is something quite distinct from the nominal temperature of a patient with dengue, in whom the terminal rash is appearing. In measles, the temperature, so far from falling, often rises when the eruption begins, and the general distress is often aggravated. Keeping all this in view you will be better prepared to attach to this circumstance the importance that it deserves.

The rash which you saw can be very easily described. It was a measly rash. So very exact, indeed, is the resemblance, that mothers learned in the various eruptive fevers of infancy will argue the question with you, and insist that the child with such a rash must have measles. More than this, medical men who think they have special experience in measles, treat a succession of such cases, under the impression that they have to do with measles. Other medical men have told me that they had never seen measles with the same attendant symptoms as those of the cases they were now treating, and yet they regarded the eruption as so peculiarly distinctive, that they lulled to rest their doubts on the subject, and tried to persuade themselves that the disease must be measles. Any dermatologist, if he were shown a case in which the eruption was at all general, if he attempted to found a diagnosis on the characters of the erup-

tion alone, would infallibly find himself in error, and pronounce, without hesitation, that the case before him was measles. I cannot tell you any means of distinguishing between the measly rash of dengue and that of measles. Not only are the elements of which the rash consists similar, but in many cases they arrange themselves on the skin in the same crescentic manner. In dengue, however, I have noticed that the arrangement of the irregularly-rounded patches and crescentic margins of the eruption is seldom so marked as in measles. It seldom begins on the face as in measles, and often first appears at the root of the neck or on the knees, or elbows, or palms of the hands. It is sometimes quite as general an eruption as that of the best marked case of measles, but, as a rule, it is not so, and much larger spaces are generally met with in which there is no eruption than are usually left uncovered by the eruption of measles.

So far from constituting a general eruption it is very often extremely limited in its appearance. In this case, when the eruption first came out, four inches at the upper part of the chest was all that was occupied by it. This is often the case, but more usually even when it is limited in extent, some other part of the body, as one or both knees, for example, may constitute the whole surface affected by it.

In most of the cases which I have seen, the eruption having once disappeared, does not return again. This child, however, constituted an exception to this rule. After remaining nearly forty-four hours without eruption, having had no fever in the meantime, and no rise of the thermometer marking its advent, the rash again showed itself, but it began at quite different points, the palms of the hands and legs above the ankles being now the parts affected by a measly rash. In measles, you sometimes see a similar phenomenom in a second outbreak of the eruption, but in such a case the rise in temperature which heralds in the first appearance of the rash is again repeated when the exanthem reappears.

On the next morning, about eighteen hours after the rash had reappeared, it was still distinct, and had not spread much. I did not see the child then, but reliable witnesses state that the eruption had quite changed its characters. It no longer resembled measles, but the parts affected by the eruption were swollen, and covered by the wheals of urticaria. each element of the

eruption was prominent and surrounded by a red blush. Within twenty-three hours of the time this rash began, and rather more than six hours after it was seen to have assumed the characters of urticaria, it spread and covered the whole body. With this urticarial rash, there was no itching. The morning after the rash had become general, as soon as it was light, a search was made for the rash, but it had vanished, the skin being left without a blemish.

It is by no means uncommon for the terminal rash to appear as urticaria. In fact, one of my medical friends consulted me about a fever which he had never seen before, and which was invariably followed by urticaria. Nurses and mothers recognise this as nettle rash, and it possesses the usual characters of this eruption, as it occurs under other circumstances.

Its fugitive nature is often well marked, as it may remain visible for only half an hour. The distressing itching it occasions is at times very troublesome. While alluding to this let me mention that the itching, though it was at no time present in the case of this child, often proves the source of great annoyance and calls for treatment. You must be prepared to meet with it in cases in which the rash has not assumed the characters of urticaria : the itching of the surface is some times a very prominent symptom even in those cases in which no eruption has been seen.

In this case, the urticaria was preceeded by a measly rash, probably the one form of eruption was developed into the other. I have no other observations bearing on this point. In fact, I have been singularly unfortunate in being unable to see the first commencement of any of the forms of rash. They are usually so evanescent, and reach their full development so early, that opportunities for watching how they begin are rare. Nothing that I have observed would lead me to think they begin differently from the rash of measles. Indeed, competent observers have assured me that they have seen the eruption begin in the minute red points observed in measles.

About the termination of the rash I can speak with more confidence. In almost all the cases that I have seen, it disappeared entirely after remaining out for a few hours. In other cases I have seen it remain out for two or three days and vanish

suddenly. I think I observed it to remain for five days in an exceptional case.

In several cases it did not end in this way. It gradually declined like most other rashes, or even when gone left a motling of the surface behind, not unlike the appearance seen after measles. This was not common in my experience, but other observers have told me they have met with it so frequently as to cause them to regard it as the rule.

In rare cases the hyperæmia attendant on the rash is so great as to lead to distinct ecchymoses. I have seen the tiny elements of the eruption thus *hæmatographed* on the skin with vivid minuteness, and remaining distinct for many days after the eruption proper had gone.

I have already dwelt so long on the characters of the terminal rash, that though I have very much more to say regarding it, I must be extremely brief in order to find time for other points of importance The terminal rash you have seen to be one that usually very closely resembles measles, while at times the form it assumes is that of urticaria.

A third form is that of scarlatina. In my experience, this has very seldom occurred. During this epidemic one of my medical brethren assures me he has seen more of this form of rash than of any other. This quite coincides with what was seen in others of the recorded epidemics, and in 1853 the rash seems much more often to have resembled scarlatina than measles. A fourth form of rash is lichen, a fifth roseola, while sixthly, vesicles and bullæ have been met with in this as in previous epidemics.

I have already incidentally mentioned that at times no terminal rash is observed. I use this expression advisedly, because the rash is often overlooked. In the case of any fugitive rash, it is easy to understand how it is so. Knowing this to be the case, I have had several patients carefully watched, and examined every second hour during the night. Special provision has been made for good light, and yet in many cases I have failed to obtain evidence of any rash having appeared. I am confident that I have seen many cases without a trace of rash, and that the absence of the exanthem which we regard as a rare occurrence in other eruptive fevers, is very common in dengue. I can not give you any exact idea of how

often the eruption is absent, but I should not be a bit surprised if subsequent observations proved it to be absent in about a third of all the cases.

You may well be astonished at what I tell you on this point, and about the diversity of the forms in which the eruption appears. To show you, however, that I am by no means singular in my observations of this disease, let me read to you a sentence or two that were written nearly half a century ago. Of the Calcutta epidemic of 1824, Cavell wrote as follows:—"Although some eruption was common, we cannot consider this an eruptive disease, since in a great many cases there was none. How unlike any former history of eruptive disease, is it that the eruption should assume so many characters! In one case it belonged to the class papula; in a second exanthema; in a third vesicula; in a fourth bullæ; and a fifth to that of wheal. All of these varieties I have seen."

Relapses.—In the case of this child, when once the pyrexia was over, within forty-eight hours from her first seizure, she had no return of fever, though sub-febrile temperatures were occasionally noted. By stretching a point, I tried to recognise in these slight elevations of temperature a resemblance to the relapses of fever which we sometimes see in dengue. If the defervescence has not been very perfect, and the temperature, in any case, instead of going down to sub-normal limits, remains say at 99°F., a rise of a degree and a half at once brings you into the range of febrile temperatures. It is by no means rare to meet with such cases, and then patients tell you,—"I felt a little hot at such an hour, and I think I had a little fever," while, when you see them shortly after, the thermometer marks 99°. This is the simplest form the relapse takes, and it may be repeated several times within a week. In most of your cases even this slight form is not met with, and even when it occurs once it need not be repeated again. A slightly more severe form of relapse than this is not very rare. A patient, with a normal or even sub-normal temperature on any day of the disease, say the fourth, fifth, or sixth is again seized with fever, about which there can be no doubt, and has to lie down for some hours, in such cases you often find a temperature ranging between 102° and 103°F. Under such circumstances,

the fever may even last for twenty-four hours, and the pains of the first attack may return in the relapse: usually, however, in a modified form. In rare cases a more severe form of relapse than this even is met with, in which temperatures over 104°F. may be noted. I have seen such a relapse occur on the third day, some twelve hours after the first attack was over, and when it occurs on the fourth day or later when the secondary rash is out, a high temperature with a measly rash is apt to lead you to make a diagnosis of measles. I wish you to keep this fact in mind, as I shall have to refer to it again. I have never been able to notice any regularity in the occurrence of these relapses, and can not lead you to any law which guides them. Perhaps more close watching may enable you to make advance in this direction, but, for the present, I can only regard them as accidental manifestations, not following any system in their coming or remaining away. This tendency of febrile action to recur is one of the features of dengue which deserves prominent mention, as I do not think you meet with it in any of the other febrile exanthematia, except as an index of serious local disease, while here it has no such significance. These relapses chiefly take place within the first ten days after seizure, but a condition sometimes remains which seems to render persons liable to irregular attacks of fever for long after they are well and about. Even when no relapse has taken place immediately after the attack, such people now and again get fever for a few hours—while they never before were liable to similar attacks, and seem thus to be rendered easily affected by influences, which would not previously have influenced them. You will do well not to regard these attacks of fever as specific in any way, as they probably depend on the weakening tendency of an attack of dengue, which, lowers the powers of resistance of the individual, and makes him an easy prey to even slight exciting causes of disease. I have more than once seen repeated relapses within the first ten days after the attack in those who had been much subjected to malarious influences. The curves illustrating the temperature in relapsing dengue require little comment. In the case of the adult on the fourth day the temperature rose to over 104°F. In both cases quinine was given as soon

as it was seen that the attacks were not becoming slighter, and at once checked the disease. I am glad to be able to shew you these two tracings of the temperature, as such cases are far from common.

The Sequelæ.—As you might expect, when the secondary rash has been a prominent feature of the complaint, desquamation often follows. In this child, we could not discover any tendency to removal of the cuticle in this way. In most cases of dengue you will fail to find desquamation, but still, in many cases, it constitutes a sufficiently noteworthy occurrence. When it takes place it resembles very much the desquamation after an attack of measles; small bran-like scales separate, or the scurf may be much finer than this, and almost resemble white dust. At times the desquamation is very partial in extent, but you will sometimes find it extremely general. When it is so, and much desquamation takes place, the appearance it produces on the dark-skined races is a very loathsome one, as the white fragments of cuticle are chiefly confined to the points at which the elements of the rash were situated, and the dark intervening skin gives rise to a remarkable contrast. Sometimes the amount of layers of cuticle shed is very considerable, and quite reminds one of pityriasis furfurans. When you rub such a skin in a strong sun-light you raise quite a little cloud of epidermic debris. Such an extreme form, however, is far from common. The scales are much finer than those usually separated after scarlatina. I have never seen any large flake or layer of skin separate; in fact, desquamation has been altogether insignificant in my experience when compared to what is frequent in scarlatina, and I have never met with any cases in which large continuous patches of the skin separated from the hands and feet, as one may see often enough to occur in scarlatina. Occasionally, desquamation proceeds to a much greater extent than it has done in my experience, and in at least one recorded case it proved so severe as to leave quite a raw painful surface behind. You will understand that this case is quite one of the curiosities of medical practice, and, so far from expecting to meet such cases in your after experience of this disease, you must be prepared to see many cases of dengue before you meet with

one in which you can recognize well marked desquamation. Sometimes the irritation caused while this process is going on is very considerable, and patients ask to be relieved of distressing itching, tingling, or burning, but more commonly it attracts very little attention.

Pains of a rheumatic character are very common after an attack of dengue. They are chiefly complained of in the joints, and resemble somewhat those which occur during the pyrexia, only they are usually not nearly so severe. They do not occur in all cases, but when they are met with they may give rise to most urgent distress. Sometimes they are present when the sufferer from dengue first gets out of bed. At other times he may pass some days before he is attacked by these after pains. They may last for a day or two, or pass off in ten days or a fortnight, but they are often much more persistent than this, and last for six weeks or three months. Even when they do not continue long they are sufficiently annoying, but when week after week passes away without the suffering coming to an end, the bravest heart gives in, and they are regarded with feelings akin to despair. In a few cases they give rise to quite as much suffering as an attack of acute rheumatism or gout, but in most cases they are not nearly so distressing. Even when they are not severe, and little complaint is made while the sufferer is at rest, the moment an attempt is made to use the affected joint, at once he finds himself disabled. If a knee or ankle is affected, either he cannot walk at all, or hobbles along in a manner you would style grotesque were it not such a serious matter for him. In the same way, if an elbow or wrist is attacked, he cannot lift a book or feed himself, and laments his helplessness, while expressing himself otherwise well. These pains fly about from one joint to another, and after, by your treatment, you have relieved one joint, your gain may be little, for another joint becomes the seat of the malady. There is a sense of fulness connected with the pain, and if you are guided by your patient's sensations, you will always meet with swelling of the affected part. If you trust to your own perceptions, you will often discover no change in the size of the joint. Occasionally you may meet with a little swelling, and in rare instances you may find a little puffiness of the

textures round the joint. I have never seen the tissues in such a state that œdema would be a fit term to apply to it, and even when there is a little swelling you may regard it as insignificant. I have never seen ulceration of the cartilages, or disorganisation of any joint follow on dengue. So, although this pain is a very distressing sequela, you need not look on it in any more serious light than that of the distress entailed.

An irritable state of the mucous membrane of the intestines sometimes follows on dengue, and very intractable diarrhœa or dysentery may continue for long. Luckily such a complication is not common, as it may prove so severe as to carry your patient to the brink of the grave. In other cases, when it is present, it is by no means serious, and hardly requires treatment. As a rule, the bowels are not disordered in any way after dengue.

A more rare, but still interesting, event, following on dengue, is deafness. I suppose it depends on affection of the eustachian tube. I have never seen it proceed to such an extent as after scarlatina, and have not yet met with any instance in which the auditory apparatus has become disorganized.

Sometimes the state of health is most cruelly broken down by an attack of dengue, and the constitution remains in a shattered state for long.

The Non-identity with Scarlatina.—Before proceeding to speak of the diagnosis of this disease, I think I ought here to say a few words to you on a kindred matter of such importance that, without having settled convictions on the point, it will be very difficult for you to follow me in what I have to say. I allude to the supposed resemblance or identity of dengue with scarlatina.

If you admit that the two diseases are identical, of course, there is no necessity for attempting to formulate a diagnosis between them, and the sooner the term "dengue" is got rid of, and the term scarlatina substituted for it, the better. I hope in the sequel to prove to you that this can never be—and that, therefore, we can safely confine ourselves to a consideration of the supposed resemblance between the two dis-

eases. That there must be some resemblance, I am forced to admit, as men thoroughly versed in medicine, have not felt quite certain whether this fever were not scarlatina: the symptoms modified, it may be, by the difference of climate, but still caused by the working of the scarlatina poison. When I tell you that Dr. Goodeve left the question in this state of doubt when he wrote in 1853, you will see that there is weighty reason why I should bring the subject before you. I have told you that I am forced to admit there must be some resemblance. I hasten to say I have never been able to see it. I have met with cases of dengue which were not at all well marked instances of the disease, which it might be difficult to surround with well marked lines of demarcation serving to separate them from equally indefinite instances of scarlatina; but it is not to such imperfect specimens that we should appeal when we want to establish either the similarity or the difference between two objects which we wish to compare.

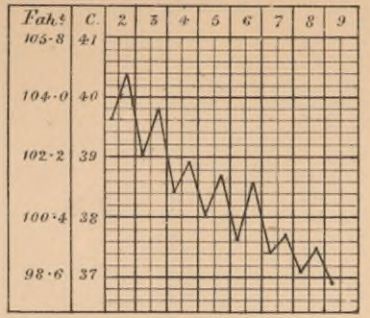
Take an average case of dengue, such a case as you can meet with every day when the disease is about, and compare it with a similarly selected case of scarlatina, and then you can have no doubt regarding the essential difference between these two diseases. I take it for granted, of course, that you are familiar with both diseases, but a great deal depends on this. You all know that strangers dwell much on the resemblance between the children of a family, while those within the family circle are impressed rather by the points in which the resemblance between one and another is deficient. To those who have seen both diseases the resemblances pass unnoted, the points of want of similarity alone impress themselves on the mind. It is right that it should be so: both of these diseases belong to the same class of febrile exanthemata, and, as such, necessarily possess certain characters in common, exactly as they do with small-pox or measles. By looking at their points of resemblance, under these circumstances, you can gain nothing. It is by studying the points in which they differ that you can hope to understand rightly the true relationship between the two diseases. In coming to the enquiry, I must ask you not to

allow your minds to be biased by the fact that certain points of similarity have led observers to question the non-identity of these two diseases. It may help you to do so if you call to remembrance that there was a time when the identity of small-pox and measles was believed in; that it is not yet very long ago that the distinctions between typhoid fever and typhus came to be recognised; while, even in the present day, the battle requires yet to be fought to establish again the non-identity of small-pox and varicella.

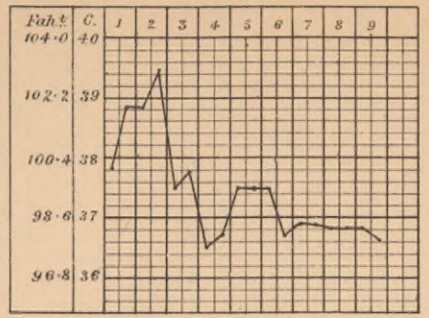
We are more fortunate now than our predecessors in being able to appeal to a single, crucial, undeniable test, which, of itself, is sufficient to put the question at rest. Our clinical thermometers, if properly used, furnish the most unanswerable proof that dengue is not scarlatina. Give the history of any case of dengue, purposely dwell on the points of resemblance to scarlatina, and keep back all the evidence which goes against this view, and furnish along with it a temperature chart, and no one versed in medical thermometry will accept your diagnosis of scarlatina. It is difficult to compare things so utterly dissimilar as temperature charts of dengue with similar delineations of the temperature in scarlatina. I will not occupy your time with any laboured explanations. I send round a number of such illustrations which appeal forcibly to the eye, and a casual glance even will satisfy you how very different are the two diseases. During the initial stage there is a certain resemblance. The temperature mounts gradually up, and attains its maximum rapidly. This type of *pyrogenetic* stage is also common in intermittent fever, in ephemera, and in many other diseases besides scarlatina, so you must not lay undue stress on this point of similarity. Even here, however, I think that there is a difference. It occupies twenty-four hours in dengue to reach a temperature of 104° or 105°F., while, if I am not mistaken, the rise is much more rapid in scarlatina, and may be accomplished in perhaps a fourth of that time.

As soon as this high temperature is reached, the similarity, be it more or be it less, ceases, and the two diseases pursue totally different courses, and finally decline in a totally different

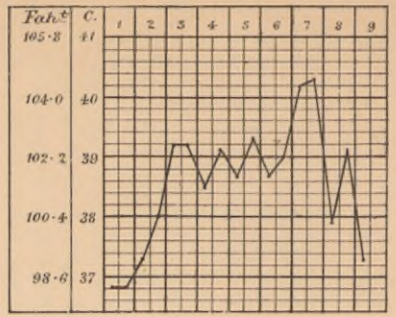
Mild Scarlatina. (WUNDERLICH)



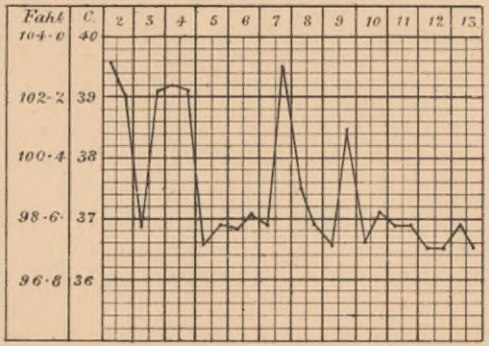
Mild Dengue,



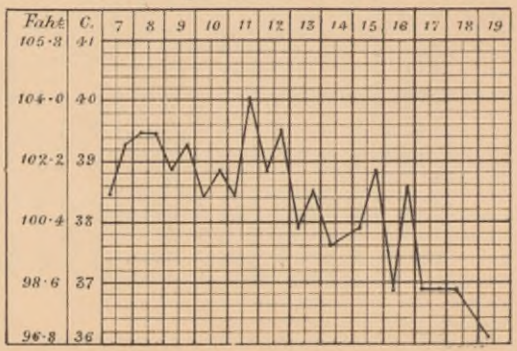
Measles. (WUNDERLICH)



Relapsing Dengue adult. (severe)



Relapsing Dengue child (severe)



Litho. at the Survr. Genl's. Office, Cal. April 1872

manner. In scarlatina the *fastigium*, the stage of fully developed fever, is prolonged for days. In it temperatures of 104°F. are very usually met with, and before the fourth day of the disease a temperature of 102°F. may be considered exceptional. In dengue, on the other hand, the *fastgium* is accuminated, and as soon as such temperatures as 104°, 105°, and 106°F. are reached, an immediate fall takes place, and it is quite exceptional to find a continuous temperature over 102°F. In very many slight cases of dengue, indeed, the temperature does not rise over 102°F. at all. Here we have at once a sharp, well-defined difference, and in tracing the course of the disease still further, we meet with equally conclusive proofs of want of identity. In dengue, the defervescence takes place by crisis, and not only so, but by a singularly rapid crisis which carries the temperatures down to sub-normal ones, in fact, at times, to those of moderate collapse. In scarlatina, a return to normal temperatures is effected in a widely different way as it occurs by lysis Here the tissue changes are much more serious than in dengue ; and a longer time for reparative action is necessary before a normal temperature can be re-gained. This period of lysis extends over several days in scarlatina, and is interrupted by slight evening exacerbations, contrasting strongly with the abrupt crisis of dengue which is effected in a few hours.

I wish to impress these facts strongly on you, and even at the risk of provoking your mirth, will ask you to allow me to compare the course of these two fevers by applying familiar names to their stages, so that I may be able to bring out strongly how unlike they are to one another as judged by the test of temperature. Let me then call the *pyrogenetic* stage the head, the *fastigium* the body, and the period of *defervescence* the tail, and you have scarlatina and dengue resembling each other more or less in their heads ; scarlatina having a long bulky big body in contrast to the short, imperfect, almost rudimentry one of dengue, while dengue has a short straight perpendicular tail, quite a different sort of thing from the long curly horizontal tail of scarlatina, as depicted in the chart of the temperatures met with during the pyrexia.

The Diagnosis.—Fortunately, in Calcutta, the diagnosis between dengue and scarlatina is not one you will be often called upon to make, as the latter disease so rarely occurs that most of those who have the largest opportunities of seeing it, did it appear, have never seen an instance of the disease. In other latitudes should the two diseases ever chance to prevail at the same time, in many of the least marked instances of either affection, which are by no means rare, the differential diagnosis might be sufficiently perplexing.

When the characteristic symptoms of either disease are well devoloped, the distinctions between them would be sufficiently easy even at the commencement of the malady.

The pains of dengue are not met with in scarlatina at the commencement of the disease—though they may be occasionally simulated at a later stage, as the rash is disappearing, by the suffering caused from the larger joints becoming swollen. The rapid pulse even early in the disease in scarlatina presents a marked contrast to the much slower one in dengue. Even here you must exercise caution in making your observations, for if you count the pulse while your dengue patient is sitting or standing, especially if he has been making any slight exertion immediately before, the pulse may have risen to 120 or 130 beats, while in the same patient, after a little rest, in a state of recumbency, it may again regain a more normal equilibrium of about 100 heats in the minute. Then, the initial rash of dengue is a much more early feature in the disease than the eruption is in scarlatina—although on rare occasions you may find the rash of scarlatina appear in the first day, it is habitually on the second day that it occurs.

In making a diagnosis from measles likewise, the initial rash of dengue, when it is present, will assist you, for there is no corresponding manifestation in measles. The high temperature 104°F. on 105°F. which you almost invariably meet with during the first day of the disease distinguishes dengue from measles, in which affection you expect lower temperatures such as those below 103°F., until the time that the rash appears.

In most cases of dengue, the complete or even comparative absence of the characteristic catarrhal symptoms of measles, will of itself serve to prevent you from committing any mistake in discriminating between these two affections. The

only occasions on which I think you will have any difficulty in making a diagnosis between measles and dengue, will be in cases which you have not seen till the fourth or fifth day, and find the patient with a measly eruption. In such cases, the diagnosis may be sufficiently doubtful, if both diseases are epidemic at the same time, and your patient have a relapse of the pyrexia, the thermometer marking for instance 104°F. With the usual cool skin of dengue, the measly rash need never cause you any uncertainty, as the higher temperature of measles at this period would prevent any doubt. In the few cases of dengue in which the terminal rash has appeared during a relapse of the pyrexia, the very decided history of the pains of dengue, has served in each case to enable me to pronounce with certainty on the nature of the affection, but had I been compelled to found a diagnosis on any general symptoms, gathered from unobservant friends, I confess I would have felt myself in difficulties. Those of you who wish to possess a more exact delineation of the differences between the various allied exanthemata will find in Aitken's work a tabular form under the head of Rötheln, which was drawn up by Dr. Paterson. If you will head a fourth column "dengue," and under each division sketch in the most prominent symptoms that I have described to you, you will easily see that there are many other points than those I have dwelt on, which will more or less assist you in framing a diagnosis.

From other febrile affections, the diagnosis is usually an easy matter. In most cases, the well marked stiffness or pain at the onset of the disease is of itself sufficient to guide you to recognise that you have to deal with dengue. When you see your patient very early in the attack, and you do not find the pains developed in a characteristic manner while the initial rash also fails you, you will find dengue written in bright red characters on the mucous membrane of the under eye-lid, and after everting it, you need hardly ever delay in pronouncing your verdict.

Although generally you have no difficulty in arriving at a diagnosis, when the disease occurs in a sporadic form, as it does annually in Calcutta, I have seen it often mistaken for measles, and unless you are on the alert, you will find it too easy to make such a mistake. Again, you meet with cases of *denguis latens*, in which, with the characteristic pains of the dis-

ease, perhaps in an aggravated degree, you have no fever, or at least when you see such a case some days after your patient has been confined to bed with it, you can get no history of a hot skin.

Then, there are very slight forms of the disease, quite protective against a second attack, instances of *denguis mitis* if you will, in which your patients are scarcely ill, where it is not at all easy to decide on its exact nature. A trifling sore throat, and slight malaise, may be all you can lay hold of, till the terminal rash appears to shew you what you have had to deal with. Or, even this may not be seen, and then all the evidence you have to guide you consists in your patient not being seized with dengue again while all others in the house have taken it.

Again, *denguis maligna* may occur, and throw difficulties in the way of a ready diagnosis. A huge over dose of dengue poison may so overpower your patient's nervous system as to obscure all the usual symptoms. Drowsiness may have passed into coma, some convulsion may have taken place, and you see your patient, for the first time, with a temperature verging on hyperpyretic, a failing heart and œdematous lungs, with the whole surface highly cyanotic. Under such circumstances, I know of nothing which will assist your diagnosis, beyond a knowledge of the fact that dengue is epidemic, and that its specific poison is capable of giving rise to such serious manifestations.

I have often wondered how it was that in America and the West Indies they thought it necessary to discriminate between dengue and yellow fever. I have ceased to do so, however, since I have seen cases of dengue attended by jaundice, and have also seen in other cases typical instances of black vomit and black stools. These symptoms, however, are very rare, and need not, I think, interfere much with the diagnosis.

The Treatment.—At the outset I have to impress on you the fact that dengue is a specific disease, and runs a certain course of its own, uninfluenced by remedies. The days are past when you would attempt to cut short a disease such as smallpox, and I think your faith will be strengthened in what I have afterwards to tell you about the treatment of dengue; when you start from such a fixed and certain basis as that, nothing that you can do will avail much in altering the course that the disease takes. You can do much good by treatment,

you can do much harm by treatment, to the individual who is the subject of this affection, but during all the times I have been brought in contact with this disease, I have not been able to collect a shadow of proof that I have ever succeeded in shortening its duration or in converting a severe case of dengue into a mild one. Mouat thought he had proof of this; the many years which have elapsed since he wrote, make us weigh such evidence as he trusted to more carefully, with the result of rejecting much, that in his day seemed good. I have told you already that there are slight forms of the disease which give little trouble, as well as more severe ones, which, besides being very distressing, entail a long train of bad health. If you adopt any favourite line of treatment, especially if the remedies you employ are rather violent ones, insensibly you allow yourselves to indulge in the belief that your therapeutic measures tend to convert cases, which would otherwise have been severe, into those of a mild nature. If you change your plan of treatment, and more certainly if you adopt an expectant line of dealing with dengue, you will meet with the same sort of slight cases, and be able to recognise them as ordinary examples of the disease uninfluenced by treatment.

Emetics and purgatives both have their advocates as efficient means to be employed in this disease, with the view of checking or curtailing it, or modifying its severity. Many practitioners have employed both of these measures in a way, that perhaps now we might be justified in regarding as heroic practice. I strongly advise you not to be led astray by their recommendations, and to reject both emetics and purgatives as measures not only unworthy of your confidence in dengue, but, on the contrary, means to be avoided as far as you possibly can. I treated a few cases some years ago by emetics, having been led to use them by the recorded experience of others. It was my good fortune to have my eyes opened in this wise to the unnecessary use of a remedy which I should feel inclined now to regard as an abuse of it. One of my early patients with dengue was a gentleman of refined education, and gifted with rare discrimination. He took twenty grains of ipecacuanha on the first day of the disease, and its operation was very violent. He had a most mild attack, and was ungrateful enough to upbraid me with the taunt that my remedy was worse than

his disease. I at once treated some cases without any emetic, and soon felt certain that most patients got on better without such a violent remedy. I hope you will not run into the extreme of believing that because emetics are not necessary in all cases, in no case are they to be resorted to. Avoid them by all means as far as you can, but when a much loaded tongue, gastric derangement and nausea, or any condition which your general familiarity with disease points out to you as being a morbid state of the system likely to be relieved by free emesis, do not let anything I have said prevent you from resorting to the use of an emetic as an exceptional expedient.

In the same way, even to a greater degree, make sure that any purgative you think right to prescribe is only given to combat some especial symptoms.

There are two very cogent reasons why you should, if possible, not resort to purgatives as a routine mode of treatment for this disease. In those cases in which the pains are severe, the movements entailed during the operation of a purgative are productive of extreme agony to the sufferers. I have always held this full in view, and have never yielded to the temptation of prescribing such remedies as long as there was much fear of their leading to suffering. I have, however, had several opportunities of watching the results when prescribed by others, or when taken by the patients on their own responsibility. In several of these cases where all the resources of the sick room were available, the results were described, as a mani-fold aggravation of the tortures of the disease and in any case in which pain constituted a prominent symptom, nothing would tempt me to sanction the use of any medicine likely to cause purgation.

The other reason why in my opinion you should abstain from acting freely on the bowels in dengue, is that in cases in which there is much tendency to prostration, the weakening effects of such a line of treatment are ill-borne. Not unfrequently such debility is extreme, and any addition to it comes to be a serious matter. I have seen syncope produced during the operation of a purgative, and though I have not seen actual collapse, I have witnessed such a close approach to it as to lead me to dread its possible occurrence. At times I have felt inclined to indulge in the uncharitable suspicion that perhaps it

was from noticing minor degrees of such a condition our predecessors allowed themselves to deal so freely in this means of treatment. I have seen a free watery evacuation abruptly take the temperature down 6°F.

This you might be inclined to think a most successful result to achieve, but when I tell you that the heat of the body is quickly regained again, and that such a casual remission is followed by great weakness—temporary at least, if not more permanent—I hope you will see I have sufficient grounds for asking you to use purgatives with all caution. The bowels very often act daily without any assistance, and even when they do not do so, no great inconvenience seems to result by their remaining confined for two days. In the older epidemics considerable importance appears to have been attached to the unhealthy nature of the evacuations. If you do not irritate the bowels, I think you will have little reason to be dissatisfied on this score, so little, indeed, that you may attend a score of such cases without having to ask anything more about the bowels, than the simple question as to whether they have acted or not. In severe cases, then, I believe purgatives to be contraindicated; during seasons when catarrhal implication of the mucous membrane of the intestinal tract constitutes a prominent feature of dengue, purgatives should be withheld ; in slight cases they are unnecessary as a rule, but should distress be experienced owing to constipation, you must be prepared to deviate from your ordinary rule, and employ such mild measures to secure efficient evacuation, without any unnecessary cathartic action, as the symptoms in any individual case may seem to indicate as appropriate. If you act on the principle of allowing the bowels to take care of themselves as long as movement is likely to cause much pain, you are far from liable to do any harm by using laxatives when occasion demands.

It has attracted the attention of most of you that this child was put on belladonna, many of you asked me why she was treated in this way. I was led, many years ago, to suggest the use of belladonna for the relief of the severe pains experienced in ardent fever. The power which I believed this drug to possess in producing contraction of the vessels in the membrances surrounding the spinal cord was the idea which promted me to make a trial of this agent. For long I have used it as a sovereign remedy in the pains of dengue, though I attach very

little credit to the hypothesis which first guided me to make use of belladonna under similar circumstances. I do not for the present propose to theorise on its mode of action. In Dr. Harley's valuable work you will find much information on this subject. I prefer to bring it forward to your notice as an empirical fact —a fact which you will find of immense value to you—that in belladonna, we possess an agent of surprising power, when used against the very severe symptom which pain often constitutes in this disease.

It is little short of marvellous how case after case yields as soon as the drug is given.

You do not require to push the belladonna very far—medium doses very soon produce the results you want. The preparation given to this child was the tincture, and I habitually use it in this form as little likely to lead to accident.

When I first began to use it, I prescribed one drachm of the tincture of belladonna, and five drachms of orange syrup, and directed that a sixth part should be taken every hour by an adult till the third dose had been given. In this way you can regulate the effect, and stop the medicine if a first or second dose gives the desired result. I very seldom, however, find that less than three doses prove sufficient in any cases in which the pains are really troublesome. So, when immediate relief is wanted, you may give two or three doses in one. In a bad case you may require to give rather larger doses, but I have not often had to do so. Some times three doses give such marked relief, that no more of the medicine requires to be taken. More often, though the relief is very decided, the pain still remains, and in some hours again become so troublesome as to lead to a repetiton of the dose.

In this way, by having resort to two or three doses of the belladonna from time to time, you get over the period when this symptom is troublesome, with very little suffering. I cannot commend my formula to you as a very elegant one, it is much too sweet for most palates, but this fault is easily forgiven as your patients are very grateful for the immediate relief they experience. In very few cases will more than two drachms of the tincture be expended in a single case, and you will find it a safe precaution not to order any large quantity of the medicine to be at the bedside at one time.

I began to use the tincture, and having hit on an active sample of it, very often send to the same druggists, to have prescriptions containing this tincture dispensed. You may prefer, however, to use the succus belladonnæ in similar doses, or if chance restricts you to the use of the extract, a third of a grain repeated twice or thrice in twenty-four hours will generally suffice, or in a case with severe pains, half grain doses may be necessary. You will sometimes find it useful not to give it in the form of pill, but to dissolve the extract, and give it in some mixture which conceals its taste.

I think you will find it safer not to use atropine frequently, but if in any case you wish to employ it hypodermically, you will do well to use Dr. Harley's solution of one grain of the sulphate of atropia in an ounce of water, as this is a very convenient strength for ordinary use. Five minims of the solution containing $\frac{1}{96}$th of a grain of the drug, will be enough for a small woman or a child of twelve, $\frac{1}{60}$th of a grain—eight minims—is a full dose for most cases, while ten minims containing $\frac{1}{48}$ of a grain is the full dose for a powerful well-developed adult, and is a dose which should seldom be required, and must not be exceeded in any case. In my own practice, I restrict the use of atropine in dengue to cases in which the pain is very intense, and has lasted for some time before I see the sufferer, and I use it then because the relief it affords is so rapid. I always, however, dissuade enthusiastic followers from using it more extensively, as I think its place as a therapeutic measure should be limited to the position I have attempted to assign to it.

If you can not secure trustworthy attendance on any case of dengue, you must make sure that the belladonna is left within reach of your patient, for often a sufferer is quite unable to go any distance to hunt for the medicine. I know the case of a medical man who, after having experienced the immediate relief of a previous dose of belladonna, was quite unable to avail himself of another dose, as he was deserted by his attendant and suffered hours of misery, though the charmed antidote was within a few yards of him, simply because he was unable to get at it.

You will find that belladonna helps you much in another way besides by that of its power of relieving pain. Restlessness, distress, and anguish quite apart from pain, are often very pro-

minent features of the attack. Even in cases where the pain is not very severe, your patient may experience sufficient misery. You will find nothing alleviate all this so well as belladonna. You have seen me use the drug under similar circumstances in typhoid fever with very happy results, and even if there were no pains to be relieved in dengue, I would use belladonna to soothe these other symptoms.

The only occasion in which I had an opportunity of noting any decided physiological action from the drug was in the case of an over-zealous patient who, in spite of my instructions to the contrary, persisted in taking six drachms of an active sample of the succus belladonnæ (Thompson's) within two days. Its mydriatic action was here considerable; though with the assistance of double convex lenses he could read small type quite close to the eye, reading without this aid was impossible. Where no belladonna had been taken, I have seen the power of accommodation of the eye so much impaired after an attack of dengue, that you must be cautious in attributing to belladonna all the faulty vision you may chance to meet with in this disease.

Belladonna does not relieve the headache materially. For this symptom, I have found a sponge bag filled with ice, if kept on the pillow in loose contact with the head to be the best palliative. In cases in which the headache was described as maddening, I have seen relief obtained by the application of leeches to the temple, but regard this measure as one which should seldom be resorted to.

During the pyrexia, I think a coffee cupful of strong soup taken every six hours is more easily digested than any other food. When there is an objection to soup, milk answers tolerably well. Soda water and iced water may be given freely.

For myself, I prefer to treat the pyrexia of dengue purely expectantly, and seldom, unless I find the urine to be scanty, give even a few grains of citrate of potass. If you think you must medicate, make your fever mixtures as simple and innocuous as possible. I was led into believing that twenty grain doses of quinine and large doses of aconite were beneficial, by finding often that a lower temperature supervened soon after these drugs were given. Now, I know that such remissions are normal characters of dengue, and occur without the assistance of medicine, so

I no longer use this class of remedies. When the temperature rises over 105°F., I use cold water sponging to assist in producing a fall of temperature. The natives of this country and some Europeans dread the use of cold water in this way. You may, however,avoid coming in collision with such a prejudice by prescribing a lotion containing compound tincture of lavender, to be used in the same way. Besides the disadvantage of staining the sheets red I know of no other drawback, and even this is of little consequence, as it gives rise to the idea of salutary medication, more than a colourless lotion would do.

As soon as the temperature rises over 106°F., I advise you to have a cold bath made ready, and to familiarise yourselves beforehand with this form of treatment for hyperpyrexia as worked out for us by Dr. Wilson Fox. I have never had occasion to employ it, though I have seen the preparations made ready, and left instructions for the patient to be put into the bath as soon as a temperature of 107°F. had been reached. In a case where a relapse of the pyrexia at a late period of a fair convalescence had taken place, I found a temperature, when for the first time I saw the child, to be 109·5°F. Judging this to be the *pro-agonistic* stage, and that death was too close at hand for a cold bath to influence the result, I did not advise this means to be used, and under similar circumstances I counsel you to act with caution.

The danger from these high temperatures, during the hot months of the year, is very great, as it is precisely under such conditions that heat apoplexy is apt to supervene. If you see cases under such circumstances you will do well to remember that vessels with ice kept near your patient are sometimes of use under similar circumstances.

I have already told you that convulsions are common in children during the course of dengue. Provided this symptom occurs early in the disease, and the child wakens completely after the attack is over, you need be under no apprehension, as the symptom, though very alarming, is not dangerous. I have treated many such cases expectantly, and they have all recovered. When the convulsions recur frequently, even if the child continues to regain sensibility after the fits are over, you will do right to make an attempt to put a stop to such undesirable manifestations. I think I have seen

bromide of potassium assist in arriving at this result, but I am much more sure that conium has a very decided action in such cases. As soon as I see that the excitement of the motor centres does not pass off of itself, I at once prescribe this drug with confidence. Two drachms of the succus conii in twenty four hours is a fair dose for a child of a year old, and Dr. Harley cautions you, that to give this drug in too small doses is simply to trifle with it. When other medical men have prescribed it, at my recommendation, I have found that the druggists have lessened the dose prescribed, so in addition to signing such prescriptions, I advise you to take the precaution of placing your initials after the amount of the conium which you order, to shew cautious dispensers that you have made no mistake in what strikes them as being an unusually large dose

As I have seen cases in which these convulsions returned several times, recover without any very special treatment, you will understand why I have been somewhat guarded in my estimation of the value of therapeutic agents.

Such convulsions are also often dependent on the irritation caused by the cutting of a tooth, during the attack of dengue, so you must not neglect to have the gums examined on every occasion when this symptom occurs during the period of dentition to have them freely divided, if necessary.

For the distressing itching and other sensations which afflict some patients about the period of the terminal rash, you will find nothing so good as a free application to the skin of a drachm of camphor in fifteen drachms of mustard oil. As I have seen loss of sleep produced by patients getting out of bed again and again to have hunts for imaginary ants which they thought were stinging them, you will do well to guard against the possible necessity for the use of such an application by having the remedy prepared before hand.

The little girl whose case has served as a good text for my remarks, took a little compound tincture of gentian for a few days after the terminal rash had disappeared. Any other simple tonic would have answered equally well. In many cases you will find the convalescence after dengue sufficiently rapid without any assistance from medicine. The majority of cases, however, stand sadly in need of some tonic when the disease is over, as besides being much pulled down the

convalescent has lost all appetite. Use your own favourite remedies under such circumstances, but keep in mind that when the nervous tissues have had their nutrition much impaired, and the brain refuses to work, you possess in strychnine a means of promoting rapid recovery which you will find invaluable. I often combine $\frac{1}{16}$ of a grain of strychnine with 15 minims of dilute phosphoric acid and a sufficiency of water to cover the extreme bitterness, and prescribe such a combination to be taken three times a day. A generous diet is essential, and a few ounces of good wine often necessary. A pint bottle of really good after-dinner claret during 24 hours is my favourite stimulant after dengue, or a similar quantity of sound full bodied burgundy, but as long as you are sure your wine is good, you may consult your patient's likings or your own whims within very considerable limits.

For the pains in the joints which occasionally trouble patients for a few days after an attack of dengue, I usually prescribe nothing, as they often pass off without any treatment. When they are more persistent, or so severe as to demand treatment, any of the usual liniments, which you would use under similar circumstances afford temporary relief here. Combinations containing opium, or a chloroform and belladonna liniment are more or less useful. Advantage is sometimes derived from frictions with any of the more stimulating compounds as those containing ammonia, oil of cajeput, &c. The remedy, however, which I would most strongly advise you to employ is turpentine. As a fomentation, or a constituent of a liniment, or simply rubbed on by itself it often gives marked relief. During the epidemic of acrodynia which began in Paris in 1828—as well as in previous epidemics of this disease elsewhere, all observers seem to have agreed that turpentine was their most reliable resource in combating the distressing pains, which were so often met with.

In acrodynia, the pains seem very much to have resembled those of dengue, and indeed in other respects, as in the curious variety of the eruptions observed, the two diseases possess many points of similarity. As in the Paris epidemic, various forms of paralysis, and other symtoms not common in dengue, were frequently observed, and as the pyrexia which is so prominent a symptom of dengue at the commencement of the disease seems to have been entirely wanting, we must conclude the

two diseases were different, though we avail ourselves of the experience accumulated in acrodynia while treating the after pains of dengue.

The endermic application of morphia after Trousseau's method with which you are familiar, is an expedient you should always bear in mind.

Among internal remedies, you will find alkalies and colchicum, and, indeed, all the more usual mode of treatment of very little use. The only treatment which, I think, I have seen do much good, has been that of iodide of potassium, combined with a fatty diet. Dr. Raye tells me he has seen bromide of potass succeed after the iodide had failed.

Galvanism and electricity are some times useful in these pains. I think I have found the continuous current to be more effective than any other form.

Whatever treatment you employ, you will find that sudden changes of temperature and slight gastric derangements are apt to bring the pains back, even when you thought you had got rid of them—so you must be particular in guarding sufferers against both sources of danger. The expedient of immediately using additional clothing as soon as the temperature of the air falls suddenly—a strict attention to diet—and above all, avoiding wines with the slightest suspicion of acidity, are measures which are absolutely indispensable, and a disregard of them will bring discredit on any line of treatment which you may adopt.

I have already casually remarked that quinine is efficacious in arresting the relapses of the pyrexia which I have described to you: ten grains a day was given to the adult whose case furnished the curve which is in your hands. It was begun on the fifth day of the disease, and you can judge of the result. In the case of the child whose temperatures are delineated in the other chart, quinine in five-grain doses twice a day was begun late on the eleventh day of the disease, and quickly put a stop to further paroxysms of fever.