as on his first attack. Next morning he was well, with but an occasional extra-systole, and no further notice of him was taken until three days later, when his temperature went up to 104°F .; pulse rate 110. He was now found to have a perfectly regular pulse, and he had no muscular pain, headache nor backache. He had, however, marked abdominal pain and diarrhoea. (In his former attacks he had been constipated.) His pulse is here shown. (Fig. 6.)

FIG. 6.

From this point not a single extra-systole was observed until October 15th, though the temperature remained high for a week, reaching normal only on the 12th. On October 10th rose spots appeared on the abdomen, and paratyphoid B was found bacteriologically to be present. The pulse rate did not rise above 100 after the first day; on October 8th it was 90, and on the 10th 75.

On October 16th slight pain returned to the legs, which had been quite free from this symptom—most unusually, as he stated—and a few extra-systoles appeared. These continued off and on till the 22nd. On the 23rd his temperature again rose, and reached 103°F . on the 26th, but without pain or headache. He was sure this was not his trench fever, and had no extra-systoles. The pulse was 130. Temperature and pulse fell to normal on the 28th, and some extra-systoles at once appeared. On November 1st, another attack with pain and headache came on, and this was accompanied by a few extra-systoles.

The interesting point is that when they appeared the bouts of extra-systoles were always accompanied by trench fever symptoms, and that an exact eight-day periodicity was

FIG. 7.—Heavy line = extra-systoles per minute. Dotted line = temperature. A. Typical trench fever. B. Diarrhoea and abdominal pains. C. Trench fever pains. D. Abdominal pains; no trench fever pains.

shown in their onset. This is shown in Fig. 7. The temperature is also shown.

It is thus evident that the toxin of trench fever in this case produced a different effect on the rhythm of the heart from that produced by the toxin of paratyphoid B. Extra-systoles are relatively common in cases of trench fever.

THE HERPES-VARICELLA INFECTION.

BY

A. E. CARVER, M.D. CANTAB., M.R.C.P. LOND.,
HONORARY PHYSICIAN, TORBAT HOSPITAL.

GENERAL recognition has as yet scarcely been accorded to the contention, which was first advanced by Bokay¹ of Budapest twenty-nine years ago, and in support of which convincing evidence has been accumulating during the last few years, that herpes zoster and varicella own a common causal agent and are intercommunicable.

Further attention in this country was drawn to the association between these diseases by Dr. Le Feuvre in 1913, writing from Bulawayo. He reported nine cases in the *Guy's Hospital Gazette* and the *Medical Journal of South Africa*, in which varicella followed upon contact with herpes zoster; and others in which a varicella rash occurred in persons already suffering from herpes—the generalized rash appearing within five days after the appearance of the localized herpetic eruption. In this latter connexion he quoted a very pertinent observation by Adamson,² to the effect that in cases of herpes isolated vesicles may occur "sparsely scattered over all parts of the body," and suggested that this is in fact a scanty varicella eruption. It must be seldom that comprehensive search is made in a patient suffering from herpes for vesicles scattered over other parts of the body, but if this statement be generally corroborated it will constitute an

important link in establishing the contention that the two diseases are of identical origin.

Since Le Feuvre's first communication over fifty well authenticated cases have been reported in which varicella developed in persons who had been intimately associated with patients suffering from herpes zoster, and in each instance the probability of the infection having been contracted from other cases of varicella could be excluded.

Moreover, the interval between the appearance of the herpetic eruption in the one patient and that of the varicella rash in the other was within the recognized incubation period of the latter disease, or exceeded that period by no more than one day. Thus, in 51 cases in which the necessary dates and details are given this interval was:

10 days in	...	...	5	18 days in	...	...	1
12 "	...	...	1	19 "	...	...	5
13 "	...	...	6	20 "	...	...	1
14 "	...	...	13	21 "	...	...	3
15 "	...	...	2	22 "	...	...	1
16 "	...	...	4	"From 8 to 20 days" in 8			
17 "	...	...	1				

It is somewhat remarkable that of these 51 cases of varicella 8 were adults—rather a high percentage considering the infantile nature of the complaint.

In 1919 Dr. Cranston Low,³ in an illuminating paper rich in bibliography, concluded that these diseases are probably due to the same virus, and made the suggestion that in herpes zoster the infection spreads from the nose along the lymphatics to the olfactory nerves and the cerebrospinal fluid; whereas in varicella it is probably a blood infection.

The following history of three cases which occurred in one family last autumn seems to be worth recording. Three children living in a country house were together in a tram on September 4th. This was the last occasion upon which they were away from home together in any enclosed or crowded place. On October 1st one child developed varicella at a school to which she had returned on September 22nd. On October 3rd, another child developed the disease at home, and,

on October 4th, the third child developed it at another school 200 miles away, to which she had gone for her first term on September 21st.

Clearly, the three children contracted varicella independently, yet from some common source; and seeing that they had not been about together excepting in the country during the twenty-seven days preceding the appearance of the rash in the first case, it was at first difficult to explain how this had come about. The two school children had been certified, in good faith, before returning to their respective schools, as having been in contact with no infectious disease during the preceding three weeks, and it was a matter of considerable annoyance to all concerned that two schools should have become infected through them at the beginning of the term.

Whilst staying in the house in which they had spent their holidays the children's grandmother had suffered a very severe attack of supraorbital herpes, of which the eruption began to appear on September 14th. To this patient the children had limited access, and, in view of the fact that contact with any case of varicella can be excluded, the suspicion is very strong that the herpes was the source of their infection. In these cases the herpes-varicella interval was respectively seventeen, nineteen and twenty days from the first appearance of the herpetic eruption.

From the foregoing it appears that, sometimes at all events, herpes zoster is an infectious disease, contact with which is not rarely followed by varicella; but I have been able to find no recorded instance in which herpes in one patient has clearly given rise to herpes in another patient.

In all the cases that have been reported the varicella infection appears to have been contracted during the period of onset and development of the herpetic eruption, and no case has been reported in which it occurred as a result of association with herpes in its later stages. It is questionable, therefore, at what period of the attack the infection

from the herpetic person ceases to be communicable. From experience we know that varicella itself is highly infectious during the period of onset, and it is authoritatively laid down that persons suffering from varicella continue to be potential sources of infection until a new epidermic covering has spread over the site of the pocks, that is, until all scabs have separated, upon which precept practice is generally based; but until evidence is forthcoming that the period of infectivity similarly persists to the end of the attack of herpes, it would be unjustifiable to place a contact in quarantine until three weeks after the last herpetic scab had come away.

It must be admitted that the argument is not complete. Careful inquiry is necessary to elucidate the problem of where and how the herpetic infection is originally acquired. Then again, many cases of herpes zoster occur to which no spread of infection has been traced; and this raises the further question whether all cases of herpes zoster are in fact etiologically identical, or whether some are due to one infection, others to another infection, and others again to a process of a different category altogether.

REFERENCES.

¹ BRITISH MEDICAL JOURNAL *Epitome*, 1913. ² H. G. Adamson, *Skin Affections of Childhood*. ³ BRITISH MEDICAL JOURNAL, 1919.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

ASSOCIATION OF HERPES ZOSTER AND VARICELLA.

IN view of the recent correspondence in the JOURNAL on the subject of the association of herpes zoster and chicken-pox, I think the following note may be of interest, and also helpful in making record of such cases.

On January 10th last Mrs. X. came to see me because of a rash on her body. This proved to be typical herpes zoster along the course of one of the upper left intercostal nerves. She asked me at the time if there were any fear of infecting anyone else, and I assured her that it was most unlikely, and that I had never known such a thing to occur in my own experience.

On January 25th—that is fifteen days after the herpes zoster appeared—I was asked to see the elder daughter. She had a temperature of 103° and a typical rash of chicken-pox. Some of the spots were well in the blister stage, and others were still coming out in crops at different stages. Three days later the younger daughter also developed typical chicken-pox. Both daughters had chicken-pox twenty years ago, the elder slightly and the younger more severely. To their knowledge none of the family had been in contact with any infectious disease. The incubation period of chicken-pox being usually eleven to fifteen days, it follows that had Mrs. X. suffered from chicken-pox instead of herpes zoster no one would hesitate to say that the daughters were infected from her. After the above experience I think it would be wise to be guarded in one's statements in regard to the possibility of infection from a case of herpes zoster.

W. MORTON ROBSON, M.D. Lond.,
F.R.C.P. Lond.

Northampton.

A CASE OF TETANUS.

THE following case seems worthy of record, in view of the facts that: (1) there was, after the most careful scrutiny of the patient, and after investigation by the interpreter, no evidence or history of the minutest injury having occurred; (2) the case steadily improved, and finally recovered under treatment by the intramuscular method alone.

The patient (a German) reported sick to the medical officer in command of the prisoners of war compound in June, 1919, complaining of stiffness in the neck and feeling unwell. His temperature was not raised. He was "excused duty" and told to report next day. For the next three days he reported, but complained of nothing more than he did on the first day. On the evening of the fourth day he developed stiffness in the jaw and difficulty in swallowing, and was immediately sent to No. 42 Casualty Clearing Station at Douai diagnosed as (?) tetanus.

On admission the patient had an anxious expression, risus sardonicus was present, trismus was very marked, and swallowing difficult. There was great rigidity and tenderness of the

muscles of the neck, the abdominal muscles were rigid and hard, the legs and arms rigid. Spasms were present, but not frequent, nor were they very severe; respirations were good. The temperature was 97° and the pulse 72. There was no evidence of cervical glandular inflammation, oral sepsis, carious teeth, or any other affection which might possibly give rise to the condition the patient presented.

Active antitetanic treatment was commenced at once, and within the first forty-eight hours of admission 52,000 units of antitetanic serum were injected intramuscularly. On the third day 8,000 units were injected, and for the next six days the daily dose was 9,000 units. On the tenth day no serum was given, and on the twelfth day a final dose of 1,500 units was injected, making altogether a total of 115,500 units administered in twelve days. The serum used was the concentrated form supplied by the Department of Hygiene, University of Toronto, a supply of which the A.D.M. stores fortunately had in stock at the time.

On the third day after admission the patient's temperature rose to 101°, at which level it remained more or less constant for seven days, when it gradually declined and became normal on the twelfth day. Constipation was very marked for the first five days, and required treatment. Sleeplessness and restlessness were also marked during the same period. By the seventh day the trismus was slightly lessened and the teeth could be just separated. From the eighth day onwards the trismus and muscular rigidity steadily diminished and the patient improved, until, on the twentieth day after admission, all signs and symptoms of the disease had disappeared. Shortly after this date the patient was up, and after a brief convalescence he was usefully employed for several weeks helping to look after the other German patients in hospital.

The outstanding features of the case may be summarized as follows:

1. No evidence of injury.
2. Rigidity of muscles of neck (later of abdomen and limbs).
3. Marked trismus.
4. No respiratory embarrassment.
5. Mild nature of convulsions.

The type of case should be classified as one in which trismus occurred after other signs of tetanus had shown themselves. Local premonitory symptoms occurred in the following order: (1) Pain (in muscles of neck); (2) difficulty in swallowing; (3) muscular rigidity.

Accidents due to serum were absent. There was no anaphylactic shock; there was no reaction, as shown by the temperature, to the injection of the serum in large doses, and there were at no time any signs of a serum rash appearing.

Worcester.

L. T. CHALLENGER, M.R.C.S., L.R.C.P.

MASSAGE OF THE HEART AND RESUSCITATION.

I NOTICE that Professor Gunn, in his paper on massage of the heart and resuscitation (January 1st), expresses surprise that a mechanical pump is not used for artificial respiration in the human subject. I think that other anaesthetists will agree with me when I say that a pump for supplying intermittent inflation of the lungs is unnecessary. If a catheter is passed into the trachea with its distal end at the bifurcation, and if a continuous stream of air or oxygen (pure or etherized) is made to pass along it, the patient's colour will remain pink, and the pulse normal, even although no respiratory movements are taking place. This shows that there is sufficient interchange of gases to oxygenate the blood.

If, however, both pleural cavities are opened, and a very considerable pressure is required to inflate the lungs, it is necessary to let the pressure fall to zero from time to time, or the filling of the heart will be interfered with. Fortunately the number of operations in which this is necessary is small.

I have often thought that there are many other conditions in which insufflation of the lungs is indicated, but which until recently have been regarded as hopeless. For instance, a cerebral abscess or haemorrhage may have caused respiration to cease through increased intracranial pressure. If a tracheal catheter is at once passed, and the lungs inflated with oxygen, life may be maintained for a sufficient time for an operation to be performed.

A short time ago I was called to see a girl of 10 in *extremis* with bronchopneumonia and pericarditis. She was quite unconscious; the lips were purple, and she was giving about eight gasping respirations per minute. No carotid or radial pulse could be detected. I was struck with the similarity she presented to a deeply anaesthetized patient with a partially obstructed airway. In both there were two morbid conditions: (1) the obstruction, and (2) the toxin, which was chemical in one and bacterial in the