hypersensitivity the serum rarely contains sensitizing antibody in amount sufficient to sensitize the previously normal body." He further quotes the work of Chase (1945), who reported that guinea-pigs injected with a leucocytic peritoneal exudate derived from tuberculous hypersensitive guinea-pigs acquired, within one to three days, the capacity to react to tuberculin. This reactive capacity was of brief duration, and, curiously, could be conferred only by living cells. Freezing the cells of the exudate, or heating them to 48° C. for fifteen minutes, destroyed their sensitizing power.

The prompt reaction to the B.C.G. with local tissue destruction in our patient, who received *whole blood*, was identical with the Koch reaction, which is usually ascribed to a state of hypersensitivity (Rich and McCordock, 1929; Rich, 1930). Clawson (1933) found that the lesions produced by intravenous B.C.G. were more extensive and severe in previously sensitized rabbits than in the control animal.

Apart from the speeding up of the appearance and stages of the local reaction which we describe, there is no definite evidence that the B.C.G. vaccination was more pathogenic than usual. The subsequent gland abscess could fairly be regarded as a typical accepted complication. However, the extent of the induration (21 mm. diameter) resulting from 1/1,000 tuberculin is much in excess of the average seen after B.C.G. conversion. The glandular complication was not prevented by passive immunity, though the local fixation effect of agglutinating antibody received from the donors might have waned before a natural cellular reaction had time to develop.

Conclusion

In a case such as we have described one has to decide which of the following factors played a part: allergy and/or immunity; if allergy, from the cells and/or serum of a tuberculin-positive donor; if immunity, from a passive humoral agglutinating antibody reaction, with or without a cellular reaction.

Having regard to the opinions quoted above and to our investigations, the reaction appears to have been an immediate allergic phenomenon without obvious evidence of immunity, and was probably induced by the cells in the 600 ml. of refrigerated, but not frozen, blood received from the tuberculin-positive donors.

When, as at present, the study of allergy is of such general interest and importance, and when, in addition, immunization as a preventive measure on the one hand and desensitization as a therapeutic measure on the other are being advocated, this case, though a single one, seems to be worthy of record and consideration.

It is hoped that parallel findings by others will also be reported.

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Medical Memoranda

Herpes Zoster

Between October 1, 1948, and October 1, 1954, I attended 72 patients with herpes zoster (41 females, 31 males). Their ages ranged from 13 to 88 years, and more of these patients were over than under 50 (Table I).

TABLE I.—Ages in Decades

	1-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
No. of cases	0	4	5	2	5	15	20	16	5

The distribution of the rashes was as follows: trigeminal first division, 7 cases; second division, 2; third division, 3; cervical roots, 16; dorsal roots, 35; lumbar roots, 3; sacral roots, 6. There was some overlapping, as adjacent roots were often affected, and in one third-division trigeminal case the second cervical root was also involved.

Pre-herpetic pain varied from nil to severe, and was variously described as itching, irritation, "like a needle," neuralgia, burning, soreness, shooting, crushing bones, stomach-ache. Pre-herpetic symptoms were absent or negligible in 44 cases, slight or moderate in 21, and severe in 7. The longest period of pain before the onset of the rash was 10 days, the usual being two to three days (Table II).

TABLE II.—Pre-herpetic Pain in Days Before the Onset of the Rash

Days	Nil	1	2	3	4	5	6	7	8	9	10	Total
No. of cases	44	1	12	9	1	1	0	3	0	0	1	72

Pain during the stage of eruption varied from slight discomfort to severe pain, and the same descriptions were applied as for pre-herpetic pain where it had occurred. Eruptive pain was experienced by some patients who had had no pre-herpetic pain, and vice versa. The amount of rash varied within wide limits, but no relation was noticed between the extent of rash and the degree of pain. One man aged 26, with left intercostal (D 5) herpes, was dyspnoeic on exertion during the eruptive stage. Eruptive pain usually corresponded with the distribution of the rash, but in two supra-orbital cases the main pain was in the mastoid region. Two males with S4/5 involved had painful and difficult micturition during the eruptive stage.

Treatment was mainly symptomatic with powder, calamine lotion, or collodion, and aspirin, aspirin compounds, or "nepenthe" as required. Four cases received ultra-violet rays, three systemic penicillin (two oral and one parenteral), and one chloramphenicol at the onset of the rash. The reasons for giving these additional treatments were more experimental than clinical. In no case was the course of the disease apparently altered thereby, but it is interesting to note (see below) that two cases treated with ultra-violet rays developed post-herpetic pain and two did not, and the one case treated with parenteral penicillin developed post-herpetic pain, as did also the one treated with chloramphenicol.

The vesicles dried into scabs which separated in from five days to six weeks. Although the cases often appeared in batches of two, three, or four, with intervals of up to six months without a single case, no association was established with known chicken-pox epidemics.

Pain lasting more than six weeks from the onset of the rash, and severe enough to require advice or treatment, occurred in five cases—that is, one in 14. Three were males and two females. In each case this post-herpetic pain was a continuation of the eruptive pain and was of the same nature. In these five cases the ages and situation of the rashes were: aged 73, maxillary; aged 70, supraorbital; aged 70, occipital; aged 68, intercostal; aged 56, intercostal.

In the supraorbital case it has so far lasted for over three years, but in the others it tended to remit within 18 months. Two of these five had severe pre-herpetic pain, the other three had none.

No effective treatment for post-herpetic pain was discovered. The methods tried were analgesics, including aspirin and its compounds, opium, nepenthe, levorphanol tartrate, pethidine, local injections of procaine, deep x rays (two cases), short-wave therapy, ultra-violet rays, ultrasonics (one case), E.C.T. (one case), liver, posterior pituitary injection, ergotamine tartrate, dextroamphetamine sulphate, chlorpromazine. The deep x-ray therapy was given to the supraorbital and one intercostal case, the ultrasonotherapy and E.C.T. to the supraorbital case, the latter on account of mental depression. No relief of pain resulted.

Of these five cases with post-herpetic pain, as stated above, two had ultra-violet rays at the onset of the rash, one had parenteral penicillin at the onset, and one had chloramphenicol at the onset. No significance is attached to this, except to indicate that these measures did not prevent the development of post-herpetic pain. Four of the five were emotionally unstable individuals, and the fifth developed generalized neurodermatitis 18 months after the shingles. Eight others, in whom post-herpetic pain did not occur, were also regarded as neurotic or emotionally unstable.

I am indebted to Sir Charles Symonds for advice and criticism.
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Herpes Zoster after Fractured Spine Complicating E.C.T.

Since its introduction by Cerletti and Bini in 1938 electric convulsion therapy (E.C.T.) has been used widely and increasingly in the treatment of various forms of mental illness. Although vertebral fractures are now a well-recognized complication of E.C.T. they were not described until four years after its inception, because they are largely symptomless and discoverable only by radiography (Cook, 1944). The *British Medical Journal* (1954) states that the incidence of vertebral fractures as a result of unmodified E.C.T. is high, and Lingley and Robbins (1947) and Meschan *et al.* (1950) give the incidence as 21.3% and 35.4% respectively. All workers agree that complications of the vertebral fractures are extremely rare (Kitching, 1954). A case is described below in which herpes zoster appeared after a fractured spine resulting from E.C.T. I have been unable to trace any record in the literature of the occurrence of this particular sequence.

CASE REPORT

A man aged 29 suffering from schizophrenia was admitted to hospital on June 6, 1955. He was recommended for a course of E.C.T. Routine radiography of the spine showed no abnormality. He received his first treatment on June 27. After the third treatment, on July 1, he complained of pain in his back, and lateral and antero-posterior x-ray films were taken of his thoracic spine.

The x-ray report stated: "There is a slight upper dorsal scoliosis and there is wedging of the bodies of D4 and 5 and to a lesser extent of D3, the appearances being of a compression fracture. D3 is certainly involved, as there is some irregularity of its anterior margin. In the antero-posterior projection there also appears to be minimal lateral wedging of D6."

No further E.C.T. was given and the patient was seen by the orthopaedic surgeon, who advised no special treatment. The pain in the back gradually spread to the front of the chest, and on July 8 the patient reported the appearance of a rash running from the middle of his chest under the left armpit and on to the middle of the back as far as the spine. On examination there was an eruption of grouped vesicles upon an inflamed base involving the left second and third intercostal nerves. A diagnosis of herpes zoster was made. One week later the lesions were crusted for the most part, but the patient still complained of pain

which was severe enough to require an analgesic to enable him to sleep. By the end of July most of the crusts had fallen off and the pain had practically gone. However, the patient refused any further treatment, although his mental condition had not yet cleared up.

COMMENT

Herpes zoster appearing after injury to the vertebrae in the region of a ganglion was observed by Mitchell and Keen as far back as the American Civil War (Klauder, 1947), and Roxburgh (1941) states that it often follows injuries to the spine. In view of the vast number of patients treated with E.C.T. in the last 17 years and the high incidence of vertebral fractures as a result of this therapy it is rather surprising that there have been no cases similar to the one described above. It must be mentioned, however, that Kitching (1954) was impressed by the discrepancy of the figures given by different investigators for the occurrence of fractured spine following E.C.T. He says that these figures show all too convincingly that the radiological diagnosis of vertebral fractures is by no means an exact science.

As regards the zoster being a chance occurrence, Chalier and Martin (1932) formulated two circumstances in order to associate trauma with the presence of herpes zoster. Firstly, herpes zoster should appear in the region or within the range of the injury. Secondly, the disease should appear within one day to one month after the injury. These two conditions were satisfied in the above case.

The appearance of zoster following trauma to a nerve ganglion is ascribed to the awakening into activity of a dormant chicken-pox virus within the ganglion (Sequeira *et al.*, 1947), and in the case here described there was a history of chicken-pox occurring at about 8 years of age.

Finally, it may be mentioned that Meschan *et al.* (1950) reported that the incidence of vertebral fracture (radiologically shown) was reduced from 35.4% to 19.5% when curare was administered, and Kitching (1954) states that in all situations where time and space permit modified E.C.T. should be encouraged. In my case the use of modified treatment would possibly have prevented the occurrence of the fractured spine and hence averted the resulting herpes zoster.

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The Food and Agriculture Organization has established a number of fellowships with the object of fostering research in the field of food and agriculture. These fellowships will be called after André Mayer, who was closely associated with scientific research in France as well as with work in the international field, particularly in relation to F.A.O. The fellowships will be awarded for advance training in research work in fields of particular interest to member countries and to F.A.O. as a whole. Only persons with the highest qualifications who have already shown a strong inclination and a real aptitude for research and who would benefit from additional training will be selected. Five or six fellowships will be offered in 1956 and will be spread over the whole field covered by F.A.O.—i.e., agriculture, agricultural economics and statistics, fisheries, forestry, and nutrition. Further information can be obtained from the Secretariat of the F.A.O. National Committee for the United Kingdom, c/o Ministry of Agriculture, Fisheries, and Food, 10, Whitehall Place, London, S.W.1.