and does so with simplicity and certainty. I have never failed to obtain crystals in a known positive case. Occasionally an old stain may require a little longer treatment, but the result seems to follow just as surely. It must be emphasized that the reagent should be freshly prepared if prompt reaction is expected. It gives satisfactory results for about two months only, although I have obtained crystals using a solution six months old.

The method is as follows. With a sharp scalpel a portion of the suspected stain is scraped off the weapon or other article on to a clean slide. *The smaller the fragment the better.* The largest portion on the slide should not exceed about half the size of an ordinary pin's head. I find that the minute scraping which sometimes adheres to the scalpel usually suffices; this often has to be removed with another scalpel or some instrument possessing an edge. Taking care that this is not blown off the slide, a drop of Takayama's solution is placed on it and a cover-slip adjusted. It is important that the drop be not too large, otherwise the cover-slip will "float" on the surface, and the formation of crystals will be delayed. In the case of a stain on fabric a good method of procedure is to cut out the stained portion, and having placed it on the centre of a slide, to scrape gently the surface of the stain with a sharp scalpel until a few minute fragments of "fluff" are deposited on the slide; a drop of the solution is then added as before. It is necessary that the laboratory bench be free from air draughts, lest the material on the slide be blown away before the solution is added. On microscopical examination (which should be immediate), if the blood is present a distinct pinkish area will very soon be seen among the debris on the slide. As soon as this is identified the ocular of the microscope should be removed and the tube of a hand spectroscope with a wave-length scale inserted in its place. The characteristic bands of haemochromogen should be made out and the reading of the scale taken. Emphasis is laid on the necessity for immediate examination, as I have found that the spectrum is much more distinct and more surely obtained before crystal formation than after. Usually, if the blood stain is reasonably fresh, crystals will form in from two to five minutes, but it is well to leave a slide for re-examination some hours later before recording a negative.

The crystals are so characteristic in colour and shape that they cannot be mistaken by an observer with even a little experience. They are of a pink to salmon-pink colour, and in shape are flat and rhomboid. The ends of individual crystals are often splintered. Some crystals terminate in a blunt point like the blade of a pocket-knife; others, again, are quite rectangular. Seen on edge they are like sharp lines. There is a strong tendency to "sheaf" formation. The best crystals are the rather fine, separate ones seen off the edge of the fragment, actually in the solution, against a clear background. These take longer to form and are rather small, but are well worth study under the oil-immersion lens. Another characteristic type of crystal which I have seen occasionally is derived from fairly fresh blood stains. The crystals are curved instead of flat, and tend to lie so as to present their thin surfaces uppermost, the result being a number of fine, curved, dark pink lines, giving a most striking appearance to the microscopical field. Such crystals as do not lie completely on their sides may be seen to present the same rectangular structure, and there are practically always plenty of the more usual flat forms to be seen as well.

The colour change described by Kerr and Mason after the addition of Takayama's solution—namely, green-brown, dark red to pink—has not been observed, certainly by myself, but this does not seem of great importance. I have found the use of heat entirely unnecessary; where delay occurs in crystal formation I merely leave the

preparation at room temperature for fifteen minutes to half an hour, examining it at intervals. Should the material for study be scanty and crystals few and possibly very fine, necessitating the use of a high magnification, care should be taken to focus down very slowly and cautiously to watch for fine crystals on the surface of the preparation. Often this is the first place at which crystal formation occurs, and they may be picked up at this point many minutes before being seen at any other level in cases of difficulty. It is unfortunately very easy to focus past the surface and miss these crystals. Where they are slow in appearing I have found that they may at times be caused to appear by gently tapping the microscope stage.

GENERAL CONSIDERATIONS

Carried out in this manner we thus have a perfectly definite diagnostic triad: a colour reaction, the formation of specific crystals, and the production of certain bands at specific points in the spectrum. No other known substance but blood will give these three reactions in the circumstances described. If a positive result has been obtained in this manner no further test is necessary in order that testimony may be borne as to the presence of blood. In fact, it is bad practice to use other tests, the results of which may possibly be negative in the presence of blood and whose positivity does not alone justify one in affirming that the stain is of blood. Should such tests be negative or doubtful the positive evidence already obtained is immediately weakened in the eyes of a jury. Logically speaking, a test the results of which are open to criticism cannot strengthen the results of one possessing an absolute value. It is good practice, however, if sufficient material is available, to obtain a solution of the stain and to demonstrate, if possible, the spectrum of oxy- or methaemoglobin macroscopically and then by treatment with caustic soda and ammonium sulphide solution obtain the spectrum of haemochromogen. This, too, is also an absolute test for blood. Unhappily the material available is all too frequently insufficient for this procedure, and it is in such cases especially that the procedure described is invaluable.

No claim to originality in the use of the method is intended, but it is felt that a description of a good routine application of Takayama's solution is needed and that some such method deserves far wider usage than it appears to have at the present moment among those practising forensic medicine.

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TWO FURTHER CASES OF SARCOMA ASSOCIATED WITH KNOWN TRAUMA

BY

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In a recent article in the *British Medical Journal* I was able to record two cases of sarcoma in association with a known trauma. In the following note I propose to describe two similar cases, wherein two totally different organs were involved.

CASE I

In the first case the patient, a boy of 17, was playing with his dog in the garden when he received a blow on the right testicle. This was attended with marked pain and rapid swelling, which was treated as a traumatic haematocoele. As

the swelling did not subside he attended the out-patient department, and the swelling was tapped, yielding a few ounces of obviously altered blood. In spite of treatment the swelling continued to get larger at a rather more rapid rate. The following fortnight the patient commenced to feel unwell, remained in bed, his appetite failed, and he experienced intense thirst (15 pints per diem).

Physical examination revealed a well-nourished youth with a large right-sided scrotal swelling, which was somewhat opaque to transillumination, only slightly tender, and slightly fluctuant. On these grounds the swelling was provisionally diagnosed as a haematocele, and operation performed through a right inguinal incision, when a large tumour of testis and tunica vaginalis was exposed. This was removed as high as possible. The wound was closed with drainage for forty-eight hours.

As an immediate result of the operation the general symptoms were somewhat ameliorated until eighteen days later, when an acute facial diplegia occurred. This persisted in spite of treatment. Although there was rapid healing of local wounds there was soon ample evidence of pelvic secondaries, followed by pulmonary and spinal involvement. Death from exhaustion ensued approximately seven months after original accident.

Post-mortem Examination.—Extreme emaciation. There was a large sacral bed-sore, a well-healed inguinal scar, and a right-sided amputation of scrotum and testis. There was no abnormality in the alimentary or cardiovascular systems. Remaining structures of the uro-genital system were normal.

The osseous system showed a pathological fracture of right third costo-chondral junction, with secondary deposit locally. There were subdural miliary and plaque-like secondary deposits all over the skull and meninges, and numerous intramedullary deposits. The subdural growths involved the exits and meningeal sheaths of both facial nerves.

Several localized tumours were present in the cord at varying levels, and there were numerous pulmonary and pleural secondaries.

Lymph nodes showed abundant metastatic deposits, chiefly in the aortic and right inferior mesenteric chains.

Sections of primary and secondary growth showed a typical round- and spindle-celled sarcoma with extremely active mitosis.

CASE II

In July, 1931, a Sealyham bitch, aged 12, was chasing a rat in the garden when she staked herself on one left breast. The wound bled freely, and was dressed by the owner with a lysol dressing. The lesion healed by secondary intention, leaving rather a puckered scar. At the time of the original injury there was a good deal of bruising seen, and the swelling associated with this never subsided. The case was first seen by a veterinary surgeon in September, 1931, when the lesion was an enormous mammary growth, showing at its most prominent part a recently healed puckered scar. The tumour was excised under general anaesthesia, and the wound healed briskly by first intention.

In December, 1931, a swelling began to appear from under the ribs, the dog went off her food, and the swelling continued to increase in size. This was shown later to be a large secondary hepatic deposit. The animal died from asthenia and secondary liver growths in January, 1932. There was no post-mortem.

Examination of Specimen.—Large nodular encapsulated tumour of left mammary region—weight, 2 lb. (total weight of the animal, 12 lb.). The tumour bears on the cutaneous surface a stretched fibrous scar; the area of skin surrounding this is depressed, and sections taken at this point show a dense belt of fibrous tissue separating skin from tumour, which elsewhere pushes up immediately beneath the skin. Large areas of the tumour show yellow or haemorrhagic degeneration, with some hyalo-colliquative necrosis and cystic degeneration.

Microscopical appearances: In one area there is considerable epithelial hyperplasia, elsewhere the skin is thinned and atrophic. The cutaneous appendages extend well into the scar tissue. Some dilated, epithelial-lined spaces are seen; these are possibly of sweat-gland origin. The tumour itself is composed of spindle cells, sometimes closely packed, sometimes oedematous and interspaced with inflammatory cells. There is a certain amount of variation in cell size and form. Large vascular spaces, many formed of tumour cells, are

present. Much hyaline degeneration is also seen. The tumour is a fairly malignant spindle-celled sarcoma.

The cases, both of which have been confirmed by careful microscopical examination, are interesting from the point of view of the association of sarcoma and known trauma.

I am indebted to Mr. Dickson Wright for permission to publish Case I. I should also like to express my thanks to Mr. C. H. Bryans, M.R.C.V.S., of Bournemouth, who so kindly provided the history in Case II, as well as the pathological material.

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AMBULATORY TREATMENT OF VARICOSE VEINS BY COMBINATION OF LIGATION AND INJECTION

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Some disappointment is caused in certain cases of very extensive varicose veins by the difficulty experienced in inducing large veins to react to the various sclerosing solutions. It has been suggested that in these cases two solutions should be injected more or less simultaneously, so as to produce a precipitate of insoluble quinine salicylate crystals in the interior of the vein. I have always felt this to be a very dangerous procedure, for obvious reasons. Further, it is fairly certain that a considerable number of these large veins will recanalize after a time, even when they have been coaxed into thrombosing. Maingot¹ has recently said that 30 per cent. recanalize with sodium morrhuate injections, and Howard, Jackson, and Mahon² have found 98 per cent. to recanalize after sodium chloride injections in a careful analysis of forty-eight cases, followed for a year or more.

TECHNIQUE OF METHOD

Feeling that the solution of both problems lies in a combination of ligation and injection, I have used the simple technique here described for the ligation of varicose veins as part of the ambulatory treatment. The vein selected for ligation is the "parent" vein of a group of veins, and the most prominent, rather than the highest portion of it, is selected for ligation.

The skin is sterilized and anaesthetized with novocain solution. An incision half an inch long is then made across the line of the vein, and when the subcutaneous tissue is reached the small retractor, shown in Fig. 1, is inserted. (This instrument is an adaptation of Irwin Moore's beautifully designed laryngo-fissure retractor.) The vein is then picked up and freed from connective tissue, the retractor removed and turned round, and the prongs inserted under the vein and separated. Owing to the self-retaining nature of the retractor the vein is thus kept on the stretch and elevated out of the wound (Fig. 2). While so held, 2 c.cm. of 5 per cent. sodium morrhuate are injected into the lumen of the vein. The object of this injection is to "fix" the thrombus which will form, after the ligation, above and below the ligature. Two ligatures of catgut are now passed round the vein, at least an inch apart, and the vein divided between them