originated through iso-immunization in pregnancy, since it is known that it could not have arisen as a result of blood transfusion. This possibility is strengthened by the occurrence of a neonatal death (third pregnancy), although there is no proof that this was due to haemolytic disease caused by the action of the irregular agglutinins (anti-M) in the maternal serum. In relation to this possible explanation it is noteworthy that the next child's cells do not contain agglutinin M and are therefore compatible with the maternal serum; this would account for the absence of haemolytic disease in the fourth child even in the presence of maternal iso-immunization to agglutinin M. It is difficult to suppose, however, that if iso-immunization to M substance had arisen in a Type N Rh-negative woman from a pregnancy in which the foetus carried both M and Rh factors there would not have been simultaneous production of anti-Rh. In Wiener and Forer's case (1941) of iso-immunization by transfusion the Rh-negative Type N individual developed both anti-Rh and anti-M agglutinins. The frequency of anti-Rh antibodies arising from pregnancy or transfusion as compared with the rarity of anti-M agglutinins indicates that the Rh factor is usually a better antigen in man than the M substance. Since the children and mother all belong to Group O the antigenic qualities of Rh have the optimum conditions in which to exercise their effect, for it is recognized that iso-immunization to the Rh factor is more frequent when the pregnancy is homo-specific for ABO groups than when it is hetero-specific (Race, Taylor, Cappell, and McFarlane, 1943; Plaut, Barrow, and Abbott, 1945; Wiener, 1945). The fact that the fourth child, who is Rh-positive, did not suffer from haemolytic disease practically excludes maternal iso-immunization to the Rh factor as the cause of the loss of the third child, because once haemolytic disease has affected an Rh-positive child of an Rh-negative mother no subsequent Rh-positive child escapes haemolytic damage. If, therefore, iso-immunization to the Rh factor has failed to occur it is reasonably certain that the irregular anti-M agglutinin in this patient's serum is of natural rather than iso-immune origin.

Summary

A case is reported of anti-M agglutinins in the serum of an Rh-negative patient, and reasons are advanced for regarding it as of natural occurrence.

The work described in this paper was carried out under the supervision of Prof. D. F. Cappell, then Director of the East of Scotland Blood Transfusion Service, and I would like to thank him for his interest and criticism.

REFERENCES

- Landsteiner, K., and Levine, P. (1927). *Proc. Soc. exp. Biol.*, N.Y., **24**, 600, 941.
 Plaut, G., Barrow, M. L., and Abbott, J. M. (1945). *British Medical Journal*, **2**, 273.
 Race, R. R., Taylor, G. L., Cappell, D. F., and McFarlane, M. N. (1943). *Ibid.*, **2**, 289.
 Singer, E. (1943). *Med. J. Austral.*, **2**, 29.
 Wiener, A. S. (1942). *Amer. J. clin. Path.*, **12**, 302.
 — (1943). *Blood Groups and Transfusion*, 3rd ed., Springfield, Ill.
 — (1945). *Proc. Soc. exp. Biol.*, N.Y., **58**, 133.
 — and Forer, S. (1941). *Ibid.*, **47**, 215.

Medical Memoranda

Treatment of Chilblains by Paravertebral Sympathetic Block

In an article by Morris (1942) on the treatment of thrombophlebitis by paravertebral sympathetic block it was suggested that the condition is alleviated by the reduction of arterial and venous spasm, particularly the former.

Having a number of cases of severe chilblains which had resisted the usual forms of treatment, such as the administration of calcium orally and intramuscularly, I wondered whether a paravertebral block might not relieve and even cure the symptoms. On theoretical grounds it seems probable that in cases of defective circulation in the limbs the cold atmospheric conditions give rise to arterial and venous spasm. The spasm results in suboxygenation of the tissues, which of itself gives rise to further vascular spasm. This vicious circle is broken by the sympathetic block, and the circulation is restored to normal. Once having been restored it remains normal for a considerable period. Again on theoretical grounds, it would seem likely that the relief of the spasm by a short-acting local analgesic should

not outlast the duration of analgesia, but in the following series this has not proved to be the case.

METHOD

The technique used is a slight modification of that summarized in M.R.C. War Memorandum No. 13 (1944). The analgesic employed has been amethocaine 1/1000 plus adrenaline, the effect of which lasts about two and a half hours. An hour before the injection the patient is given a hypodermic injection of morphine gr. 1/4 or 1/6. With the patient sitting, a 10-cm. needle is inserted four fingerbreadths from the midline at an angle of 40° to the sagittal plane at the level of the interval between the second and third lumbar spinous processes. It is pushed forwards and medially until it strikes the lateral aspect of the vertebral body. It is then withdrawn a little and re-inserted until it comes to rest in contact with the antero-lateral aspect of the vertebral body. It is pushed forward a further 1 cm. The stylet is withdrawn to make sure that the needle has not perforated a vessel. 20 c.cm. of the amethocaine-adrenaline solution is injected, and almost immediately there is a feeling of warmth in the ipsilateral lower limb. This feeling persists for the period during which the analgesic is effective. I have not yet attempted to use alcohol—first, because of fear of inaccurate placing of the solution; and, secondly, because it has not been necessary.

Of the eight cases treated six have proved to be cured throughout the whole of the winter months. The two most interesting cases were those of women, both of whom were deputizing for their husbands in butchers' shops as a war measure. After one injection these women were able to return to work in the shop with no discomfort, although cold and snowy weather persisted on and off for several weeks afterwards. Another patient was very neurotic and was unable to sit still while the injection was given. One woman recorded a certain degree of analgesia of both legs, obviously due to inaccurate placing of the solution; but it passed off after two hours, and a lasting relief of her chilblains followed.

The technique of the injection is not difficult to acquire after a little practice, and the results are so good for such a long period that it is well worth the time required to perfect it.

My experience suggests that there is a field for further investigation, not only in the treatment of chilblains but in other conditions where defective circulation appears to be due to vascular spasm.

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REFERENCES

- Morris, J. Nicholson (1942). *Curr. Res. Anesth. & Analges.*, **21**, 137.
 M.R.C. War Memorandum No. 13, "Arterial Injuries," 1944, p. 22, London.

Acute Haemolytic Anaemia due to Sulphonamide Administration

The following case illustrates well the acute and dangerous nature of this rare complication of sulphonamide administration—two-thirds of the patient's blood being destroyed by haemolysis in two days. The remarkably quick and complete recovery after cessation of sulphonamide administration and after blood transfusion is also typical.

CASE RECORD

On the evening of Sept. 11, 1944, a South African air mechanic aged 22 sustained minor second-degree burns of both legs from a petrol fire. He dressed himself with gentian violet and did not report sick until morning, when he was admitted to hospital. On admission his temperature was 100° F. His burns were cleaned with saline, dead skin was removed, and flavine in saline was applied. They were then lightly dusted with sulphanilamide powder and dressed with vaselined gauze. In view of his temperature he was put on a course of prosectasine (benzyl-sulphanilamide) by mouth also (1 g. 4-hourly). From then on, his clinical course was as follows:

Sept. 13.—Perfectly comfortable. Temperature normal.

Sept. 14.—Feeling rather miserable. Slight headache. Temperature 99.2° in evening.

Sept. 15.—Complained of feeling very weak, headache, and pains in both loins of a dull aching character. Complete loss of appetite. His burns were re-dressed in the morning as he complained of pain in the legs; they were perfectly clean. (Dressed with flavine—dusted with sulphanilamide powder—vaselined gauze.) Early in the afternoon he passed a quantity of urine which was deep red in colour and translucent. At the same time it was noticed that his conjunctivae were yellow. *Pathological reports* were:—(i) Urine: Alkaline; albumin +++; few leucocytes; few epithelial casts; bile, nil; alcoholic amidopyrine test, +, +, +. (ii) Blood (slide only): A marked poikilocytosis and anisocytosis, and polychromasia of the red cells; a few megaloblasts and normoblasts; no malaria parasites. Administration of prosectasine was stopped as soon as the haemoglobinuria was noticed. He had by then received a total

of 17 g. in 3 days, plus a small amount of sulphanilamide locally on the burns (estimated at approximately 3-4 g.).

Sept. 16.—Temperature 100° F.; pulse 88. Felt very ill. Marked anorexia and nausea. Obvious icterus—lemon-yellow colour. Pains in loins ++, and tender on palpation over kidneys. Spleen and liver not palpable. Urine still a deep-red colour. Treatment: Fluids ++++; sod. bic. 30 gr. 4-hourly; burns were re-dressed to wash away all trace of local sulphanilamide; burns clean. Full Blood Examination:—R.B.C., 2,280,000 per c.mm.; W.B.C., 36,000 per c.mm.; Hb (Sahli), 55%; C.I., 1.2. Red cells: Anisocytosis, poikilocytosis, polychromasia of severe degree; megaloblasts and normoblasts in great numbers. White cells: polymorphs, 70%; monocytes, 10%; lymphocytes, 20%; no eosinophils or basophils seen. During the afternoon he was finding it difficult to drink enough fluid on account of nausea and occasional vomiting, so he was given 3 pints of fluid (glucose-water 2 pints, glucose-saline 1 pint) intravenously.

Sept. 17.—Symptoms exactly the same as on the 16th; felt very weak and looked very yellow. Urine: Alkaline; very deep red colour—translucent; few red cells; few leucocytes, no casts; alcoholic amidopyrine test, ++++; albumin, ++++. Blood: Hb, 32%; Group O (IV). In view of the haemoglobin level a transfusion was considered necessary. During the afternoon he was given two pints of Group IV blood by slow drip, followed by one pint of glucose-water. After the first half-pint of blood he suddenly felt much better and began to talk cheerfully.

Sept. 18.—Much better. Appetite returning. Still slight icterus of conjunctivae. No tenderness over kidneys—no pain in loins. Morning urine—light-red colour; afternoon urine—clear. Blood (afternoon): Hb, 37%; W.B.C., 13,900 (polymorphs 68%, lymphocytes 25%, monocytes 7%); R.B.C., 2,300,000 per c.mm. Red cells: Cells improved in appearance—poikilocytosis, etc., much less; very few normoblasts and megaloblasts seen (much fewer than in last film).

Sept. 19.—Felt well and cheerful, though still weak; appetite normal. Urine: Clear; alkaline; albumin, faint trace. Sugar, nil; no blood or casts; few leucocytes only.

A final blood examination, made on Sept. 22, was as follows: R.B.C., 2,910,000; Hb, 58%; C.I., 1.0; W.B.C., 23,000 (polymorphs 74.5%, lymphocytes 20%, monocytes 5%, eosinophils 0.5%); no megaloblasts, normoblasts, or myelocytes seen. Fragility: normal—haemolysis in 0.3% saline.

His further clinical course was uncomplicated, and he was discharged back to duty five days later.

This man had never previously been ill, and was quite certain that he had never been given sulphonamide drugs before. It is regretted that no further investigation could be made, as the case occurred in a mobile field hospital of the R.A.F. on active service.

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BIBLIOGRAPHY

- Bennett, J. T., and Ware, R. L. (1941). *U.S. nav. med. Bull.*, **39**, 119.
Gilligan, D. R., and Kapnick, I. (1941). *New Engl. J. Med.*, **224**, 801.
M.R.C. War Memorandum No. 10, 1945, "The Medical Use of Sulphonamides," London.

Duodenal Atresia in a Newborn Infant

Successful treatment of this condition is, I believe, uncommon; the following case may therefore prove of interest.

CASE HISTORY

The baby, a male, was born on May 26, 1945, in the Royal Maternity Hospital, Belfast. The weight at birth was 8 lb. 2 oz. There were two previous children, both normal and healthy. On the first day he vomited fluid which was viscous and stained with bile. The vomit was projectile in character and was more severe on the following day. Meconium was passed on the third and fourth days, and as the vomiting was still more pronounced a barium-meal examination was made. This showed almost complete gastric retention at four hours.

The baby was transferred to the Belfast Hospital for Sick Children, its weight having fallen to 6 lb. 4 oz. There was some distension of the upper abdomen, and increased gastric resonance was noted on percussion. The general condition was fairly good, although dehydration was obvious. It was decided to attempt gastro-enterostomy, and dehydration was combated by subcutaneous infusion. Laparotomy was performed (Mr. J. S. Loughridge), when it was found that the stomach and first part of the duodenum were much dilated. There was a good deal of matting of the small intestine by adhesions. The caecum was freely mobile and was situated in the mid-abdomen. A side-to-side gastro-enterostomy was done between the stomach and jejunum. The operation time was 35 minutes.

Apart from considerable shock after operation, progress was uninterrupted. Thirst was relieved by half-normal saline by mouth, and next day breast milk was given by means of a Belcroy feeder. On the fourth day success was assured, and a gain in weight of 10 oz. was recorded. The baby was discharged home on the seventh day after operation. Progress has been uninterrupted, a steady gain in weight being reported.

I wish to express my thanks to Dr. F. M. B. Allen and Mr. J. S. Loughridge, under whose care the infant was, for permission to publish these notes.

Belfast.

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Reviews

SURGERY OF THE HAND

Surgery of the Hand. By Sterling Bunnell, M.D. (Pp. 734; illustrated. 72s.) London: J. B. Lippincott Company.

Dr. Bunnell's remarkable book is the outcome of a life devoted to one special field of surgery, and it is a brilliant achievement. Most people accept their hands without any thought of the amazing complexity of their mechanism or of what a deformity or an injury may mean. To most surgeons this book will be a revelation.

The author has attacked his subject with massive thoroughness. Starting with the study of comparative anatomy, he then discusses the normal mechanism of the hand and methods of examination in great detail, and these chapters are ingeniously followed by a chapter on the reconstruction of the hand to restore its normal mechanism. The correction of deformities, whether due to contractures of the soft structure or to abnormalities of the bones, is then discussed. There follows a chapter on the repair of injured nerves, evidently the result of wide experience, and the author then takes up the even more difficult problem of the repair of tendons and of the intrinsic muscles of the hand. A large section follows devoted to the mechanism of injuries and to infections of the hand and their modern treatment, and the volume ends with a discussion on congenital deformities and of neoplasms.

So far as we are aware no book has ever been produced dealing with such thoroughness with injuries of the hand, and certainly none which so impresses upon one the vast importance of this subject. The author seems to deal with nerve injuries, deformities, and infections with equal facility, and perhaps the chief attraction of the book is that it so obviously all arises from his own experience. It is impossible to give any idea of the vast amount of detail which he has brought together, or of the minuteness with which the most complex procedures are described, but so thorough are the descriptions that any competent surgeon will be able to carry out in his own practice every operation. The illustrations throughout are superb, whether they are photographs or diagrams to explain minute points of detail. We would congratulate the author on a magnificent achievement, and urge any surgeon who ever has to operate on a hand to make his own the vast experience recorded in this volume.

MICROBIAL ANTAGONISMS

Microbial Antagonisms and Antibiotic Substances. By Selman A. Waksman. (Pp. 350; illustrated. \$3.75.) New York: The Commonwealth Fund. 1945.

To see penicillin in correct perspective it is necessary to understand that it is only one, though therapeutically the most useful, of many similar substances formed by micro-organisms. That antagonism between different species is expressed in the formation of such substances has been recognized since the earlier days of Pasteur's work. For a broad conspectus of this phenomenon, long neglected in its wider aspects, and now exciting the liveliest interest, we can recommend Selman A. Waksman's new book, *Microbial Antagonisms and Antibiotic Substances*. The author is microbiologist to the New Jersey Agricultural Experimental Station; he has done important work in identifying antibacterial substances produced by *Actinomycetes*, and is largely responsible for popularizing the use of the word "antibiotic." He almost reconciles one to its use by contrasting "antibiosis" with symbiosis, these being two opposite forms of mutual relationship which mixtures of microbic species may exhibit in Nature. The subject is approached by way of the flora of soils and water and the competitive or antagonistic interrelationships which exist between the species found there. Methods of isolating and testing antibiotic substances are then described, following which there are accounts of those produced by bacteria, *Actinomycetes*, and fungi; the numbers of these hitherto identified are given as 11, 7, and 15 respectively, but it need scarcely be said that besides these adequately studied and characterized products there are believed to be many others. Other chapters deal with the chemical nature of these products, their mode of action,