# False Positive Serological Reactions in the Diagnosis of Syphilis

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OF the many problems that confront the general practitioner, one of the most perplexing is the interpretation of a positive serological test for syphilis on a specimen of blood from a person who shows none of the usual clinical features of syphilis and no history of infection. What is the busy physician, who makes no pretense of being an expert syphilologist, to conclude, or what may be the best procedure to follow when the laboratory report is not confirmed by clinical findings.

It may be stated at once that there is no serological test for syphilis, among the scores that have been devised during the past thirty-nine years, that is truly pathognomonic of that disease. They are, all of them, empirical tests that are usually positive as the result of syphilitic infection, sometimes negative in infected persons and occasionally positive in persons in whom no infection has ever occurred.

The idea of serological tests for syphilis grew out of a discovery by Bordet —the immunological principle of "complement fixation" in which an antigen, when combined with its homologous antibody, acquired the property of "fixing" or removing free complement from a saline solution. It was suggested that this principle might provide the basis for a diagnostic test in syphilis; the antigen being obtained from the Treponema pallidum and the antibody from the serum of the syphilitic patient. As it was impossible to obtain the Treponema pallidum in pure culture, an extract of syphilitic foetal liver containing vast numbers of the spirochaetes was substituted as the source of the antigen. Wassermann and, independently, Detre in 1906 put the theory to the test and it worked! The Wassermann test was thus thought to be a specific immunological reaction and its diagnostic value was quickly confirmed, yet within a single year the specific basis on which the test was presumably founded was shown to be erroneous. The "antigen" supposed to have been derived from the teeming spirochaetes in the syphilitic liver could be obtained in much greater abundance from normal tissues such as heart muscle. The Wassermanntest was, therefore, not a specific antigen-antibody union but rather a reaction between lipoid substances extracted from normal heart muscle and some unknown constituent in the blood of syphilitic persons which, for want of a better name, we still call "reagin." Other tests, such as the Kahn, Hinton, Eagle, etc., were soon developed and, while they differ in sensitivity, they all represent only minor modifications of the basic principle which controls the mechanism of the Wassermann test—a mechanim which is as yet not clearly understood. The wonder is that such a high degree of sensitivity and specificity has been attained in these tests not that in certain cases or in a relatively small number of diseases "false positives" may occur and must be interpreted with all the skill and acumen the physician can bring to bear

on the problem, for it is essentially a clinical problem rather than a laboratory one.

"False positive" serological reactions (the term is a poor one because the tests are nonspecific) can conveniently be divided into two types—Technical and Biologic. In the technical variety there is implied some mistake in the actual performance or reporting of the test or in the collection of the specimen. That this is possible can be shown by having two capable technicians working independently perform and read the same test on the same blood specimens in the same laboratory. If such a series is a large one some discrepancies will result, usually of a minor nature but not always so. The reaction is not a simple one like the chemical combination of silver nitrate and sodium chloride and minor factors like the temperature of the reagents or even of the room in which the test is done, may modify the intensity of the reaction. A more common source of error arises from unlabelled or mislabelled specimens. Seldom does a day pass in this laboratory that we do not get a specimen labelled with a certain name and accompanied by a data sheet on which a different name is given. Bloods showing haemolysis or chyle or chemicals introduced in the collecting syringe or container may adversely alter or make it impossible to read the result properly. It is chiefly for these reasons that positive reports must ALWAYS be repeated for confirmation unless supported by definite clinical evidence of syphilis.

Biologic "false positive" reactions are much more frequently encountered than the technical type. They are caused by the presence of "reagin" or some substance closely resembling it in the blood as the result of a variety of pathological conditions other than syphilis; or, in rare cases, by a measurable amount of reagin in an apparently normal, healthy individual. Eagle and others state that it may rise to a level that can be detected by the diagnostic tests in perhaps one person out of 4000. It is also well established that the sensitivity of screen, presumptive or exclusion tests can be stepped up to such a degree that the serum of 15 or 20% of healthy persons will show borderline positive or doubtful results. As the sensitivity of such tests is increased, there is a corresponding and accelerated decrease in the all important specificity of the test. This is why positive or doubtful results obtained with such sensitive "screen" procedures should never be reported to or accepted by the physician.

While "reagin" may be present in measurable quantities in the blood of a very small number of normal individuals, it is the high level resulting from diseases or conditions other than syphilis that is the casue of the great bulk of these vexing reactions. It has been evident for many years that diseases such as malaria, yaws and leprosy are usually characterized by positive serological reactions when there is no evidence whatever of syphilis, a fact to be remembered following demobilization of troops who have seen service in areas where malaria is endemic. In this laboratory "false positive" reactions have been demonstrated with considerable frequency in atypical (virus) pneumonia, infectious mononucleosis, upper respiratory infections and sinusitis, malaria, mumps, following successful smallpox vaccinations and in other conditions of undetermined origin. There is considerable evidence in the literature on the subject to indicate that anti-typhoid inoculation, lymphocytic choriomeningitis, relapsing fever, rat bite fever, the administration of serum and several other pathological conditions may be characterized by a confusing serological pattern. The evidence is much less convincing in tuberculosis and

febrile conditions, malignancy (every one is familiar with the frequency with which carcinoma of the tongue is associated with a positive blood test) undulant fever, jaundice and pregnancy; all of which indicates the care that must be exercised by physicians when they encounter confirmed positive or doubtful tests in patients in whom no clear history or clinical evidence of syphilis is easily elicited. In such cases it is indefensible to make a diagnosis of syphilis on a blood test alone without a most painstaking and often prolonged investigation, but it is almost equally indefensible to dismiss the positive case with the pious hope that this is just another false positive. Furthermore the fact, that in clinically non-recognizable or latent syphilis the positive blood test may be almost the sole evidence on which the diagnosis is based, affords little comfort. It is indeed an astute physician who treats the patient, not his blood test.

A word should be said about blood tests in pregnancy and the newborn infant. While there is no clear evidence that the pregnant state per se induces any change in the serological pattern, blood tests on cord blood or on the young infant must be interpreted with due regard to the serological state of the mother. The children of syphilitic mothers who have been given early and adequate antisyphilitic treatment in the prenatal period are nearly always non-syphilitic, yet many of them show a positive blood test. This is due to the placental transfer of reagin from the mother. In such cases the blood of the infant reverts to negative without treatment usually in a period of one or two months. If the titre does not drop or rises in that period, the child is probably a congenital syphilitic.

With all this discussion of the "false positives" something should be said of the "false negative" reaction in syphilis. When properly conducted and sensitive diagnostic tests are employed about 90-95% of clinically active cases of syphilis will show a consistently positive serological test in blood or spinal fluid. The 5-10% which may remain negative with an equal consistency is significant and a diagnosis of syphilis must not be withheld in the presence of definite clinical signs because of a negative serological test.

Having enjoyed relatively little clinical experience over the past twenty years, it would be presumptuous of me to venture to advise or even to express my own opinion on the best approach towards the investigation that leads to the solution of this problem and the diagnosis that will serve in the best interests of the patient. Every case of this kind is an intensely individual one. In any event I could do no better than to outline the course of investigation as suggested by Moore, Eagles and Mohr who speak and write on this subject with the authority that arises from painstaking study of their extensive experience. They offer the following suggestions:

1. Careful history and clinical examination as to syphilis and also as to possible intercurrent infection with particular reference to those conditions which are known to be the cause of biological false positive reactions.

2. Laboratory studies that would include examination of blood smears for malaria parasites, differential blood counts for possible infectious mononucleosis (a much more common disease than is commonly realized), blood tests for heterophile antibodies and the sedimentation rate.

3. Repeated serologic tests by several technics preferably including both a Wassermann and flocculation test at least one of which should be quantitatively titred. If possible, duplicate specimens should be sent to another

laboratory to exclude possible laboratory error. A continuously falling titre in the absence of antisyphilitic treatment suggests a biologic false reaction due to some intercurrent condition other than syphilitic infection. Prolonged serologic follow-up, for months if necessary, is clearly indicated. (In this laboratory quantitatively titred serologic tests are available on request but the total number that can be done is limited at present by the shortage of the highly trained personnel necessary and the priority granted to members of the armed services particularly on demobilization.)

4. The cerebrospinal fluid should be examined if there is no obvious explanation for the supposed false positive result, as a significant proportion of these persons are actually cases of asymptomatic neurosyphilis.

5. Clinical and serologic examination of members of the family and sexual contacts.

Finally let me make a plea for a more reasonable response on the part of some physicians towards laboratory investigations in general. We know there are those who invest all laboratory investigations with a halo of infallibility and others who regard all such tests with an air of suspicion particularly when the results do not agree with their opinion of the pathological processes involved. The two extremes of the swing of the pendulum are involved, Laboratory or X-ray or, for that matter, individual findings elicited by clinical examination should be assessed for what they really are—additional pieces of informaion that, together, pave the way towards a correct diagnosis, some of which may obscure but much more often clarify the way. Relatively few of the myriads of laboratory tests are entirely pathognomonic of any particular pathological process. The isolation of typhoid bacilli from the blood stream is pathognomonic of typhoid fever, a definite diagnosis can be based on that information in the absence of other findings; but who would venture to speak with the same assurance with respect to positive widal tests or the repeated isolation of typhoid bacilli from the faeces of his patient.

# Congenital Polycystic Kidneys

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DURING the past ten years, at St. Joseph's Hospital, five cases of polycystic kidneys have come to operation or post mortem. The condition has been found, according to different observers, from 1 to 5.6 times in every thousand deaths coming to post mortem. Three of our cases came to operation while in the other two the condition was only recognized at post mortem.

The youngest was eighteen days and the oldest thirty-eight years. The condition has been found in stillborn infants, but most often in old age. If these patients pass childhood, they are generally symptom free until the fourth decade. Apparently life depends upon the amount of uninvolved kidney substance. The infant in this series had absolutely no kidney parenchyma as far as could be recognized in examination of the gross specimens which were translucent and two or three times the normal size.

An interesting feature about this condition is that it is often accompanied by other congenital deformities and cystic disease. Case No. 3 has a bilateral congenital dislocation of the hip, and Case No. 5 has idiopathic epilepsy. It would appear that the fundamental cause of polycystic disease of the kidney must be in the germ plasm. This is borne out by finding the condition in the foetus, the newborn, and throughout life, but generally after thirty years of age. Like other congenital deformities it has been noted to run in families. We were unable to confirm this hereditary tendency in our cases.

Although the condition may be more marked on one side than the other, as was borne out by our cases that came to operation, it is always bilateral and is a different condition from the unilateral solitary or multilocular cysts occasionally found.

The size of the individual cysts varies from that of a pinhead to those several centimeters in diametor. The ones we have seen have been thin walled, containing clear or straw colored fluid of a watery nature, although sometimes the contents are darker and form a jellylike mass. The kidneys in the far advanced adult type resemble a bunch of large pale grapes that have become adherent to one another. The unincised specimen appears to contain no kidney substance as the whole surface is made up of cysts. Of course there is some functioning tissue between the cysts in those that live. The cysts themselves do not communicate with the kidney pelvis unless injured or infected. These kidneys are always enlarged, sometimes enormously so. That in case No. 5 weighed four and one-half pounds, but the Mayo Clinic reports a case each kidney weighing seventeen pounds.

CASE No. 1—Mr. K. K. Admitted June 22, 1935, age 35. Lived one hour. Three hours before admission seized with severe headache, then rapidly passed into coma, with rapid noisy shallow breathing. He became quite cyanosed before death. Spinal puncture showed bloody fluid under pressure. Post mortem examination revealed subarachnoid hemorrhage and polycystic kidneys of moderate size. This man was apparently healthy and not known to have hypertension.

CASE No. 2—Baby T, male, age 6 days. Admitted April 6, 1940, expired April 18, 1940. Born March 31st. Normal delivery. Well developed baby,

apparently normal in every way. Admitted to the hospital with history of not having voided. Catheterization failed to obtain urine. Repeated catheterizations following the subcutaneous injection of fluids failed to show any excretion of urine. The injection of 5 c.c.'s of Diodrast intravenously failed to reveal any kidney function. The intravenous injection of methylene blue was excreted by the bowel after considerable delay. The child lived eighteen days and never excreted any urine. Post mortem examination showed the kidneys to be enlarged about twice their natural size and to consist entirely of thin walled cysts. No kidney parenchyma was visible.

Case No. 3—Mrs. P. F. Age 30. Gravida VII. Admitted to hospital May 24, 1940, for incomplete abortion. A firm and slightly movable mass was found in the left upper quadrant protruding from under the lower ribs anteriorly. She complained of pain on deep pressure to the left of median line at the level of the umbilicus. X-ray examination after the injection of Diodrast showed no appreciable delay in the concentrating power of either kidney. There was X-ray evidence of tumor or cyst formation of both kidneys but much more marked on the left side. After recovery from the abortion she complained of a dull pain in the left lower quadrant and the mass was more easily palpated. On June 22, 1940, a large polycystic kidney the size of a grapefruit was removed from the left side. The urine and blood pressure was normal. This woman has a bilateral congenital dislocated hip. Since her operation her health is fair.

Case No. 4—Mrs. C. C. Age 38. Admitted October 28, 1940. Complaining of pain in the left kidney region. Swelling of hands, puffiness of lower eyelids, headache, dimness of vision. Urinalysis showed a slight trace of albumen and two to four pus cells per field. X-rays showed large pathological kidney on the left side with some deformity of the calyces and pelvis on the right. On November 4th, a large polycystic kidney was removed from the left side.

Case No. 5—Miss F. D. Age 37. Admitted August 7, 1943, complaining of a mass in the left flank accompanied by pain extending down into the lower abdomen. Patient had noticed the mass for two years. She claimed pain was becoming progressively worse and was accompanied by marked frequency. This patient had been subject to marked epileptic seizures since childhood and claimed they were brought on by the pain. X-ray examination showed very poor visualization of the kidney pelves especially on the left side. The right kidney pelvis and calyces were also markedly deformed. The blood pressure was 138/90. The urine contained two plus albumen and twelve to fourteen pus cells per high power field. N.P.N. 40.9 mgs. Creatinine 1.4 mgs. Urea Nitrogen 19.5 mgs. Operation on August 11th, a very large polycystic kidney weighing four and one-half pounds was removed from the left side. The epilepsy was not cured.

# The Rh Factor

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THE Rh factor was discovered in 1940 by Landsteiner and Wiener.[1] This was accomplished by injecting rabbits with the blood of the Rhesus monkey and in this way obtaining an antiserum. This antiserum, as was to be expected, clumped the cells of all Rhesus monkeys but in addition the cells of about 85% of humans. The common agglutinogen thus identified was designated Rh because of its presence in the cells of the Rhesus monkey. The 85% of persons who have the Rh factor in their blood cells are called Rh positive, the remainder are Rh negative.

The present status of the Rh factor may be summarized as follows: (a) It is an antigenic substance present in the red cells of about 85% of humans comparable to other agglutinogens A, B, M, N, etc. (b) It differs from factors A and B, however, in that no *normal* Anti-Rh agglutinins ever occur against it. Thus blood Group A contains an agglutinin for Group B cells and vice versa but the serum of Rh negative individuals never normally contains agglutinins capable of clumping the cells of Rh positive persons. (c) The Rh factor is inherited as a Mendelian dominant as are factors A, B, etc. Before sub-groups of Rh had been recognized, it was assumed that inheritance was by means of two allelomorphic genes, Rh and rh, Rh representing the positive character and being dominant over rh, the negative character. Thus Rh positive individuals might have as their genotype RhRh (homozygous) or Rhrh (heterozygous), while Rh negatives could have only rhrh. It has been recently shown by Wiener[2] that not merely a single Rh factor but instead five sorts of Rh agglutinogens can be identified. According to his theory, these agglutinogens and the Rh negative type are inherited as a series of six allelomorphic genes named $Rh^1$, $Rh^2$, $Rh_0$, $Rh''$, $Rh_0$, and rh. Under this theory eight Rh blood types should exist and of these all but the rarest type Rh′ Rh″ (calculated frequency 1: 10,000) have actually been encountered. This theory appears to be firmly established and along with the A, B, O. groups and M, N types, use of the Rh tests raises the chances of excluding parentage in medico-legal cases from 33% to almost 45%. (d) Antibodies formed in response to the Rh antigen are called anti-Rh agglutinins. Such agglutinins cannot develop in a person with Rh positive blood and never occur *normally* in Rh negatives. There are two conditions however, in which anti-Rh agglutinins may be produced:

(1) Repeated transfusions of Rh positive blood to an Rh negative recipient.

(2) An Rh negative mother carrying an Rh positive child. It is because of the possible production of anti-Rh agglutinins under these two conditions that the Rh factor has become of definite clinical significance. The wide interest shown in the factor since its discovery is due to the fact that it makes clear certain hitherto unexplained transfusion reactions and has become the basis for the present concept of the etiology of erythroblastosis foetalis. Each of these entities will now be discussed briefly.

## Relation of the Rh factor to Transfusion Reactions

The occurrence of hemolytic transfusion reactions in patients receiving blood from their own group had frequently been reported prior to the discovery of the Rh factor. Such reactions were in general of two types: (1) In most cases the recipients had received several uneventful transfusions, then one or more mild reactions and finally a severe hemolytic and sometimes fatal reaction occurred. (2) In other cases the first transfusion was followed by a severe hemolytic reaction. It was observed that the majority of these reactions following a first transfusion occurred in women soon after delivery or following an abortion.

The role of the Rh factor in such unexplained accidents was first demonstrated by Wiener and Peters.[3] In the typical case, the patient is Rh negative and becomes sensitized to the Rh factor either as a result of repeated transfusions of Rh positive blood or by pregnancy with an Rh positive foetus (see below). The existence of sensitization to the Rh factor can often be detected by demonstrating the presence of Rh antibodies in the patient's serum. Once such sensitization has occurred and the patient has developed anti-Rh agglutinins, administration of a further transfusion of Rh positive blood, even though it is of the same group, can be as disastrous as the giving of Group B cells to a Group A recipient whose serum normally contains anti-B agglutinins. The amount of Rh positive blood and number of transfusions necessary to produce antibodies are not established but are probably subject to wide variation. In a recent series of cases observed by Levine,[4] reactions occurred following the administration of four to twenty transfusions over a period of four weeks to twenty months. In women who have never borne children and in men, at least two transfusions have preceded the reaction in practically all cases. Final proof of this Rh factor incompatibility is provided when Rh negative patients who have shown severe reactions to transfusion with Rh positive blood have subsequently been transfused safely and beneficially with Rh negative blood.

(It should be noted that in such transfusion reactions, the routine cross matching revealed no incompatibility. Routine grouping and cross matching are done with slides and at room temperature. Testing for the Rh factor and for anti-Rh agglutinins, however, requires special and more sensitive technique. It is carried out in test tubes at incubation temperature followed by centrifugation. Agglutinins to factors A and B have a much higher titre than anti-Rh agglutinins and are active over a wide range of temperature. Anti-Rh agglutinins react best at body temperature so that at room temperature with ordinary technique anti-Rh agglutination may be difficult to detect or absent.)

The second group of severe hemolytic reactions observed were those following a first transfusion. Such reactions occurred mainly in pregnant women during or following delivery or soon after an abortion. The explanation lies in the sensitization of an Rh negative mother by the Rh positive cells of the foetus and the development of a high titre of anti-Rh agglutinins in the maternal serum. (See erythroblastosis—below). It should be noted that immunization produced by pregnancy gives a higher and more sustained titre of anti-Rh agglutinins than that produced by transfusion alone.

## Relation of the Rh factor to Erythroblastosis Foetalis

The pathogenesis of this disease was not understood until 1941 when Levine [5, 6] demonstrated the role of the Rh factor. In the typical case the mother is Rh negative, the father Rh positive and the foetus Rh positive having inherited the factor from the father. Foetal blood bearing the Rh antigen passes into the maternal circulation presumably due to some defect in the placenta. Immunization of the mother thus takes place since the Rh factor is an antigen foreign to her cells. The anti-Rh antibodies so produced cannot affect the mother's Rh negative cells but, since the placenta is normally permeable to antibodies, these filter back into the foetus and cause destruction of its Rh positive cells. This gives rise to one of the syndromes of erythroblastosis foetalis, namely hemolytic anemia, malignant icterus or congenital hydrops.

The essential feature of erythroblastosis appears to be an abnormal destruction and regeneration of erythrocytes. The pathological manifestations are the direct results of this hemolytic process and the attempt at regeneration on the part of the body. The development of the various manifestations in logical order is outlined clearly by Davidsohn[7] as follows:

Destruction of foetal erythrocytes results in *hemolytic anemia* from which follows (1) anoxia—as a result of reduced oxygen carrying power of the blood (2) hemolytic icterus, dependent upon excessive destruction of blood and (3) erythroblastemia, a response on the part of bone marrow to the hemolysis. In response to the anemia, foci of erythropoiesis develop in different organs especially the liver thus producing pressure atrophy and circulatory disturbance. This liver damage manifests itself in hypoproteinemia, macrocytosis and a further intensification of the previously mentioned hemolytic jaundice. Anoxia may be traced to hemolytic anemia, erythroblastemia and macrocytosis. Anoxia causes endothelial damage which along with hypoproteinemia results in oedema. The latter (congenital hydrops) is thus the most severe manifestation of erythroblastosis and such infants rarely recover. Icterus gravis, next in seriousness has a mortality rate of over 50%. It depends in part on hemolytic icterus, in part on liver damage with biliary stasis and obstructive jaundice. The chances of recovery in these cases may depend largely upon the associated liver damage. Hemolytic anemia may be present as the only manifestation of erythroblastosis with or without excessive erythroblastemia. This is the least severe type of the disease and the type which responds best to transfusion with Rh negative blood.

Sufficient evidence has accumulated to put the above theory of the etiology of erthroblastosis on a firm footing.

## Occurrence of Erythroblastosis

Only a small proportion of women with Rh negative blood and Rh positive husbands give birth to infants with erythroblastosis. The combination of Rh positive husband and Rh negative wife is calculated to take place in 13% of marriages, while in 9% of all births an Rh positive infant is delivered by a mother with Rh negative blood. The incidence of erythroblastosis, however, appears to be only approximately one in 400 births.[8] In other words the disease develops in only about one in 40 infants for whom the possibility of its occurrence exists.

This comparatively low incidence may be due to several factors (1) Erythroblastosis is rare in the first child of a family, hence women bearing only one child will have no infant with the disease. Further, the incidence of erythroblastosis increases with the number of pregnancies, and the tendency to limit the number of children in modern marriages probably contributes to the rarity of the disease. (2) An Rh positive father may be homozygous (RhRh) or heterozygous (Rh rh). The child of a homozygous father will always be Rh positive but if the father is heterozygous the child may be Rh positive or Rh negative. Erythroblastosis has been reported in one twin which was Rh positive while the other twin being Rh negative remained well. (3) In regard to the production of Rh antibodies by an Rh negative mother carrying an Rh positive child, it should be noted that (a) the ability of the placenta to allow escape of foetal cells into the circulation may vary; (b) some mothers may not be capable of being sensitized. (4) Erythroblastosis may occur in mild form and pass unrecognized.

These factors help to explain the discrepancy between the incidence of the disease and the comparative frequency of marriages between Rh positive men and Rh negative women.

## Diagnosis of Erythroblastosis

The establishment of a correct diagnosis of erythroblastosis includes:

(1) Clinical evidence—(a) jaundice coming on at birth or shortly after; (b) a severe hemolytic anemia in the first week of life; (c) congenital hydrops.

(2) The Rh status of the mother, infant and father should be determined.

(3) A blood film from the infant should be examined for erythroblasts —their absence, however, does not rule out the disease.

(4) Demonstration of anti-Rh agglutinins in the mother's serum.

## Illustrative Cases

Two recent cases of erythroblastosis seen at the Grace Maternity Hospital, Halifax, may be briefly outlined.

*Case No.* 1. The patient was a male infant born April 27, 1944. Delivery was spontaneous and the baby appeared normal at birth weighing 8 pounds, 10 oz. On the second day slight jaundice was noted which steadily deepened during the 3rd and 4th day. Numerous erythroblasts were present in the blood film. The child died on the sixth day just as arrangements for transfusion with Rh negative blood were completed.

Grouping of the baby and parents revealed the following:

Father—Group O, Rh positive.

Baby—Group O, Rh positive.

Mother—Group O, Rh negative.

Anti-Rh agglutinins were readily demonstrated in the mother's serum.

*Family History*—the first child died on the fourth day—deeply jaundiced; the second child developed jaundice on the third day and died on the ninth

day; third child developed jaundice on the third day but recovered. The history of the fourth child has been outlined above.

*Case No.* 2. The patient was a male infant born on September 12, 1944. He was the second child, delivered spontaneously, birth weight 7 pounds, 10 oz. Condition at birth was apparently good but on the third day he was noticeably pale and listless. On the fourth day the hemoglobin reading was 30% with 1,500,000 red blood cells per cu. mm. Numerous erythroblasts were present in the blood film. Rh grouping revealed the father to be Rh positive, the baby Rh positive, the mother Rh negative with demonstrable anti-Rh agglutinins in her serum. This was obviously a case of erythroblastosis having as its main manifestation a severe hemolytic anemia. The infant was transfused with 120 c.c. of Group O Rh negative blood following which the hemoglobin read 60% and red blood count 3,100,000 per cu. mm. Two days later the hemoglobin had fallen to 45% so a further large transfusion of Group O Rh negative blood was given, following which the hemoglobin reading was 135%. The infant was discharged in good condition and when seen again one month later was well, the hemoglobin being maintained at a normal level.

**Practical Applications**

1. Patients receiving repeated transfusions should have their blood tested for the Rh factor. If negative, subsequent transfusions should be carried out with Rh negative blood in order to avoid sensitization.

2. Mothers of infants showing severe jaundice, hemolytic anemia, oedema, still births or a history of any of these should be given Rh negative blood only. Transfusion of Rh positive blood to the mother of an erythroblastotic infant may prove fatal as in any other incompatible transfusion. The husband's blood should obviously not be used since in all cases of erythroblastosis it is Rh positive.

3. Transfusion with Rh negative blood is the treatment of choice for all cases of babies showing any of the manifestations of erythroblastosis.[9],[10] The father's blood is Rh positive and so is ineffective in combating anemia, adding further to the hemolysis and jaundice. The mother's whole blood contains anti-Rh agglutinins and is therefore unsuitable. Two transfusions of 75 c.c. of blood Group O, Rh negative, will provide enough blood to maintain the hemoglobin at 60% even if all the foetal red cells are destroyed. (An infant's total blood volume is approximately 250 c.c.). It is important that transfusion be given as early as possible. If known Rh negative blood is not available, the mother's cells, washed and resuspended in saline, may be used. Early transfusion therapy in erythroblastosis has caused a marked lowering of the previously high mortality.

4. A pool of Rh negative donors should be available at all maternity and general hospitals. Rh negative donors may be of the same group as the patient or Group O (universal donor).

**Laboratory Tests**

1. A 2% suspension of blood cells in saline should be provided for the determination of the Rh factor (a suspension of cells in saline as for ordinary A, B grouping may be sent to the laboratory). Technique of preparation of

reagents and the details of the test for the Rh factor are outlined clearly by Kracke.[11]

2. Five c.c. of the mother's blood should be sent for demonstration of anti-Rh agglutinins.

3. A blood film from the baby provides confirmatory evidence of erythroblastosis.

**Summary**

(1) The present status of the Rh factor is outlined, with particular reference to hemolytic transfusion reactions and the etiology of erythroblastosis.

(2) Two cases of erythroblastosis foetalis are presented with details of treatment.

(3) Practical applications of this new knowledge are provided with laboratory tests necessary for the diagnosis of erythroblastosis foetalis.

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# Congenital Sub-Aortic Stenosis with Report of a Case

S. T. Laufer

THE rarity of this type of congenital heart disease and the importance of its clinical recognition from a prognostical viewpoint will justify this brief case report.

Mr. W. N. aged 25 has never had any important children's disease. There was no history of rheumatic fever. He has been leading an active life until one week ago (Jan. 7, 1945). At that time he experienced a short fainting spell while working on his ship. Three days later he had three more short attacks of dizziness, the last one associated with numbness in his fingers, perspiration and chills. In spite of these attacks he continued working until his ship reached port. Then he reported to his physician, who suspected the presence of a congenital heart condition, and referred him to me.

Apparently a heart condition was recognized in 1940, at which time he was discharged from active service in the Navy. Careful questioning reveals further that he had noted occasionally shortness of breath and palpitation after heavy exercise already previously, but never gave any attention to it.

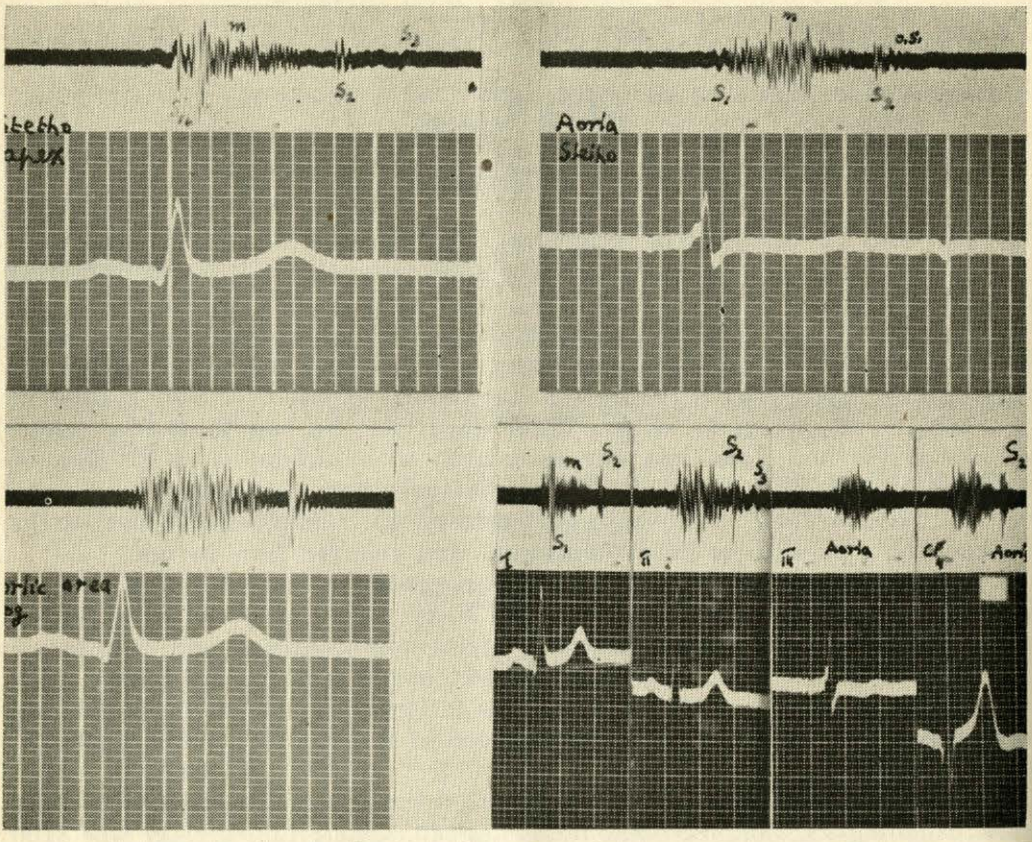
He belongs to a long living family, his father however, has been suffering from a rheumatic condition with deformation of the articulations of the hands for 35 years.

Physical examination of this 25 year old man showed a healthy-looking male, weighing 152 pounds, being 65 inches tall. His vital capacity was 3100 cc. There was no clubbing of the fingers, no cyanosis of the lips, no edema and there was no shortness of breath present. Examination of head, eyes, including fundi, mouth and chest was negative.

On examination of the heart a circumscribed apex impulse could not be palpated, nor was there any pulsatory movement of the anterior chest wall visible or palpable. In the aortic area to the right of the sternum a systolic thrill was palpable accompanied by a loud, rough, systolic murmur. This murmur was heard also over the apex region as well. Here both heart sounds were audible, the second giving the impression of being split. Over the aortic area the first sound was covered by the murmur, but the second aortic sound was well audible. Over the pulmonic area both heart sounds and the systolic murmur were audible. The blood pressure was 108/78, the heart rate rhythmic, 60 per minute.

Examination of the abdomen was normal; the reflexes were normal. Hemoglobin and urine without pathological evidence.

The electrocardiogram showed a normal sinus rhythm with a frequency of 60 per minute, the P waves were upright directed in leads 1 and 2, and the PR interval measured 0.14 seconds. The QRS complex was upright directed in all three leads. There was a small S wave in lead 3 visible. The ST space was on the isoelectric line in all leads, and the T wave was upright in leads 1 and 2, bi-phasic in lead 3. The chest leads showed a deep S in $CF_2$, in lead $CF_4$, a small Q, a high R and a small S wave. The T waves were upright directed in all the chest leads. (See fig.)




Phonocardiogram. Stethographic and Logarithmic Registration.
For description, see text.

Phonocardiogram: Stethographic and logarithmic registrations were done at the apex region and aortic area as well. Stethographic registration over the apex region showed the presence of normal three heart sounds composed of vibrations of rather low amplitude, especially if compared with the vibrations indicating the systolic murmur. Over the aortic area the vibrations of the second sound are well visible, the second part of it showing a coarse vibration of low intensity, evidently due to the opening of the A-V valves (O.S.[4]).

Radiographic examination: The heart showed only a minor degree of aortic configuration. On fluoroscopic examination the aortic bulb and the border of the ventricle showed marked pulsatory movements.

Discussion: As outlined by other investigators[1,2] the diagnosis of this congenital malformation is not difficult.

The differential diagnosis against an acquired stenosis of the aortic valves is made by the absence of rheumatic fever in the history, the presence of a normal second aortic sound and a normal pulse pressure. Walsh et al[1] have stressed the importance of the age in the diagnosis of this malformation, as

acquired stenosis of the aortic valves seldom occurs in patients under the age of 20. The younger the patient the more likely the diagnosis of this malformation will be correct.

The pathologic lesion leading to this anomaly is represented by a firm, raised fibrous ring of tissue below the aortic valve, considered to be a remnant of the bulbus cordis (Sir Arthur Keith). The endocardial elastica is participating in the formation of the fibrous ring which consists principally of elastic fibres, thus excluding the possibility of an inflammatory or mechanical cause as outlined by Wiglesworth.[3]

The prognosis in this type of congenital malformation is considered poor. Bacterial endocarditis is one of the main causes of death; others however, die suddenly. An exact explanation for the sudden death is difficult to give. The tendency to faintness and to actual syncope in cases of aortic stenosis belongs to the same cause, so far obscure and difficult to explain. It has been related to a hyper-active carotid sinus reflex.

Summary: A case of congenital sub-aortic stenosis with phonographic registration is described. The clinical diagnosis and pathology of this anomaly is briefly discussed.

## REFERENCES

1. Walsh, B. T., Connerty, H. V., and White, P. D., Am. Heart Journal, 25: 837: 1943.
2. Young, D., Am. Heart Journal, 28: 440: 1944.
3. Wiglesworth, F. W., quoted by 1.
4. Luisada, A., Arch. Ped., 60: 498: 1943.

I am indebted to Dr. E. F. Lampell from the Norwegian Public Health Service for referring this case to me.

# Abstracts from Current Literature

DISEASES OF THE HEART. A REVIEW OF SIGNIFICANT CONTRIBUTIONS DURING 1943. Williams, Conger.: Arch. Int. Med., 1944, 73: 477. (Continued).

Askey in reviewing the syndrome of painful disability of the shoulder and hand following coronary occlusion, suggests that some of the changes in the palmar aponeurosis may be related to myocardial infarction. Moreover, Kehl reports 6 cases of Dupuytren's contracture following coronary occlusion within a period of eleven months. In no case was there evident relationship to trauma or any change before the thrombosis occurred. Pain, stiffness, swelling, repeated discolouration, numbness, tingling and coldness of the hands were encountered with the contracture. Four of the patients also had pain in the shoulder. Johnson reports clinical observations in 39 cases in which disabling changes in the hand resembling sclerodactylia following myocardial infarction. In a period varying from 3 to 16 weeks after infarction occurred, pain and stiffness of the fingers appeared, with nonpitting swelling of the hands. Evidence of circulatory change was seen in the form of coldness and change in colour, which varied from erythema to cyanosis. At a later date thickening of the skin, atrophy of the soft tissue and in some cases palmar contracture occurred. The changes described bore a close resemblance to the scleroderma and Raynaud's disease. The anginal syndrome was present in every case. Pain in the shoulder occurred in 34 cases and bore some relation to the site of radiation of anginal pain. The changes in the hand were bilateral. Arthritis did not appear to be an important factor in the genesis of this syndrome. Although 10 patients had a brief "rheumatic" history, none had had previous rheumatoid arthritis, and 4 had had hypertrophic arthritis. It is emphasized that the changes described do not progress to gangrene and trophic ulceration of the fingers, in spite of their resemblance to the sclerodactylia of Raynaud's disease. The possible etiologic relationships are discussed.

Master and associates followed the course of the blood pressure in 538 cases of coronary occlusion over an average period of three to four years. In every case the blood pressure fell to some extent, and the lowest pressure is usually reached between the twelfth and fifteenth day. Two-thirds of the hypertensive patients regained a hypertensive level, but one-half of this group showed a delayed rise over a period of one to two years. It was concluded that the height of the blood pressure after the attack did not influence the future course of the patient significantly with respect to subsequent angina pectoris, heart failure, coronary occlusion or death.

Much has been written in recent years concerning the mechanism of production of coronary occlusion, and it has been held that bleeding from vascular channels of the intima of a vessel may cause arterial occlusion, either directly by producing local hematoma or indirectly by thrombus formation near the site of the hemorrhage.

English and Willius investigated this question by means of autopsy studies. One hundred and thirty-five selected hearts were examined, forty per cent of which showed intimal hemorrhage. There was acute occlusion of the coronary artery in 20 specimens. Whenever hemorrhage was encountered in the intima of a coronary artery, coexistent degenerative changes were

found. It was concluded that the intimal degenerative changes represented the primary factor in the pathologic condition, while the hemorrhage was secondary.

Steiner studied the serum cholesterol level in 15 patients with coronary heart disease and in 15 controls of the same age. They made repeated observations over periods up to two years. The level in the patients with coronary arteriosclerosis was found significantly higher than that in the normal subjects, with wide fluctuations characterizing the former group and fairly constant levels occurring in the latter group.

Engelberg has reported 6 instances of disease of the coronary arteries in young adults with xanthomatosis. In each case three characteristic features were present. The cutaneous lesions consisted of single or multiple firm subcutaneous nodules of variable size, found mostly on the extensor surfaces of the extremities. In every case the diagnosis of coronary insufficiency was made, and all the patients showed hypercholesteremia. The results of treatment with low cholesterol diet were inconclusive.

Massie determined the size and shape of the heart by roentgenography in 16 patients who had had myocardial infarction. Films were taken at the bedside with patients in the sitting position from periods varying from the third to twenty-eighth days and during the third and sixth months. No consistent change in cardiac size was observed. In the two weeks following the infarction only 4 patients showed a demonstrable alteration in the size of the heart, which was increased in 2 and decreased in the other 2. The alterations observed in the pulmonary fields were of interest in that 12 patients showed pulmonary congestion in the first one to two weeks, with the presence of basal rales by auscultation in only seven.

Harrison presents evidence to show that disturbed carbohydrate metabolism is another disorder which may precipitate various manifestations referable to the cardiovascular system. Characteristic features of such a mechanism are the appearance of symptoms two or more hours after meals, with relief following the injection of dextrose, and reproduction of symptoms following administration of insulin. The author refers to the state which produces these symptoms as "relative hypoglycemia", because the blood sugar values of the patients studied were usually within the limits of normal or only slightly abnormal. In many cases studied the subjective and objective reactions were similar to those commonly seen in cardiac neurosis. However, attacks of angina pectoris at rest were seen in those with typical effort angina.

Lesser reports further observations on the action of testosterone propionate in the treatment of angina pectoris. Favourable results were obtained in every one of 22 patients with angina. A control series of patients who received sesame oil showed no improvement. After treatment was initiated, an average of twenty-eight days elapsed before improvement was noted, and a period of forty-three days elapsed before this became marked.

On the other hand, Levine after a trial of the drug in 19 patients, was unable to conclude that it had any beneficial effect. Five of the 19 patients observed definite improvement, but the author believed that this could be accounted for by the vagaries of the disease. Eleven patients reported no change whatever after four weeks of treatment with a dose of 25 mg. three times weekly.

A large scale experiment has been carried out in the reexamination of

4,994 men rejected for military service because of the diagnosis of cardiovascular defects or neurocirculatory asthenia. Of the total number of 4,994 cardiovascular rejectees examined by expert cardiologists, there were 863 (17.3 per cent) resubmitted as 1A and 4,131 (82.7 per cent) whose rejection as 4F was confirmed. The chief cause for rejection was rheumatic heart disease, found in over 50 per cent of the total number of men examined. Mitral valvular disease alone was diagnosed in over 60 per cent of these cases. The balance were comprised of aortic disease and combined mitral and aortic valvular disease. The second most common cause for final rejection was hypertension, found in approximately 21 per cent of the total series. Third in frequency as the cause of rejection was neurocirculatory asthenia with about 4 per cent of the total series. The fourth condition responsible for rejection was sinus tachycardia occurring in 3.8 per cent of the entire group. The fifth most common cause for rejection was congenital heart disease. The abnormality most commonly diagnosed was ventricular septal defect (Roger's disease) in more than a third of all the cases. Five other defects, in the order of their frequency, were patency of the ductus arteriosus, pulmonary stenosis, coarctation of the aorta, auricular septal defect and subaortic stenosis. Other causes for rejection included cardiac enlargement alone determined by X-ray examination, arrhythmias, electrocardiographic abnormalities alone and including 10 cases with bundle branch block; cardiovascular syphilis, thyrotoxicosis, recent rheumatic fever, cardiac strain from chest deformities, coronary heart disease, pericarditis and peripheral vascular defects. A history of rheumatic fever was obtained in slightly over a fourth of all the cases of rheumatic heart disease.

There were eight problems of particular interest which remain unsolved and should be the focus of follow-up study but concerning which tentative opinions were expressed: (a) The interpretation of apical systolic murmurs (may they, if very slight or even slight, in the absence of any other abnormal or doubtful findings, be considered inadequate reason for rejection?); (b) The upper limits of the normal blood pressure (may the systolic pressure in very nervous young men be set perhaps as high as 160 mm. of mercury or even a shade more, provided the diastolic pressure does not exceed 90 mm.?); (c) The limits of the normal pulse rate at rest (may there not be a wider range, say from 40 to 120 per minute, than that actually given in the current criteria?); (d) The heart size, which also varies widely, especially according to body build, and may perhaps in a few normal individuals exceed the standards set by Hodges and Eyster; (e) The electrocardiogram, of which the wide range of normal has not yet been explored adequately; (f) Neurocirculatory asthenia, difficult to diagnose in mild degree, but probably rejectable even when slight, unless there is an obvious cause which can be corrected; (g) Recent rheumatic fever, a hazard even when the heart seems perfectly normal; (h) Exercise tests, the usefulness of which, in cardiovascular examinations for military service, is open to question.

A follow-up study of the men reclassified as 1A and especially of the doubtful borderline cases in the final 4F group should, in the years to come, aid in solving some of the various problems in cardiovascular diagnosis that still remain.

Carter and Traut investigated the incidence of angina pectoris in 300 patients with proved pernicious anemia. In only 3 could a definite diagnosis

of angina be made. They were also interested in the incidence of symptoms and findings suggesting organic heart disease. Some manifestation was present in 257. Their conclusions were as follows: In the presence of severe anemia it is impossible to segregate dependably patients with primary cardiovascular involvement. All of the usual criteria of cardiovascular disease may occur solely as the result of anemia. These symptoms and findings are not restricted to any type of anemia or related to the severity of the anemia. Examination of the blood is essential for dependable differentiation. Cardiovascular manifestations often occur with hematologic decompensation and disappear after treatment or during a remission.

Osgood observed that fluctuation as much as 30 mm. of mercury systolic may occur in paroxysms of bronchial asthma with decline of the level during inspiration and rise during expiration. In some patients this fluctuation varied directly with the intensity of the asthmatic paroxysm. This phenomenon was explained by following and amplifying the observations of Reid, who stated that the lungs are more important than is generally realized in promoting the return of blood to the left side of the heart. In this conception the flow of blood in the pulmonary veins is considered an active propulsion, as in the squeezing of a sponge, rather than an aspiration. The propulsion takes place during expiration. During inspiration the blood is held in the lung. This mechanism is exaggerated in asthma by the greater negative intrathoracic pressure during inspiration, which may result in a more pronounced dilatation of veins. It is also considered that the expiratory "squeeze" is perhaps greater because of increased thoracic pressure at that time.

DIFFERENTIAL DIAGNOSIS OF WEAKNESS AND FATIGUE. Allan, F. N.: New Eng. Jour. Med., 1944, 231: 414.

Allan states that one of the problems most frequently encountered by the general practitioner and internist is the complaint variously described as weakness, exhaustion, fatigue, loss of ambition, low vitality or weak spells. Data have been compiled at the Lahey Clinic on 300 consecutive cases in which weakness, fatigue or weak spells were the chief complaint. Physical disorders were found to be responsible in 20 per cent of the cases; in the others a nervous state was the cause. This state was classified as a neurosis in approximately 20 per cent and as a benign nervous state, chronic nervous exhaustion or nervous fatigue in the rest of the cases. In nearly half of the cases in which a physical disorder was found to be the cause of weakness it was possible to make a positive diagnosis by clinical observations alone. In the others, laboratory tests or roentgenograms were essential to reveal a hidden disease or confirm the diagnosis. The most frequent physical disorders were chronic infection, diabetes, heart disease, various neurologic disorders and serious diseases of the blood. Certain conditions, such as vitamin deficiency and glandular disorders, considered widespread causes of weakness by both the public and the medical profession, were actually found to be rare, and not a single case of weakness due to liver trouble, poor elimination, or low blood pressure was encountered. Although a high percentage of patients with weakness or fatigue have no physical disorder, there is a group in which physical conditions of unusual interest may be discovered. In any case these symptoms warrant thorough and complete investigation.

SULFONAMIDE IN CHRONIC BRONCHIAL INFECTIONS. Oatway, W. H.: Ariz. Med., 1944, 1: 194.

This report is concerned with the use of sulfadiazine, sulfamerazine and sulfathiazole in 48 cases with purulent bronchial secretion. The diagnosis was chronic bronchitis in 11 cases, bronchial asthma with bronchitis in 11 cases and bronchiectasis in 16 cases. The author is concerned chiefly with the 16 cases of bronchiectasis. The symptoms had persisted from one to twenty-five years. The daily volume of sputum varied between twenty and eight hundred cc. Administration of sulfonamides by mouth has been found regularly effective in all cases of simple, uncomplicated bronchiectasis. The sputum was reduced in all cases. The average was a 62 per cent decrease. In the presence of atelectasis and putrid secretions the sulfonamides were much less efficient than in simple bronchiectasis. Tolerance has been about as expected except in cases known to be clinically allergic. There is no reason to believe that the lesion structure of bronchiectasis will change, though progress may be prevented by sulfonamide treatment. It is recommended that sulfonamides be used in nonsurgical cases and for preoperative therapy. It should be combined with postural drainage, bronchoscopic aspiration, climatotherapy and treatment of the sinuses.

E. DAVID SHERMAN, M.D.
Abstract Editor

THE BULLETIN OF THE VANCOUVER MEDICAL ASSOCIATION—Vol. XXI, No. 2, November, 1944.

This issue of the Bulletin of the Vancouver Medical Association deals almost entirely with psychiatry. Three articles are presented which seem so worthwhile that they should be abstracted and presented to a wider audience.

The first of these articles is entitled "Psychiatry in General Practice" by Dr. George H. Stevenson of Toronto. This paper was read at the British Columbia Medical Association Annual Meeting. Stevenson points out the growing recognition of the fact that there are other factors important in causing ill health besides germs, trauma and the like. He points out that thirty years ago Crile described cases of hyperthyroidism which recovered without operation when economic and personal problems were cleared up. He reviews briefly outstanding publications which have put forward the view that emotional upsets could result in ill health and, perhaps, actual physical pathology starting with Prof. Walter Cannons—"Bodily Changes in Pain, Hunger, Fear and Rage" to the most recent publication of Flanders Dunbar—"Emotions and Bodily Change" and "Psychosomatic Diagnosis." (All available in the Dalhousie Medical Library.) The part played by the experiences of World War I and their elaborations in the present conflict are stressed as being of importance in the rapid growth of this branch of medicine.

Following this historical review, Dr. Stevenson goes on to discuss various matters of concern in the treatment of neurosis and psychosis. The dangers of surgery in the neurotic patient are stressed—"neurosis cannot be removed surgically but can be made worse." However, he feels the surgical procedure of prefrontal lobotomy,—"the severance of the tracts between the hypothalamus and the prefrontal areas of the brain" to be a surgical procedure

of definite value in the treatment of certain psychosis. He reports five cases that had been in hospital for several years and were so improved by this operation that they could return home.

Returning more closely to general medicine the danger of the indiscriminate use of bromides is discussed and attention drawn to the fact apparently not widely enough known, that bromides have a great tendency to pile up in the blood and lead to psychotic symptoms. The number of psychotics which are treatable and recoverable are stressed. The syndrome of depression is particularly discussed and the need for adequate community facilities for handling this common type of reaction mentioned. This leads to a discussion of the possibilities for psychiatry in a general hospital—where he feels such cases should be handled. His views on this subject are so pertinent it would perhaps be wise to quote extensively—"I have just spoken as if there were no alternative between home nursing and mental hospital in such cases, but there should be an intermediate facility, namely the psychiatric ward in the general hospital. This has been a development of the last twenty years in the United States, more particularly of the last ten, and we are making a slow beginning in Canada." He points out the success of such wards in Winnipeg and the Toronto set up and then continues—"But every general hospital of fifty beds should have a small well equipped psychiatric section, not only for observation but for protection of the patient and for at least preliminary treatment. A general hospital is not doing its full duty to the sick public if it refuses the delirious patient. Even the smallest general hospital should have a room or two (not in the basement or in the corner of the laundry) but close enough to the other wards for good nursing, treatment and the availability of consultants. The Victoria General Hospital in London, Ontario, has recently opened a 13 bed psychomedical ward with continuous hydrotherapy, electro therapy, occupational therapy, dietetic facilities and skilled nursing. I cannot urge too strongly the importance of such a ward for the welfare not only of depressed patients but of any other psychiatric or psychosomatic problems occurring in general practice."

The various "shock therapies" are discussed, in Dr. Stevenson's opinion —"The most useful and promising therapy in psychiatric practice in the last twenty years."

The neuroses are briefly reviewed and stress laid on a rational investigative psychotherapy centred on the personal problems of the patient's life. The paper concludes with a very brief discussion of mental hygiene and the part the general practitioner can play in introducing mental hygiene principles to the general public.

The second paper of this group is entitled "The Diagnosis of a Neurosis" by Dr. G. A. Davidson of Vancouver. He rightly points out that the diagnosis of neurosis is not made by excluding physical disease but that it is a diagnosis made on positive psychological findings—(a) a background of insecurity in childhood—such things as broken homes, fighting parents, etc., being of importance; (b) the presence of problems in the individual's life which must be adjusted to and (c) symptoms which are the result of overactivity of the autonomic nervous system—the thing we call anxiety or a single symptom taking the place of the former group and temporarily relieving the anxiety. The first group of symptoms are such things as cardiac palpitation, easy sweating, gastric irritability, diarrhoea, and broken sleep. These are the things

seen in the early stages of a neurosis—if following this a hysterical paralysis develops, the anxiety symptoms are temporarily displaced.

Dr. Davidson concludes that if careful histories of this kind are taken, neurosis will be diagnosed early and a great deal of time and expense will be saved. Such investigation points the way to successful treatment rather than simply doing an X-ray and then when that is negative saying—"it's only your nerves—go home and forget it."

The third paper is by Major General Brock Chisolm, at that time Director General of Medical Services, Canadian Army, also delivered at the Annual Medical Society Meeting. This paper is entitled "Emotional Problems of Demobilization." General Chisolm points out that the time of demobilization requires great adjustment on the part of the soldier. For anywhere from one to six years his one aim in life has been fighting and killing, he has lived in a closely knit group all thinking the same and with predictable attitudes to friend and foe. In the final days of a campaign he has had little opportunity to think of demobilization. Then overnight he must change. I quote from General Chisolm—"There is a very extensive loss of orientation, a feeling of being lost and bewildered, a groping, turning toward the things in civilian life and all its very different values. During this period soldiers tend to be highly labile in mood, unstable and unpredictable. The sudden release from the years-old fears of imminent death with the release of all consequent tensions, leaves soldiers disorganized and uncertain. These states may be expressed in quarrelling, defiance, drunkenness, even rioting and insurrection."

On the return home the soldier must readjust to wife, children and community. Things may be very changed since he went away. Apart from the more obvious problems of family breakup and infidelity women have become more independent, they have run the home for five years, their group value has been greatly enhanced by all their war-time activities. In finding new occupations General Chisolm points out that many of these men are doing something they never did before—they had gone straight from schools and colleges to war. There they lived a co-operative life working as a group—not the competitive life of modern job hunting. It will be hard to readjust to this and if the need of the returned soldier to feel an important part of the group cannot be satisfied, they will form their own groups to insist on their rights and privileges.

General Chisolm feels that all these difficulties can be avoided if we recognize and plan for them—"And they returned from the Wars and lived happily ever after" can be true but will be so only if we recognize these problems and aid with them. His conclusion seems worth quoting in its entirety —"It should never be taken for granted that all the adjustment has to be done by the returned soldier. Civilians may well find certain aspects of the philosophy of the good soldier which could with value be incorporated into their own thinking and feeling patterns."

ROBERT O. JONES, M.D.

# Correspondence

184 College Street
Toronto 2B, Jan. 29
1945

## TO SECRETARIES OF DIVISIONS

Dear Doctor:

### Re Soldiers Dependents' Board of Trustees

Herewith enclosed you will please find a copy of a letter dated January 13, 1945, which I have received from Mr. J. Pembroke, Chairman of the Dependents' Board of Trustees. His opening remarks refer to correspondence and discussions which we had previously, with which you are familiar with one exception, namely, that a few days before his letter was written, I pointed out to him in a fairly lengthy discussion, that, in our opinion, his Board was making a great mistake in not accepting the proposals we had put forward.

Along with his letter came the working sheets with respect to the nine provincial tariffs. Happily, the Board of Directors of the Ontario Division was in session last week which gave me an opportunity of placing the matter before them. The Ontario Division has agreed to complete the basic minimum tariff and just as soon as it is ready, I shall forward a copy to you. Furthermore the Board passed the following resolution:

> *RESOLVED* that this Division is prepared to operate on a mean average schedule of fees of the nine provincial divisions of the C.M.A. for Dependents' Allowance cases only;
>
> That this Division is prepared to grant 15% reduction to the above cases because they are soldiers' dependents;
>
> That this Division is prepared to appoint medical advisory committees to the Dependents' Board of Trustees where indicated by the Dependents' Board of Trustees in this Province.

Just as soon as you have had an opportunity to consider the proposals put forward, together with the copy of the tariff which will be sent you immediately it is available, I shall be glad if you will advise me of the decision of your Division.

This matter has been hanging fire for a long time and I am sure it is to the mutual advantage of all concerned that it be satisfactorily adjusted at the earliest possible date.

Yours sincerely

T. C. Routley
General Secretary

**Department of National Defence**
**The Dependents' Board of Trustees**

Ottawa, Canada
Thirteenth
January
1945

Dr. T. C. Routley
General Secretary
Canadian Medical Association
184 College Street
Toronto 2B
Ontario

Dear Dr. Routley:

Following our telephone discussion earlier this week concerning your letter of December 6, 1944, and our previous correspondence, I have now had an opportunity for a further full discussion with my Board and am authorized by the Board to present certain proposals along the lines of our telephone discussion, with a view to arriving at a mutually satisfactory solution of any outstanding difficulties connected with the payment of medical accounts by the Dependents' Board of Trustees in behalf of dependents of members of the Armed Forces.

There does not seem to be much value in discussing further the issues already covered in our previous correspondence. We seem, as you state in your letter, to have reached a point where the Association does not concur in the Schedule of Fees submitted by the Board, while the Board, in turn, does not accept the Association's recommendation to use the existing separate Provincial schedules. However, your letter does suggest that the various Divisions of the Association might be disposed to consider accepting a Schedule which nearly approximated the Provincial schedules.

I am therefore now authorized by my Board to suggest to you that the Association itself prepare a Schedule of Fees, to bear the endorsement of the Association and (if and when approved by the Board) to constitute the authorized Schedule of Fees for the handling of medical accounts as between the Board and members of the Medical Proression. I would assume from our discussion and correspondence, that such a Schedule would be an average of the various Provincial schedules and would reflect the opinion reported at the October 22nd Meeting of the Executive Committee of the Canadian Medical Association that a definite percentage reduction from such schedules should be granted because the Board's Schedule will be used in connection with the medical accounts of dependents of the Armed Forces only. Any such Schedule prepared by the Association would receive the immediate consideration of the Board and I venture to hope that any minor differences therein calling for adjustment would be very quickly resolved by agreement between us.

In the hope and expectation that this proposal will be acceptable to the Association, I enclose herewith the original work sheets used by the Board's advisers in the study of medical fees undertaken by them for the Board last year. On these work sheets is set out a substantial amount of data concerning existing medical schedules and the use of these sheets may save you much

time and labour. Since these are originals and my only copy, it would be appreciated if you would see that they are returned to me in due course.

I am further authorized to inform you that as and when a basic Schedule of Fees is agreed upon between us, the Board are prepared to accept the suggestion of the Association that a small Advisory Committee be appointed by the appropriate Provincial Medical Association to assist each regional Dependents' Advisory Committee in respect to medical accounts arising in the area covered by such Committee. (This would entail, for example, the appointment of two Committees in British Columbia—one in Vancouver and one in Victoria; two Committees in Alberta—at Calgary and Edmonton; two Committees in Saskatchewan—at Regina and Saskatoon; one Committee in Manitoba—at Winnipeg—and so on). It would be, inter alia, the duty of such Advisory Committees, if appointed, to make specific recommendations to the regional Dependents' Advisory Committee in respect to the assessment of any medical account not clearly and definitely covered by the authorized Schedule.

As a further practical indication of the desire of the Board to co-operate and to make available the best possible service to dependents, the Board will be prepared to recommend to the Honourable Minister of National Defence that the Board be enlarged by the addition of a member of the Medical Profession. In this connection, the Board will be glad to consider any names the Association may care to submit as to a suitable appointee. At the present time, the Headquarters of the Board is in Ottawa, while the Executive Committee of the Board meets regularly in Montreal; further consideration is being given to the relative desirability of recommending the appointment of a medical man resident in Ottawa or Montreal. I shall write you further in this matter at a later date and, in the meantime, would welcome any comments or suggestions you may care to make.

The foregoing covers, I believe, the major points referred to in your letter of January 3, 1944, having in mind tha tthe Board have already indicated willingness to meet your other requests (in respect to the forwarding of cheques directly to doctors and the manner of making explanations of accounts not paid in full), once a basic agreement in the matter of a Schedule of Fees has been reached.

I trust the proposals outlined will commend themselves to you and will permit of a speedy settlement of our differences.

Yours sincerely

(Signed) J. Pembroke
Chairman

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February 7th, 1945.

**Memorandum to The Divisions, The Executive Committee**
**The Committee on Economics.**

In the prorogation of Parliament on Wednesday, January 31st, the following paragraph appeared in the Speech from the Throne:

"I announced, at the opening, that the Government was prepared to recommend a measure to provide for federal assistance in a nation-wide system of health insurance. Such a measure would include assistance to the provinces for preventive medicine. I also stated that the Govern-

ment was prepared to support a national scheme of contributory old-age pensions on a basis more generous than that of existing pensions. *The introduction of these measures is conditional upon suitable agreements with the provinces.* My ministers reaffirm their readiness as soon as such arrangements are reached, to proceed with these great social reforms."

After carefully reading this paragraph, one wonders if the Federal authorities are thinking in terms like this: "We have a draft bill ready but unless the provinces are willing to say before hand that they will accept it, perhaps with certain modifications, we are not going to introduce it in the House." Please observe the sentence, "The introduction of the Bill is *conditional* upon suitable agreements with the provinces."

T. C. ROUTLEY, General Secty.

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**Department of Veterans' Affairs**

Christie Street Hospital
Toronto 4, Ontario
October 31, 1944

J. E. Hiltz, M.D.
Acting Superintendent
Victoria General Hospital
Halifax, Nova Scotia

Dear Earl:

The Chief Medical Officer at this hospital has requested that I reply to your letter of October 25th concerning our experience with penicillin in the treatment of chronic osteomyelitis.

Most of our cases have been septic compound fractures. About 25%, however, have been hematogenous in origin. The principles of treatment have been the same in both instances.

Our results on the whole have been satisfactory, although we hesitate to use the word "cure" for any one of them, the reason being that recurrences of the disease are not unusual even after many years of quiescence.

In our series, complete healing of discharging sinuses has occurred in every case in which surgical procedures have been adequate in the removal of diseased bone. In these cases penicillin has been shown to be a valuable adjunct to surgical procedures. Other cases in which it has not been possible to remove all diseased bone by surgical procedures have not benefitted by the use of penicillin. There have been a few notable exceptions in which penicillin alone has resulted in complete healing.

As a general rule, therefore, in the treatment of chronic osteomyelitis, fundamental surgical principles are still the basis for treatment.

Penicillin is not a substitute for surgery, but is a valuable adjunct. There is no statistical evidence available to prove this statement either here, in the U. S. A., or in Great Britain, but the clinical impression of all investigators is the same.

It is difficult to advise you about the quantity of penicillin which should be allotted to cases of chronic osteomyelitis. It would seem, however, that priority should be given to other conditions such as septicemia, meningitis' acute osteomyelitis, pneumonia and other serious infections in which penicillin plays a more important role.

In those cases of chronic osteomyelitis in which operative procedures are indicated, we recommend penicillin for two days preoperatively and five to ten days postoperatively, depending upon the response of the patient as shown by temperature, pulse, white blood count, and sedimentation rate. The recommended dosage is 120,000 units per day given in six or eight divided doses by the intramuscular route.

An excellent article has appeared recently in the British Journal of Surgery which outlines the principles of penicillin treatment by Florey and Jennings. The following is an extract:—

> There should be no failure if penicillin is so applied as to be continually in contac with all infecting organisms in a bacterio-static concentration, provided also tha leucocytes and tissue fluids have access. Under these conditions growth is bound to cease, and the infection to be overcome. Apparent failures should suggest one of the following defects:——
>
> (1) Dead tissue such as slough or sequestrum is present, and is forming a focu of infection. Such tissue should be removed at the beginning of treatment, or in any case as early as possible.
>
> (2) An infected area is not being reached by drug. In systemic treatment a large or thick-walled abscess or an infected serous cavity will form such an area; good surgical access and local injection of the drug will be called for. In a local infection, there may be unsuspected sinuses or other extensions of infected tissue, and these are an indication for further surgical intervention to enable the drug to reach every infected piece of tissue.
>
> (3) The dose is too small or application too infrequent.
>
> (4) The principal bacteria causing the in"ection are not sensitive to penicillin.
>
> (5) The preparation of penicillin has lost potency, and no longer contains the stated number of units.

Another article which is worth reading appeared in the J.A.M.A. on December 18, 1943, by Major Champ Lyons, on the use of penicillin in septic compound fractures.

I trust that this information will be of some assistance to you. If there are any specific questions with regard to further details of treatment, I shall try to find the answers for you.

Best regards,

Yours truly

H. D. Hebb
Surgeon Lieut. Commander
R.C.N.V.R.
Secretary
Joint Services Penicillin Committee

(This letter has been published on account of the information it carries concerning the use of Penicillin.)

# "V. D. Briefs"

## Painless Intravenous Technique

Try the use of an intradermal wheel of novocaine administered with a fine needle, as a prelude to removing blood specimens or administering arsenicals. Patients will be grateful. This technique will permit you to prod around for difficult veins. Patients won't disappear after the first "shot"—never to return.

## Latent Syphilis—An "Exclusion" Diagnosis

All syphilis is *latent* at some time in its course. Most syphilis is *latent* at any given time. Diagnosis is established by:

(1) Repeated positive blood tests.
(2) No clinical evidence of disease.
(3) C.S.F. negative.
(4) X-ray heart and great vessels negative.
(5) Supportive historical evidence of syphilis.
(6) Supportive epidemiological evidence of syphilis.
(7) Exclusion of conditions causing False Positive tests!

## Contact Investigation

Somewhere in the community there is at least one contact associated with each V.D. patient's infection.

The physician's *most important duty* is to arrange for this contact to be examined.

The physician and his patient may determine the fate of many.

Where possible, the patient should arrange to bring his or her contact in for investigation.

If this is not feasible, identifying information concerning the contact should be passed to the Health Department for discrete, confidential investigation by specially qualified workers.

"Find V.D. Contacts—Report V.D. Cases"

# Personal Interest Notes

DOCTOR Clarence N. Morrrison of New Waterford, Cape Breton, son of Doctor M. D. Morrison and the late Mrs. Morrison of Halifax, was married on December 6, 1944, to Miss Catherine Slessor, whose parents came to Nova Scotia from Aberdeen, Scotland. After graduating from Dalhousie Medical College the Doctor took a post-graduate course in London and in Dublin, and holds a diploma from the Rotunda Hospital of the latter city.

The Psychiatric Journal Meeting, the first association of psychiatrists the Maritimes has ever had, has been established, and has been formed for discussion of problems of psychiatric casualties, both while in the armed forces and later in their rehabilitation in civil life. The meetings were organized by Captain H. S. Sager, psychiatrist, R.C.A.M.C., who is acting chairman. He is stationed at the Nova Scotia Hospital, Dartmouth. This new development in M.D. No. 6 for interchange of ideas amongst psychiatrists of the three services and civilian psychiatrists "will likely be taken up by other army districts in Canada," Doctor Sager said. At present there are approximately twenty members of the new association of psychiatrists. They are from the three services, the Department of Veterans' Affairs, the staff of Dalhousie University, the staff of the Nova Scotia Hospital and civilian psychiatrists in the Halifax area.

On February fifth Doctor D. J. Mackenzie, Provincial Bacteriologist, addressed the Gyro Club of Halifax on the history of the Provincial Laboratory. Doctor Mackenzie spoke of the work of the Provincial Laboratory from its beginning until the present time outlining the enormous growth that has taken place in the past half century. He told of the enormous work that was entailed on account of the venereal diseases activities and stated that forty per cent of his entire staff are engaged in examinations in connection with venereal diseases control. Doctor Mackenzie was introduced by Doctor S. H. Keshen of Halifax.

Captain C. O. Homans, R.C.A.M.C., who returned to Hubbards for a short visit from four years of war service in Europe, was tendered a banquet on January 16th, by the Duke of York Lodge, I.O.O.F. The banquet was held in the Odd Fellows' Hall where, in addition to the Duke of York members and guests, there were in attendance the members of Duchess of York Lodge and a representation from Progress Lodge, Bridgewater. Doctor Homans is spending his furlough with his wife and family at Hubbards, after which he expects to be posted in Canada.

The BULLETIN extends congratulations to Captain J. H. Charman, R.C.A.M.C., (overseas), and Mrs. Charman on the birth of a daughter on January 14th, at the Halifax Infirmary.

Captain Wilfred E. Boothroyd, R.C.A.M.C., overseas, formerly of Halifax, and for two years medical officer of the Princess Louise Fusiliers, has been promoted to the rank of Major. Major Boothroyd graduated from Dalhousie Medical School in 1940.

## New Health Services Planned by Manitoba

A comprehensive programme of new health services to be enacted by the Manitoba government with the province bearing the greater part of the cost was announced at Winnipeg on January 10th by Hon. Ivan Schultz, provincial health and public welfare minister. The programme provides for:

1. Preventive services.
2. Diagnostic facilities, X-ray and laboratory available to everyone at the public cost and centering in local hospitals.
3. Curative or personal health service to provide "such medical care and supervision as can be given in the patient's own home or in the doctor's office or local hospital including maternity work and minor surgery."
4. Assurance of "sufficient and adequate hospital facilities available at reasonable distance to all the people in the province" with capital costs to be met for all hospitals by the municipalities in each hospital district and a greater share met by the municipality where the hospital is situated.

Mr. Schultz said that the programme outlined was the only one possible at the present time because of the lack of medical and nursing personnel and the lack of building and hospital equipment.

The minister said the province was planning concentration of initial services on the "under-served" rural areas.

The preventive service part of the programme will be found on the setting up of health units throughout Manitoba under local boards largely of lay persons, with the cost to be carried two-thirds by the province and one-third by the municipal authorities.

Mr. Schultz said the net new cost to the province of these units is $26,000 capital and $265,000 annual. The municipalities annual contribution was set at $65,000 and that of the population in unorganized territory at $6,000 annually. Those sums were in addition to a total of $167,700 now spent annually by the province.

To assure early and correct diagnosis, the Manitoba health programme includes the locating of three major centres in Winnipeg, Brandon and Dauphin with full medical radiologist and bacteriologist-pathologist services in each. All rural hospitals will have X-ray and laboratory equipment provided and will be supervised from the key centre.

These services are to be provided at public cost as an utility on reference of the regular practitioner. The province will meet the entire capital cost, $300,000, and roughly two-thirds of operating costs up to fifty cents a head for the diagnostic clinics everywhere except in Winnipeg. The two-thirds of the operating costs to be borne by Manitoba annually were set at $242,600 by the health minister.—(*Halifax Chronicle*, January 11th).

## The Rotary Club of Autigonish sets up a Penicillin Bank.

Following a speech given by Doctor T. B. Murphy to the Rotary Club of Antigonish at its regular meeting on January 29th, the Rotary Club of that town decided to establish a bank for the purchase of Penicillin for the use of people who at present were not in a position to pay for it. This will set a very fine example to other parts of the province and will mean that people in those districts who otherwise would have to do without the drug, will now have the benefit of Penicillin. The drug will be kept at St. Martha's Hospital and administered through the staff of visiting physicians.

# Obituary

THE BULLETIN extends sympathy to Dr. R. E. Mathers of Halifax on the death of his brother, Harry Isaac Mathers which occurred on January 24th, at the age of seventy-four. Mr. Mathers was President of I. H. Mathers and Company, Limited, a business founded by his father, and of the Scotia Stevedoring Company, Limited, which he himself established.

The BULLETIN also extends sympathy to Dr. B. W. Skinner of Mahone Bay on the death of his wife, Catherine, who died in January following a prolonged illness: and to Dr. G. D. Donaldson of Mahone Bay on the death of his four year old son, Paul, who died at the Sick Children's Hospital in Montreal during December.

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# Society Meetings

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### The Pictou County Medical Society

At a recent meeting of The Pictou County Medical Society the following officers were appointed—

President—Dr. J. S. Murray, River John.

Vice-President—Dr. A. E. Blackett, New Glasgow.

Secretary-Treasurer—Dr. W. A. MacQuarrie, Trenton.

Representatives on the Executive of The Medical Society of Nova Scotia —Dr. J. S. Murray, for one year more; Dr. G. A. Dunn, Pictou, for a period of two years.

A motion was passed rejecting the proposal by Major General G. B. Chisholm re changes in the nomenclature in the R.C.A.M.C.

The Society would again like to express its desire to have 100% of the active practitioners members of The Medical Society of Nova Scotia and the Canadian Medical Association.

W. A. MACQUARRIE, M.D.

Secretary-Treasurer