of exhibitions and education. The personnel of the former divisions are distributed to the two new divisions, with certain eliminations inevitable in the shake-up.

The staffs in history and science are drastically cut by a system of transfers. Demotions of the professional and technical personnel are made in all divisions, which includes directors, senior curators and curators, the latter reduced to curatorial assistants. Without cause, men and women of high scholastic standing and national reputation have been demoted. There have been no hearings, no impartial investigations.

It becomes apparent that a complete change is effected in the basic structure and functions of the museum which is at wide variance with the plan of the founders. In effect, it becomes a museum of exhibitions, art instruction and "education." The latter function serves principally as an instructing agency for the schools, and for circulating study materials. Both of these agencies have been carried on by the museum, under other names, since 1927, and supplements a similar activity of the Visual Education Section of the Los Angeles City School system. The directors of history and science have stated to the writer that in the past there has been no dearth of instructors to meet the needs of educational groups.

Following this action of the board of supervisors there developed such an avalanche of protesting letters and resolutions that the board of governors of the museum has appointed a special committee to investigate the matter. Chief among the protesting groups are the founding societies, who have a legal as well as scientific interest in the museum and who feel that the abrogation of their contract is ill advised and is working to the detriment of science in Southern California. Other protesting groups are the Southern California Academy of Sciences and the Federation of Natural Sciences of Southern California. To date some forty organizations have joined in this crusade against the crippling of science in the Los Angeles Museum.

It is gratifying to note with what high respect the research at the Los Angeles Museum is held by scientists throughout America, and it is hoped that the administrating and legislating boards in control thereof will keep the museum out of politics and treat with due regard those scientists who are striving to create in this cultural center a respect-worthy museum.

Committee of the Founder Societies of the Los Angeles County Museum of History, Science and Art

A. W. BELL, *Chairman*

BLOOD GROUP SPECIFIC SUBSTANCES AND BLOOD TRANSFUSIONS[1]

SINCE Landsteiner's classical investigations, the human race can be divided in four main groups according to their blood properties. The importance of the group-specific differentiation becomes apparent from the fact that not only the blood cells and spermatozoa but organs and tissue cells exhibit the group-specific characteristics. Such characteristics are also demonstrable in secreta and excreta. A complex carbohydrate-like substance with A-specific activity has been isolated by several investigators.

The specificity of this substance is shown by the "inhibition of agglutination" test as the combination of the A-specific substance, and the anti-A antibody present in normal human serum is usually not followed by visible precipitation. The subsequent addition of A blood cells to such a mixture constitutes the only way to prove that neutralization of the antibody has occurred; A cells are no longer agglutinated.

Blood of a homologous group is commonly used for transfusion purposes. Some thirty years ago, Ottenberg proposed that blood of group 0 could be used as universal blood because the blood cells of group 0 are not agglutinated by any normal human serum, except in very rare instances. Some large clinics use 0 blood in emergency cases and apparently are satisfied with their results. However, there are quite a few reports in the literature on severe reactions and even fatalities following the use of 0 blood in patients not belonging to group 0. These reactions are frequently attributed to the interaction of high-titered isoantibodies present in serum of group 0 and the cell properties of the patient. As a matter of fact, many institutions have abandoned the use of universal donor's blood.

In order to overcome the objection against the use of the universal donor as far as it is based on the presence of potent isoantibodies, we tried to add the isolated group-specific substances. At the beginning of our work only the A substance was available. The addition of the isolated A substance in amounts as small as 25 mg or less proved practically to be sufficient to neutralize the anti-A antibodies present in 500 cc of 0 blood.[2]

For the neutralization of the anti-B antibody present in 0 blood fluid, the B substance was needed. However, knowledge of the B-specific substance was very scant. Hallauer[3] had reported extracts of blood

[1] From the Buffalo General Hospital and the Department of Pathology and Bacteriology, University of Buffalo School of Medicine.

[2] E. Witebsky, N. Klendshoj and P. Swanson, *Jour. Infect. Diseases*, 67: 188–192, November-December, 1940.

[3] C. Hallauer, *Zeits. Immunitätsforsch.*, 83: 114, 1934.

exhibiting B activity. Very recently, Kin[4] has obtained a carbohydrate-like substance from human saliva of group B. We isolated a carbohydrate-like substance from gastric juice of human beings of group B, using a technique described by Goebel for the isolation of the A-specific substance from commercial peptone.[5]

Gastric juice was fractionated several times with 2½ volumes of alcohol in the presence of sodium acetate yielding a crude polysaccharide. Traces of protein were removed by means of Sevag's procedure using chloroform and butyl alcohol. After dialysis, a protein-free carbohydrate fraction was recovered by precipitation with 10 volumes of acetone.

This B-specific carbohydrate-like substance is serologically as active as the A-specific substance. Its chemical analysis will be reported elsewhere. It may be sufficient to state in this connection that there seem to be interesting quantitative differences in nitrogen and acetyl between the A and B substances.

Following the isolation of the B substance, the problem arose whether individuals belonging to group 0 possess an 0-specific substance comparable to the A- and B- specific substances, or whether the 0-group is characterized merely by the absence of A and B properties. It is known that certain normal beef sera, when treated with AB cells, agglutinate cells of group 0 stronger than cells of other groups. A carbohydrate-like substance was isolated from the gastric juice of human beings belonging to group 0 employing the same technique as for the isolation of the B-specific substance.[6] This substance inhibited the agglutination of 0 cells.

Whereas about 80 per cent. of human beings secrete large amounts of group-specific substances in the saliva and gastric juice, 20 per cent. fail to do so. The carbohydrate fractions isolated from the gastric juice of the non-secretor group proved to be serologically inactive.

After the A- and B-specific substances were made available, the neutralization of both the anti-A and anti-B antibodies present in 0 blood was attempted. The addition of a mixture of a few milligrams of A- and B-specific substances dissolved in 10 cc of saline solution proved to be sufficient for practical neutralization of the isoantibodies in 500 cc of 0 blood.[7]

Over 100 transfusions with "neutralized" 0 blood have been given in the Buffalo General Hospital mainly to patients belonging to groups A, B and AB without necessitating determination of the blood group of the patient and sometimes even without cross matching. From the clinical standpoint, the results are satisfactory, although we are fully aware that the problem as such can not be solved from a statistical angle. It is furthermore understood that the addition of the group-specific substances can not bring about any other change than the neutralization of the isoantibodies present in blood fluid of group 0. There are still many sources of transfusion reactions left that are obviously not influenced by the addition of the group-specific substances to 0 blood.

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[4] E. Kin, *The Journal of Chosen Medical Association*, 1940, 30: 4, 550–567, April 20, 1940.

[5] E. Witebsky and N. Klendshoj, *Jour. Exp. Med.*, 72: 6, 663–667, December 1, 1940.

[6] E. Witebsky and N. Klendshoj, *Jour. Exp. Med.*, 73: 5, 655–667, May 1, 1941.

[7] E. Witebsky, N. Klendshoj and P. Swanson, *Jour. Am. Med. Asn.*, 116: 2654–2656, June 14, 1941.

CLINICAL ACHROMOTRICHIA[1]

DURING the past seven years I have been particularly interested in patients who needed endocrine therapy and who had gray hair. Soon after Lunde and Kringstad[2] and Morgan *et al.*[3] discovered that experimental achromotrichia may be due to a deficiency in a factor or group of factors belonging to the vitamin B complex, I began to administer relatively large doses of vitamin B complex products to gray-haired patients presenting metabolic problems and requiring thyroid treatment. Nine cases with endocrine dyscrasia received a vitamin B complex preparation[4] alone or together with endocrine substances. A marked change in the color of the hair was noted in all cases as a result of the above therapy. Definite darkening with many new natural colored hairs was striking evidence of the beneficial effects of the treatment. It is to be noted that the B complex preparation contained pantothenic acid.

In view of the fact that p-aminobenzoic acid has been reported to have chromotrichial activity for certain species[5] and is known to play a rôle in enzymatic pigmentation processes,[6] I investigated this substance clinically and wish to report the observations made during the past few months.

Fifty patients varying in age from 21 to 55 years with definite achromotrichia were picked at random. In 30 cases p-aminobenzoic acid was the sole therapy and in 20 cases endocrine products in conjunction with

[1] Preliminary report.

[2] G. Lunde and H. Kringstad, Avh. Norske Vid.-Akad. Oslo, I. Mat. Ki., Nr. 1, 1938.

[3] A. F. Morgan, B. B. Cook and H. G. Davison, *Jour. Nutrition*, 15: 27, 1938.

[4] Bishop Laboratories' Elixir Be-vin Complex, dosage 5 ml twice daily, by mouth, or Solution B Complex 1 to 2 ml, subcutaneously.

[5] S. Ansbacher, SCIENCE, 93: 164, 1941; G. J. Martin and S. Ansbacher, *Jour. Biol. Chem.*, 138: 441, 1941.

[6] G. J. Martin, W. A. Wisansky and S. Ansbacher, *Proc. Soc. Exp. Biol. and Med.*, 47: 26, 1941; W. A. Wisansky, G. J. Martin and S. Ansbacher, *Jour. Am. Chem. Soc.*, 63: 1771, 1941.