

exhibiting B activity. Very recently, Kin⁴ 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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CLINICAL ACHROMOTRICHIA¹

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 Kringstad² 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 preparation⁴ 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 species⁵ 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.

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. Assn.*, 116: 2654-2656, June 14, 1941.

the acid were administered. After about two months of treatment I observed in all cases a marked darkening of the hair. The recently grown shafts appeared to be normally pigmented. It is my impression that an oral dose of 100 mg twice a day is ample to give results. The data seem to show that p-aminobenzoic acid has the same effect with respect to graying as the B complex preparation used in my earlier studies.

In view of the favorable results obtained I am continuing my experiments with a considerably larger series of cases in order to establish the optimum daily dosage of para-aminobenzoic acid. The detailed data will appear elsewhere.

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QUOTATIONS

CHEMISTRY AND CANCER

ON our "Science in the News" page to-day is a collection of strange diagrams. They show the structures as the chemist conceives them of certain molecules known to produce cancer. It was for his brilliant fundamental study of these structures that Professor Louis Frederick Fieser of Harvard's chemistry department merited the Katherine Berkan Judd \$1,000 prize of The Memorial Hospital for the Treatment of Cancer and Allied Diseases.

No one can now predict whether this particular study will be the one that will lead to that goal of so many wearying researches—the prevention of malignant cell growth and its non-surgical treatment. But there can be little doubt that if the goal is to be reached it must be through a more complete understanding of the body's own normal and abnormal chemical processes.

Memorial Hospital, in its hearteningly handsome building on East Sixty-eighth Street, provides the occupants of its 250 beds with the most modern x-ray machines, ranging in size up to 1,000,000 volts, with the most up-to-date devices for applying the curative

radiation of radon gas, with the most skillful and aseptic surgery. But all these are drastic methods of dealing with a malignant growth that has already become dangerous. What about the cause? It is fortunate that beneath the same roof, under the direction of Dr. Cornelius P. Rhoads, men are working on the chemical root of the problem—subjecting experimental mice, for example, to the carcinogenic chemicals synthesized in Harvard's Converse Laboratory.

This correlation of the clinical and the chemical is one of the most encouraging aspects of modern cancer research. While doing all possible by present means for those already afflicted, scientists no longer base all their hopes on mysterious therapies whose modes of action are unknown. They are trying, step by difficult step, to reconstruct the chemical processes of life and ascertain the point at which those processes occasionally go off into the wilderness detour that we know as cancer. A substantial contribution toward that pathfinding is acknowledged in the award to Dr. Fieser, who thinks of the disease in terms of strange diagrams of molecular structure.—*The New York Times*.

SCIENTIFIC BOOKS

ORGANIC CHEMISTRY

High Polymers. Editorial Board, R. E. BURK, H. MARK and G. S. WHITBY. *Volume I. Collected Papers of W. H. Carothers on High Polymeric Substances*. By H. MARK and G. S. WHITBY. Illustrated. xix+459 pp. New York: Interscience Publishers, Inc. 1940. \$8.50.

Volume II. Physical Chemistry of High Polymeric Systems. By H. MARK. Illustrated. vii+345 pp. New York: Interscience Publishers, Inc. 1940. \$6.50.

IN the introduction to the series, "High Polymers," included in Volume I, the Editorial Board points out the technical and theoretical importance of high polymeric materials to the chemist. They set as their aim in this series the collection of our present knowledge in this field.

Volume I in the series, as the name shows, is a collection of the original papers of Carothers on high polymers and closely related topics. The volume contains a biography of Carothers; his papers reprinted under the headings: Studies on Polymerization and Ring Formation; Acetylene Polymers and Their Derivatives; Miscellaneous Papers; and a complete bibliography of Carothers' papers and patents. The value of the original papers has been increased by the preparation of an index which is a great aid to the student in locating specific topics.

Volume II in the series is essentially a revised edition of Professor Mark's "Allgemeine Grundlagen der hochpolymere Chemie." It contains a discussion of the fundamental concepts in general and physical chemistry which the author deems to be essential for the student who expects to work in the high polymer