tation on the origin and development of social strata within the group and a plea for human ecology as a science.

It must be reiterated that some of these essays are extremely well done. The chapter on ancient man is a gem. But one has the feeling that the book is a series of blocks and not a building. The author appears to have gathered together a group of special libraries and to have abstracted their contents systematically and accurately, but separately. The result might be called "a contribution toward a source-book for students of human ecology." It hardly is a textbook on human ecology. There is an exhibit of warp and woof of various colors, but they are woven into no fabric. The author deserves great credit, nevertheless, for his philosophical approach to the subject as an organic whole.

It is to be hoped that Mr. Bews will write a second book with this one as a basis. One would like to know just what part has been played by genetic variability, by meteorological factors, by proximity to sea or lowland or forest or mountain, by presence or absence of various plants and animals, by religion and taboo, and by a thousand and one other matters, on the development of the various clans of the human race. Doubtless there would be errors of omission, faulty conclusions, incorrect emphases and other forgivable sins committed by any one undertaking such a stupendous task. What of it? It would be an interesting and stimulating adventure. And at least an introduction could be written without much more of an expenditure of time than Mr. Sarton has taken for his history of science.

E. M. EAST

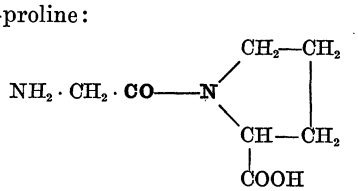
SPECIAL ARTICLES

A NEW TYPE OF ENZYME IN THE INTESTINAL TRACT

THERE are two different types of peptide linkage in proteins. The majority of amino acids possess an α-amino group and are connected with each other in proteins by peptide linkages CO—NH, analogous to the linkage in glycylglycine:

$$NH_2 \cdot CH_2 \cdot \mathbf{CO}\text{——}\mathbf{NH} \cdot CH_2 \cdot COOH$$

However, proline and hydroxyproline have only an α-imino group and are connected with other amino acids by means of a particular type of peptide linkage lacking a peptide hydrogen, analogous to the linkage in glycyl-*l*-proline:



It was found in 1932[1] that peptide linkages of the second type are split by erepsin, but not by pancreatic juice.

It could now be shown that the action of erepsin on substances like glycyl-*l*-proline is due to a special enzyme. In contrast to the principal proteolytic enzymes of erepsin, dipeptidase and aminopeptidase, the new enzyme is not appreciably inhibited by cyanide.

The fact that in some proteins (collagen, gelatin) more than one quarter of the peptide linkages[2] require the action of the new enzyme lends significance to its presence in the intestinal mucosa.

MAX BERGMANN
JOSEPH S. FRUTON
THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH
NEW YORK, N. Y.

1 M. Bergmann, L. Zervas, H. Schleich and F. Leinert, *Zeits. physiol. Chem.*, 212: 72, 1932; M. Bergmann, L. Zervas and H. Schleich, *Ber.*, 65: 1747, 1932.

2 M. Bergmann, *Jour. Biol. Chem.*, 110: 471, 1935.

THE ALCOHOLIC ADMISSIONS TO BELLEVUE HOSPITAL[1]

DURING the 34-year period of 1902–1935, inclusive, the Psychiatric Division of Bellevue Hospital has recorded 256,755 separate alcoholic admissions. From this average of over 7,500 alcoholic admissions per year a large source of material is available for psychiatric, medical, sociological, economic and public health studies. Data relative to the admissions per annum, the admission rate per capita population, both crude and specific, and the changing proportion of female admissions are recorded in this paper.

The total admissions (Fig. 1) rose from 5,830 in 1902 to a maximum of 11,307 in 1910. In 1911 a downward trend in alcoholic admissions began, and in 1919 7,962 admissions were recorded. War-time prohibition went into effect on July 1, 1919, and the eighteenth amendment became effective on January 17, 1920. In 1920 there occurred a precipitous fall in the number of alcoholic admissions to a low of 2,091, with about the same number of admissions in 1921. From 1922, when there were 4,083 admissions, the trend was upward, reaching 9,542 in 1933, the largest number of admissions since 1910. In 1934, the first

1 Observations on the admission rate per capita population and the sex distribution, 1902–1935. From the Departments of Medicine and Psychiatry, New York University College of Medicine, and the Psychiatric Medical Service of the Third (New York University) Medical Division of Bellevue Hospital, New York.

FIG. 1. Total alcoholic admissions, 1902–1935.

full year of repeal, only 7,649 admissions were recorded, but in 1935 there was an increase to 9,139.

The number of admissions in 1935 exceeded slightly the level of the 1902–1911 period. The estimated population of New York City, however, increased from about 3,432,000 in 1902 and 4,845,000 in 1911 to 7,602,000 in 1935. We have therefore calculated the alcoholic admission rate per 1,000 population of New York City (Fig. 2). These figures show a peak of

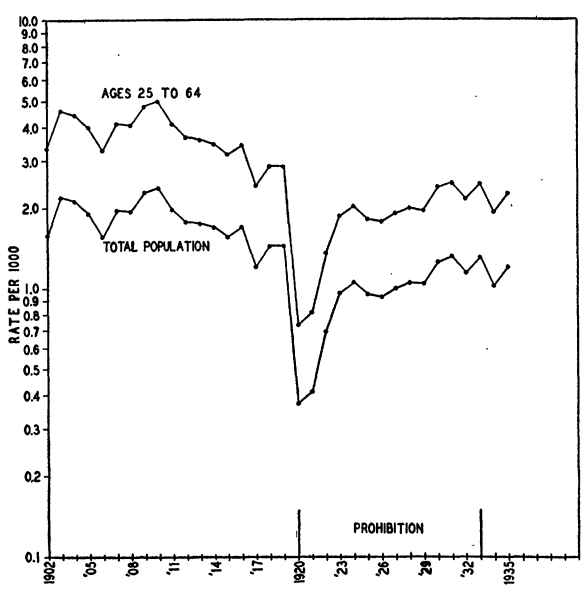


FIG. 2. Alcoholic admission rate per 1,000 total population and per 1,000 population ages 25 to 64, New York City, 1902–1935. Plotted on a semi-logarithmic scale.

2.37 admissions per 1,000 population in 1910, with an average of 1.98 for the ten-year period of 1902–1911. From 1912 to 1919 the admission rate per 1,000 population decreased to 1.44. With the advent of prohibition the admission rates fell to 0.37 and 0.41 in 1920 and 1921, respectively, averaging 19.7 per cent. of the 1902–1911 level. Beginning in 1922 the trend was upward, reaching 1.30 per 1,000 population in 1933. The average admission rate for the last five years of prohibition (1929–1933) was 1.21, which is 61.1 per cent. of the 1902–1911 level. In 1934 and 1935 the admission rate per 1,000 population was 1.02 and 1.20, respectively, which is 51.5 and 60.6 per cent. of the 1902–1911 level.

Since about 95 per cent. of the alcoholic admissions are between the ages of 25 and 64—which age group makes up but 53.1 per cent. of the population of New York City (1930 census)—we have calculated the admission rate per 1,000 population of New York City in this specific age group (Fig. 2). The peak was reached in 1910 with 4.99 alcoholic admissions per 1,000 specific population of New York City, and an average rate of 4.16 during the 1902–1911 period. During the period of 1912 to 1919 there was in general a progressive decline, falling to 2.85 admissions per 1,000 specific population in 1919. During the first two years of prohibition (1920 and 1921) the admission rate per 1,000 specific population was 0.73 and 0.81, which gives averages of 18.5 per cent. of the specific admission rate for the 1902–1911 period and 26.2 per cent. of the preceding five years. Beginning in 1922 the trend was progressively upward, and a rate of 2.44 per 1,000 specific population was reached in 1933. The average admission rate for the last five years of prohibition (1929–1933) was 2.28, which is 54.7 per cent. of the 1902–1911 level. In 1934 and 1935, the first two years of repeal, the admission rate was 1.92 and 2.26, respectively, per 1,000 specific population, which is 46.0 and 54.3 per cent. of the 1902–1911 level, and 84.2 and 99.0 per cent. of the 1929–1933 level. It may be calculated that if the present per capita alcoholic admission rate to Bellevue were as high as the 1902–1911 level we would have admitted 16,800 alcohol addicts in 1935 instead of 9,139.

During the period of this study, striking changes in the percentage of female alcoholic admissions have occurred (Figs. 3 and 4). In the ten-year period of 1902–1911 female admissions made up 26.0 per cent. of the total. Following 1912 the trend in the percentage of female admissions was progressively lower, so that in 1933 but 13.5 per cent. were females. This progressive fall in the proportion of female admissions was due to a greater decrease in female than in male admissions (Fig. 3). For instance, the average admission rate of male alcoholics per 1,000 specific male population during the last five years of prohibition was 64.0 per cent. of the 1902–1911 level; the average admission rate of female alcoholics per 1,000 specific female population for the same period was only 31.3 per cent. In 1934 and 1935 the proportion of female admissions rose to 17.9 per cent. of the total for each

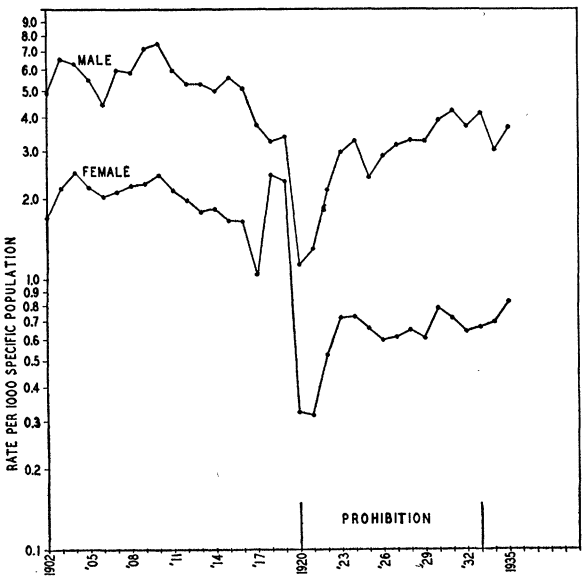


FIG. 3. Specific male and female alcoholic admission rate per 1,000 male and per 1,000 female population, New York City, ages 25 to 64. Plotted on a semi-logarithmic scale.

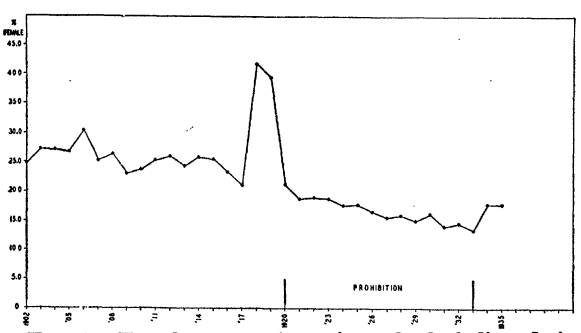


FIG. 4. Female proportion of total alcoholic admissions, 1902–1935.

year. In 1934 this was due primarily to a decrease in the male admissions and in 1935 to an increase in female admissions.

The downward trend in the percentage of female alcoholic admissions was interrupted during the years 1918 and 1919, when 41.8 and 39.5 per cent., respectively, of all alcoholic admissions were females. This increase in the proportion of female admissions was due partly to a lowering of the male admission rate, but chiefly to an increase in the female admissions over 1917 by about 230 per cent.

COMMENT

The highest rate of alcoholic admissions during these 34 years occurred in the 1902–1911 period, when the average admission rate was 4.16 per 1,000 specific population. During the 1912–1919 period there was a definite downward trend in the admission rate. During this period intensive propaganda, consisting of truth, part truth and no truth, was released by certain temperance organizations. These organizations stressed the influence of alcohol on longevity, prosperity, morals, crime and insanity. The success of the temperance organizations in molding public opinion is evidenced by the adoption of the eighteenth amendment in 1919, while only eight states had prohibited the sale of liquor in 1912. It is possible that this propaganda had its influence on many people of New York City, decreasing the incidence of intemperate drinking and thereby lowering the alcoholic admission rate.

Whether or not this is the correct explanation of the 1912–1919 fall in alcoholic admissions, the rate per 1,000 specific population for the five years preceding prohibition (1915–1919) averaged 70.7 per cent. of the 1902–1911 level. The fall in the admission rate per 1,000 specific population to an average of 0.77 for the first two years of prohibition followed precipitously the adoption of the eighteenth amendment, and reduced the admission rate to 26.2 per cent. of the average of the previous five years (1915–1919). The years 1920 and 1921 represent the maximum effect of prohibition on the alcoholic admission rate. On this basis, and by comparison with the 1915–1919 admission rate, we may grade the eighteenth amendment as about 75 per cent. effective in New York City for these two years. The last five years of prohibition (1929–1933) present a different picture. The average admission rate for this period was 77.5 per cent. of the 1915–1919 period. We may therefore on the same basis grade prohibition as about 25 per cent. effective during the last five years of its existence. The admission rates for 1934 and 1935 show no increase over the 1929–1933 level. On this basis prohibition during its last five years was 100 per cent. ineffective in reducing alcoholic admissions to Bellevue Hospital. To predict the trend in alcoholic admissions following repeal on the basis of the 1934–1935 experience would be mere speculation.

The decrease in percentage of female alcoholic admissions from an average of 26.0 per cent. during the 1902–1911 period to 21.4 per cent. in 1920 and 13.5 per cent. in 1933 is progressive and definite, with prohibition apparently not influencing the downward trend. These figures do not support the contention that prohibition and the speakeasy increased inebriety among women. The marked rise in female admissions in 1918 and 1919 may have been due in part to an increase of social drinking occasioned by entertaining soldiers embarking for and returning from overseas. It may, however, be an expression of unhappiness on the part of the women over the war-time absence of a portion of the adult male population. If the latter is true, the mere absence of the men, rather than

worry over the danger to which they were exposed, played the most significant rôle, as the percentage of female admissions was almost as large in 1919, when hostilities had ceased, as in 1918. The rise in female alcoholic admissions to 17.9 per cent. in 1934 and 1935 is too brief an experience from which a significant change in the trend may be predicted.

NORMAN JOLLIFFE

BELLEVUE HOSPITAL
NEW YORK, N. Y.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE USE OF POLARIZED LIGHT IN THE SIMULTANEOUS COMPARISON OF RETINALLY AND CORTICALLY FUSED COLORS

THE importance of the study of the binocular fusion of colors to present theories of color vision makes the phenomenological study of such cortical mixtures a matter of vital interest.[1] The writers have long been interested in the phenomenological comparison of the "cortical yellow" reported by Hecht and the usual, monocularly mixed yellow. Such a study is best carried out under conditions permitting a simultaneous comparison of the colors. The problem of presenting two adjacent stimulus fields, one of which will be presenting red to one eye and green to the other, while the other field is presenting *both* colors to *each* eye, is a difficult one for the laboratory lacking elaborate equipment. The method outlined below is inexpensive, easily set up and adaptable to other visual demonstrations.

Two light sources are used, one containing a red filter, the other a green filter. The light from each of these sources is projected through a polarizing lens upon a directional screen, which maintains the polarization of the light while reflecting it. Aluminized oil cloth makes an excellent screen, although any material covered with aluminum paint will serve. The polarizing lenses are those furnished by the Polaroid Corporation of Boston, and consist of a plain glass lens containing a polarizing material. If the two polarizing lenses are oriented at right angles to each other the directional screen will be reflecting polarized red light oriented in one direction and polarized green light oriented in the opposite direction. To the observer, the screen will appear as a yellow surface. If, however, the observer will place two more polarizing lenses one before each eye (they may be fitted into a spectacle frame for convenience), one oriented to admit the red light but exclude the green, the other to admit the green but exclude the red, the result will be retinal rivalry, since each eye will be stimulated by a different color. Under the correct conditions, cortical fusion will take place and the "cortical yellow" of Hecht will be observed. Preliminary work seems to indicate that this fusion may be helped by reducing the area of the stimulus field. This may be done by surrounding the screen with a black border of variable width.

In order to get simultaneous comparison of cortically and retinally fused colors, one can place a piece of white paper upon the aluminum screen. For small areas white adhesive tape will serve. The light striking this material will not maintain its orientation but will be depolarized and hence neither the red nor green light from this area will be stopped by the polarizing lens worn by the observer. As a result, the screen presents two adjacent fields of stimulation to the eyes, one field supplying red to one eye and green to the other, the other field supplying both red and green to each eye. The observer is thus able to simultaneously observe both retinal and cortical fusion. Intensity values of the two fields may be adjusted by rotating the screen upon a pivot. Since the light is reflected directly ahead from the aluminized portion of the screen, but reflected at all angles from the paper, rotation will cause a relatively greater loss in intensity for the aluminized part as compared with the paper. The same effect may be obtained by varying the angle from which the observer views the screen.

EDWIN H. LAND
LAND-WHEELRIGHT LABORATORIES

WILLIAM A. HUNT
CONNECTICUT COLLEGE FOR WOMEN

[1] S. Hecht, *Proc. Nat. Acad. Sci.*, 14: 237–240.

A PRECISION APPARATUS FOR MIXING GASES IN VARIOUS PROPORTIONS

IN a previous communication[1] we have shown how broken automatic pipettes can be utilized in the construction of some useful laboratory apparatus. The present note describes another appliance of considerable scientific importance also constructed out of two 50 cc automatic pipettes, which were rendered useless because of the breakage of the oval caps, and some other glass apparatus easily obtainable in any laboratory. The recent researches of Blackman,[2] Kidd and West,[3] and Singh[4] on the physiology of higher plants and of Warburg[5] and Keilin[6] on the respiratory enzymes have established that some of the fundamental

[1] Singh and Mathur, SCIENCE, 82: 2139, 626, December 27, 1935.
[2] Blackman, *Proc. Roy. Soc. (Lond.)*, 103B: 491, 1928.
[3] Kidd and West, *Proc. Roy. Soc. (Lond.)*, 106B: 93, 1930.
[4] Singh, Malaviya Commemoration Volume (Allahabad), 1932.
[5] Warburg, *Biochem. Zeitschr.*, 177: 471, 1926.
[6] Keilin, *Proc. Roy. Soc. (Lond.)*, 104B: 206, 1929.