scarcely have kept track of the rapidly growing literature of this question of the influence of the metabolism of nitrogenous food upon the general nutrition without being impressed with the effect that in the vast majority of cases in England and America the general custom is to take too much nitrogenous food—too much meat. It seems to me that there are two rather antagonistic positions taken in Dr. Haig's paper. I can not reconcile his statement concerning the perfect parallelism of nitrogenous ingesta and egesta with varying muscular force and work capacity, with his insistence upon a bread diet. Bread diet is largely a carbonaceous food and has to be taken in very considerable quantities to get a sufficient amount of albumin. The muscular power varies largely with the oxid of the carbonaceous rather than of the nitrogenous element. The nitrogenous element is, I consider, absolutely essential up to a certain amount. After that it is excreted or oxidized day by day, so that the nitrogenous excreta after a certain minimum is going to vary with the nitrogenous ingesta. This maintains the nitrogenous equilibrium. I have read nearly all that Dr. Haig has written, and am in sympathy in general with his opinions. I wish sincerely that he were here, for I believe he would clear up this which seems to be an ambiguity in his presentation of the subject.

DR. DAVID PAULSON, Chicago—It is surprising how little attention the medical profession gives to the subject of practical dietetics. We have been so busy studying pathology and surgery that we have but little time to give to dietetics, the very neglect of which is causing so much material for pathological study. Something which Dr. Haig wrote several years ago led me to undertake some experiments to determine whether or not the quantities set down in the ordinary text-books were not in excess of the real amount required by the human system. I, therefore, selected ten medical students and had them weigh the exact amount of fully toasted bread consumed each day for two weeks. The majority of this class of ten students were young men and women who were working their way through medical college. The average amount consumed was 16 ounces a day of nearly water-dry bread. Every member of the class gained in weight, some as much as three pounds on 16 ounces of bread a day. A second experiment was undertaken upon nearly 300 healthy young people, and it was found that they consumed on the average 16 ounces of starch, 2.8 ounces nitrogenous food, and 1.5 ounces of fat; this investigation was continued for several weeks. It may be fairly assumed that this is not far from the normal proportions, as these young people selected the food for themselves from an extensive bill of fare. Their weight was taken at the end of each week, and the entire experiment was conducted with the most careful and scientific accuracy by the Battle Creek Sanitarium Laboratory of Hygiene. It was shown from this that the figures set down by Pettenkofer and others are entirely too large for us to follow, in this country at least, and, secondly, that we normally use a larger amount of carbonaceous food than has been generally supposed. One part nitrogenous to four parts carbonaceous, as has been suggested by some, is certainly altogether too high. This tends to overstock the system with nitrogenous food elements and tends to produce the uric acid diathesis. I do not agree with all Dr. Haig's conclusions, yet I do believe that the medical profession is greatly indebted to him for the valuable researches that he has made in dietetic lines. I have been interested in noticing the power of endurance possessed by persons who live on a uric-acid-free diet. It has been my fortune to study some of the leading long distance runners, etc., and a number of the most successful of them live upon an entirely non-flesh dietary. The long-distance bicyclist, Nelson, is, I believe, a vegetarian. In these long distance races the flesh-eaters will generally lead for a short time, but the non-flesh eaters will almost invariably out-distance them, and get off their bicycles as though they had had no special exertion, while the others often have to be assisted. Another cyclist who a few years ago made a large number of successful long-distance records used no meat, nor tea, nor coffee. He stated to me that when he started out on short-distance runs the meat-eaters could out-distance him, but when they had reached the last ten or fifteen miles they would be nearly used up, while he would be almost as fresh

as when he had ridden only fifteen or twenty miles. I have been much interested in metabolism of nitrogens, and believe that there is much more to this subject than we now see. I hope we shall soon acquire more definite and satisfactory knowledge in this direction.

DR. JAMES PUTNEY, Charleston, W. Va.—It seems to me as if Dr. Haig were seeking to secure recognition of facts which physiologists have recognized for some time. The average of nitrogenous food is given as 100 grams per day. In the interesting account which Dr. Paulson has given us we see that the students live upon 16 ounces of bread per day, about 2 ounces of nitrogenous material. This is not so much out of the way so far as statistics go. It seems to me, too, that Dr. Haig is taking a one-sided view in his remarks about uric acid results. It is well recognized to-day that there are two classes of uric acid cases—cases of dietetic-origin, and cases of tissue destruction origin. I question whether the larger class is not the latter. It is true that we find among those people whose muscular exercise is deficient a tendency to ingest excessive quantities of food. This gives rise to the assumption that disorders of the nitrogenous metabolism are due to that fact. It should also be remembered that there is an equality in the gastric function. Nothing is better recognized to-day than the fact of the breaking down of the leucocytes attended with the development of uric acid. This indicates the distinction between those cases of nitrogenous disorders of metabolism traceable to the short cut, which the nitrogenous elements of food in excess take and the long course which the nitrogenous metabolism of tissues involves. As an illustrated case on this I want to submit the following: Mr. G., 59 years, full habits, temperate, good history, when he partook of full meat diet suffered most intense headaches and would be in bed for a day or so. With meat diet cut off, he would not have attacks until he returned to meat diet again.

THE CHAIRMAN, DR. CHARLES M. HAZEN, Richmond, Va.—I fancy Dr. Haig wishes most of all to insist upon a vegetable source of albumin, so as to get rid of ready-formed uric acid and other waste nitrogenous matter. In a recent monograph by Dr. Mallet, of the University of Virginia, it is shown conclusively that such products as kreatin and kreatinin whenever present in meats simply load up the system with proteid material of no value whatever. The point was touched upon in our discussion of the last paper in connection with food products from animals, in which it was stated that exhausted beef could not furnish proteids suitable for food.

METAMORPHOPSIA VARIANS.*

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It is possible in presenting this subject that the writer is simply going over ground that has been well covered before; though, with the endeavor to find some reference to it during the past five years, I have left no opportunity unimproved to do so, and yet without success. In fact, the subject of metamorphopsia, except that caused by the correction of astigmatism, has received but very little attention by any writer on ophthalmology to whose works I have had access; and if the cases of this variety are as uncommon as I am led to believe, the following may prove of some interest.

On June 6, 1896, while examining C. F., aged 45, for his refraction, and when obtaining his best vision with his right eye, he remarked that it was difficult to make out the line—the 30-foot line—on account of the rapid movement of the letters. He stated that they would approach each other, and again separate quite rapidly, and that the different letters of the line were continually moving up and down in an extremely irregular manner,

* Read at the Fifty-second Annual Meeting of the American Medical Association, in the Section on Ophthalmology, and approved for publication by the Executive Committee of the Section: Drs. J. A. Lippincott, Casey A. Wood and H. V. Würdemann.

and at the same time the outline of the various letters were undergoing continual change.

Inasmuch as this patient was a man of more than ordinary intelligence, occupying the position of superintendent of the erecting department of one of our large railroad repair shops, I felt bound to pay some attention to his statements and investigate the subject somewhat farther.

I will state here that the left eye was found normal, with the exception of a moderate amount of hyperopia, which when corrected with +1.25 D.S., saw 20/20+, and that in binocular vision, no metamorphopsia was present.

The right eye was then placed under full mydriasis, and the various anatomical parts studied separately. The cornea showed no variations from the normal, by focused or reflected light, and although a mechanic, it showed no maculæ caused by foreign bodies, which such patients are likely to present. Examined by the Javal ophthalmometer, model 1889, it showed one-half diopter of astigmatism with the axis 105° , but perfectly regular;

all the circles and radiating lines on the large disc of this instrument were perfect.

In using the skiascopic mirror, no irregularities of the refractive media could be made out. The aqueous was clear, and the lens was transparent throughout.

The lens was now examined for possible irregularity of outline, or density, or the possibility of a lenticonus; but the reverse shadow at the point of greatest refraction, which is present in these cases, was absent, as well as the wheel-like motion, which is observed in the shadow, where the central portion of the illuminated area has a greater degree of refraction than that surrounding it; in short, the skiascope revealed nothing unusual in an eye with +.75 D.S. and +.50 D.C. axis 105° , which was his proper correction.

Neither the plain mirror nor the ophthalmoscope showed any variation from the normal in the appearance of the vitreous, which was absolutely clear throughout. The result of the examination of the background of the

eye was equally negative. The appearance of the optic disc, distribution of blood vessels, as well as the macula, were entirely free from any abnormality.

In observing the diagrams, the left-hand column represents the original figures, the remainder, those seen by the patient.

The changes which were said to take place in certain outlines were now studied, and he was directed to do this at a distance of fifteen feet, and was asked to record on a tablet some of the changes which these various outlines underwent. At first he was directed to look, with the left eye covered, at a 100-foot L, when the letter took on the various changes represented on the diagram. Next he was asked to look at two parallel lines 100 millimeters long and 25 millimeters apart, with a small cross in the center between them, when all and many more of the changes here represented took place. I will state here that all of these drawings are copies of those made by the patient himself, while the examination was being made.

He was then directed to observe a double cross, with a small cross in the center, of the same general dimensions as the former figure, with the result that all the lines underwent rather rapid changes in their shape and direction; sometimes the vertical lines were more affected, and sometimes the horizontal, and sometimes they were all affected at once, as will be observed in the diagrams. He was then directed to look in succession at a vertical line, about 10 centimeters long, with a small cross at its middle; a circle 6 centimeters in diameter, with a dot in its center; a square 4 centimeters across, with a small cross in its center, and a diagonal square of about the same dimensions as the previous figures, fixing his vision on the small cross, and the distorted figures here shown are a few of the shapes these figures presented.

This examination was made both with and without his glasses on; with his pupils wide; and also with his accommodation intact, and the result was always the same.

These observations were continued with the patient looking through a stenopeic slit, and the pinhole disc, when the result was the same, with the exception that the changes were much slower. Various colored glasses were also used, and the only difference observed was a reduction of the rapidity of the changes; and it appeared to make no difference by what means the reduction of light entering the eye was obtained, whether by the stenopeic slit, the pinhole or by colored glass, or by glass of different colors so far as my observations went.

The reduction of the frequency of the changes by reducing the amount of light entering the eye was utilized in making the diagrams; for with full illumination the rapidity of changes was so great that it was very difficult to carry the impression long enough to record it on paper, while with a colored glass, or a narrow slit, it could be done much more readily.

In order to determine the area of this metamorphopsia region, the patient was directed to look at the various corners of one of the large diagrams and the metamorphopsia was found to extend a little over a degree in either direction, which is about as far from the point of fixation as the average individual would be able to state whether a line was straight or curved, especially with the added confusion of constantly changing position of the lines in the intervening space.

CASE 2.—Mr. J. H. M., aged 50, consulted me May 24, 1897, in reference to his refraction. The same methods of examination described in the previous case were used in this, but no lesion or physiological peculiarity in any of the refractive media or fundus could be made out.

While examining his right eye for his distance vision he complained that the letters did not retain their shapes or positions in the line, and that some of them would disappear, to return an instant later; others would move up and down about one-half their height, but not much sidewise.

This gentleman is a merchant, though at times he has paid considerable attention to landscape drawing and painting, and was, therefore, able to reproduce on paper quite accurately what he saw.

In going over the subject with him I used the same diagrams which were used in the previous case, and the accompanying drawings represent as nearly as possible some of the forms which these figures took on. While looking at a word at reading distance one or two of the letters in the center of the word would move up, and the whole word would be likely to form a curve with its convexity up, to remain but an instant, and then to return to take on some other unusual form. In studying

therefore unnecessary to repeat here. The result was negative so far as the eye itself was concerned, but inasmuch as there were some points so unlike the others they may be described. For example: while looking at the circle, it appeared to elongate; then a constriction would appear near the center, when it will appear for an instant like a figure 8, and sometimes with a dot in both circles and sometimes not.

While looking at the vertical line with the cross, the cross would curve sometimes up and sometimes down, and at the same time would appear double, and the two cross lines would approach and become one, and again separate. In looking at the square with the dot in the center, this figure would undergo many of the changes observed in the circle; it would elongate and sometimes become contracted in the center and sometimes not, and also would occasionally have two dots, one in the upper and one in the lower part.

In studying the diamond-shaped figure it sometimes took on nearly the figure of 8 form, as in the square and circle, but when looking at the left corner of the

these figures, it will be noticed that the horizontal lines are the ones most affected, while the vertical lines changed but little.

As this patient's home is several hundred miles from Easton, it has been impossible to obtain but a single opportunity of studying his case; by correspondence, however, I learned a year or so after my examination, that whenever he used the right eye alone the same varying metamorphopsia was present.

CASE 3.—Mr. G. M. R., aged 57, came June 23, 1898, for an examination of his eyes, and here again while examining his right eye, the patient complained of the letters moving about and changing their shapes.

As this gentleman, like the others, was a man of more than ordinary intelligence, a member of a large wholesale firm in the town, I felt I might rely upon his statements, and accordingly went through all the various methods of examination as in the previous cases, and

diamond, the upper left and the lower right lines take on convex curves without the other side lines being seen at all.

In order to determine the actual extent of the metamorphopsic region, he was requested to look at the center of a card with radiating lines, and was asked to observe how far these lines were affected from the point of fixation, and a careful measurement showed the area to cover about one degree, or thirty minutes either way from the point of fixation.

In observing the changes which took place in the various figures, this patient stated that when he gazed steadily at a figure for a few seconds it would go through certain changes for the period of a few seconds, when the changes would cease and remain stationary till the point of fixation was changed a little or he winked, when the process was set in motion again.

In this case, as in No. 1, the reduction of the intensity

of light was followed by a reduced frequency of the changes, and was made use of in the same manner in making the diagrams. In this case the vision of the affected eye was 20/40 and was not improved by glasses; in fact, by skiascopy the eye appeared emmetropic, and doubtless without the metamorphopsia it would have had full acuity of vision. In this case also the left eye was emmetropic and vision normal.

This patient feels that he is able to fix pretty accurately the time when this disturbance began; he states that when about 15 years old he began to shoot with the rifle and became something of a crack shot, but at about 25 years of age he found he could hit nothing, became discouraged and gave up the rifle, though he did not know that the eye did not see as well as the other till becoming presbyopic and was examined for glasses.

In reference to the cause of the peculiar changes which these outlines undergo when observed by these patients, I have endeavored to settle the question as nearly as possible in reference to the refractive media, and it seems to the writer that pathological changes and physiological peculiarities of this region can be eliminated, as cause of the metamorphopsia.

At first I was inclined to believe that the location of this disturbance must be central, but upon more careful study of reported cases of hemianopsia it seems that those due to destruction of the visual center of one side, the vision at the macula has been preserved on both sides, which if true, would leave but one location for the disturbance, viz., in the retina, and this of a form not producing ophthalmoscopic lesion.

It may be suggested that some small lesion of the retina producing a metamorphopsia, being accompanied with a small amount of nystagmus, might be held responsible for this visual disturbance. In endeavoring to settle this question I had Case 3 look through the Maddox groove, and it did not show the rapid oscillation of the line which one might expect, if a nystagmus existed; though I am of the opinion that in some cases of monocular nystagmus this disappears in binocular vision, which would render this test invalid. I may also state that in examining these cases with the ophthalmometer there was no oscillation observable.

It is now five years since my observations began with the first case and three years since Case 3 was first examined, and recent examination of both of these cases shows the same varying form of metamorphopsia to exist.

It will be noticed that all three cases were males; in each the right eye is the one affected; and inasmuch as they were unable to get the metamorphopsia in binocular vision, neither became aware of his defect till about the time he became presbyopic and had his eyes tested separately.

DISCUSSION.

DR. S. D. RISLEY, Philadelphia.—The very careful and elaborate study Dr. Dudley has made of his cases removes the paper from the realm of discussion since all conceivable causes of metamorphopsia seems to have been excluded. I am inclined to believe that minor grades of metamorphopsia are not so rare as would seem to be indicated in literature, but I have always been able to discover its cause. The chief interest in Dr. Dudley's cases therefore seems to center about the absence of any explanation for the distortion of the images, in the three instances he has presented for consideration.

DR. G. C. SAVAGE, Nashville, Tenn.—In the cases of metamorphopsia presented to us in his paper, Dr. Dudley has considered that the cause could be either refractive, retinal or mental. By means of retinoscopy he was not able to find any refractive cause that would account for the metamorphopsia. With the ophthalmoscope he was not able to find any changes

in the fundus. He was, therefore, almost forced to the conclusion that the metamorphopsia was mental. I do not agree with the Doctor that there are three causes for metamorphopsia. The one of his three that I would leave entirely out of the question would be the mental. I do not believe that there is a mental metamorphopsia. If there had been a refractive trouble in either of his cases that could have caused the visual changes, he would have detected same by means of the retinoscope. I believe it possible for retinal changes to exist that would result in metamorphopsia without our being able to detect any thing wrong by means of the ophthalmoscope. In any thickening of the choroid behind the macula, whether that thickening be due to the exudation of serum or a deposit of plasma, there must of necessity be a disturbance in the relationship of the cones. Every cone and every rod should point towards the center of retinal curvature. LaConte has beautifully said that "the rods and cones see ends on." If these ends are pointed towards the center of retinal curvature there could be no metamorphopsia other than refractive, but if they be so disturbed that some point in one direction and some in another, then metamorphopsia must exist. We all know how patients complain of metamorphopsia when there is a beginning central choroiditis. If Dr. Dudley's cases had been congenital, I would be inclined to the idea of a loose arrangement of the rods and cones. The variability of the metamorphopsia in his reported cases constitutes an interesting feature.

A PLEA FOR GREATER UNIFORMITY OF STRENGTH AND EXACTNESS IN OUR MEDICAL ARMAMENTARIUM.*

C. F. WAHRER, M.D.

FT. MADISON, IOWA.

The subject of my paper may not be new to anyone here, and, like the longing for immortality and the fabled Fountain of Youth, may be somewhat utopian in its nature, yet we must not forget that keeping eternally at it has often been followed by good results.

We certainly can not admire Shakespeare for the originality of his subject-matter, for everything he wrote was either old history or romance before he was born, but the manner in which he put it, and the way he said things and made his hearers and readers feel it, there is where Shakespeare is great. So if I can impress you with what I have to say in such a manner that you can all feel it, and so it will do good, my ambition will be satisfied.

We are all aware that in the good old days we guessed at many things, at diagnosis, at etiology, at pathology if it was considered at all, and also at the therapeutics that entered into our treatment. We do some of these things better now. We diagnose almost perfectly, by means of instruments of precision, by reasoning, by an improved symptomatology, by bacterial and chemical tests, by reflexes and many other means. The microscope also aids in our pathology, which in many instances we may call perfect. We know more of the etiology of diseases and this alone also suggests the treatment. Of these achievements we are not only reasonably proud, but feel that we are peculiarly blessed that we live in this x-ray age, so full of possibilities for us all. But in one thing still much, very much indeed, is desired, and that is after all the main thing, namely, our therapeutic means of combating disease. We may be somewhat blinded by the fact that the number of our remedies is wonderfully increased. Many old and use-

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