might, therefore, be suggested that here pigment is formed through the metabolic processes of the cell, if it were not for the fact mentioned above, that a similar position of the pigment at one side of the nucleus is to be found in cells which very probably do not produce the pigment, but receive it from other sources. How these two apparently opposing facts can be reconciled will have to be determined by further investigations. We may, however, state that, with great probability, the relations of the chromatophores to the ordinary epithelial cells is somewhat different in different classes of animals.

The pigment originates in the epidermis, and the production of melanin is a peculiarity of certain epithelial cells which preserve this function if they are transplanted to a place where formerly non-pigmented cells were present. The melanin in the chromatophores is probably derived from the proteid substances of the cell and is very likely not directly produced from a derivative of the hemoglobin for the following reasons:

1. The sulphur content of the melanin is very large.⁷
2. From the melanin decomposition products can be obtained similar to the ones obtained from the melanoidins, which themselves can be produced with the aid of acids from proteid substances.
3. Tyrosin, a radical, present in cell proteids, can, with the aid of an oxydative ferment tyrosinase, be transformed into substances similar to the melanin of sepia, and similar, probably, to the melanins of vertebrates. It is, therefore, not unlikely that the production of the pigment of the chromatophores is due to a fermentation causing oxydative and condensation processes in certain decomposition products of cell proteids.⁸

That the presence of chromatophores and of pigment in the cells is not without consequences is shown by the difference in the regenerative power of the white and pigmented skin of the guinea-pig after transplantation. Whether this difference is due to the different degree of absorption of light, and perhaps of other rays, is yet to be investigated. The theory that all chromatophores are derived from one specialized kind of mesodermal cell, the melanoblasts, I believe I have shown to be without foundation.⁹

DIABETES MELLITUS.

REPORT ON A CASE, INCLUDING A NEW METHOD OF PROGNOSIS.*

(From the Physiological Laboratory of the University and Bellevue Hospital Medical College.)

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AND

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A diabetic patient with a low acidosis and with no trace of albumin in the urine, when put on a meat fat diet, showed a constant ratio of dextrose to nitrogen in

the urine. The ratio was Dextrose: Nitrogen=3.65:1, and is the same as that found in dogs made diabetic with phlorhizin. This ratio was uninfluenced by fat digestion or by fat metabolism. The sugar was, therefore, derived from proteid alone, and rose and fell with the proteid metabolism as indicated by the amount of urinary nitrogen. The patient died five weeks later.

There was apparently a complete intolerance for carbohydrates; 85 per cent. of starch and 80 per cent. of levulose fed were excreted as sugar in the urine. Withdrawal of the carbohydrates from the diet and the continuance of the same proteid-fat quantity in the food had no effect on the excretion of nitrogen in the urine, which indicates a complete intolerance for carbohydrates.

A sufficient quantity of meat and fat for the body's needs was readily assimilated. Only 4 per cent. of the available energy of the food appeared in the feces.

The urea elimination was normal. The sulphate excretion ran normally proportional to the proteid metabolism. The phosphates ran abnormally high, as is usual in diabetes.

The above research, when considered in the light of other work to be found in the literature, enables us to formulate a new clinical method of prognosis in diabetes, using the D:N ratio for this purpose.

The procedure is as follows: If a diabetic be put on a meat-fat diet (rich cream, meat, butter and eggs), and the twenty-four-hour urine of the second day be properly collected,¹ the discovery of 3.65 grams of dextrose to 1 gram of nitrogen signifies a complete intolerance for carbohydrates, and probably a quickly fatal outcome. We have called this the fatal ratio. A lower relation between dextrose and nitrogen means that some proteid sugar may be burned. Such a tolerance for sugar may be increased on a meat-fat diet, so that the D:N ratio falls, or the sugar in favorable cases may entirely disappear from the urine.

DISCUSSION.

DR. VICTOR C. VAUGHAN, Ann Arbor—This paper shows: 1, that proteid overfeeding may easily be done in diabetes; 2, that the dietary as given by von Noorden is not the proper dieting; 3, that one must estimate the total nitrogen; 4, urea determinations are not sufficient; 5, he finds here that his relation between "D" and "N" remains constant simply because they both come from the same thing. They both come from the proteid of the food, and, consequently, where one increases the other increases; when one decreases the other decreases, and the relation remains the same. Some years ago I published some dietary tables for diabetes and I have followed them ever since. The plan consists in cutting down the carbohydrates gradually, generally taking bread only, because we can estimate the amount of carbohydrate in bread easily, taking say 600 grams during the first day and cutting it down a hundred grams a day (supposing that there is about 55 per cent. of carbohydrates in wheat bread), and making good the calories not with nitrogen but with fats, and (some of you will object to this, I dare say) with alcohol. I do not believe in the general use of alcohol in medicine, but I can not treat this kind of diabetes well without alcohol. Alcohol furnishes a large number of calories and one gets no sugar. Dr. Lusk has shown that there is no reason, at least at present, for believing that any of the dextrose comes from the fats. I think we have been influenced altogether too largely in this country by von Noorden's dictum on diabetes, and I think it has done us harm.

1. The urine should be collected so that an early morning hour (before breakfast) terminates the period for one day. This is necessary, because the sugar formed from eaten proteid is eliminated before the nitrogen belonging to the same. The long period between the evening meal and breakfast allows for the elimination of both constituents.

7. Abeland Davis: Journal of Exper. Medicine, vol. i, 1896.

8. Of interest in this connection is the observation of Jacques Loeb, that the disappearance of black pigment of the yolk sac of fundulus embryos can be demonstrated if there is lack of oxygen.

9. Other references to be consulted are: L. Loeb: Untersuchungen über die physiolog. Wirkungen des Sauerstoffmangels, Pflüger's Archiv, vol. lxi. L. Loeb: Ueber Transplantation von weisser Haut auf einen Defect in schwarzer Haut u. umgekehrt am Ohr des Meerschweinchens, Arch. f. Entwicklungsmech, vol. vi, 1897. L. Loeb: The Growth of Epithelium in Agar and Blood Serum in the Living Body, Journal of Medical Research, vol. viii, 1892. L. Loeb and R. M. Strong: Regeneration of Pigmented Skin of the Frog, Amer. Jour. of Anatomy, vol. iii, 1904.

* Abstract read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Pathology and Physiology, and approved for publication by the Executive Committee: Drs. V. C. Vaughan, Frank E. Wynn and Joseph McFarland.

DR. WINFIELD S. HALL, Chicago—I indorse the recommendation that Dr. Lusk has made, that these difficult cases of nutrition, the proper treatment of which necessitates more or less extensive and expensive outlay in time and apparatus involved, extensive and expensive chemical analyses day by day and week by week, perhaps, for a long period of time, should, by common consent of the medical profession, be sent to institutions thoroughly equipped for such work, namely, the larger hospitals associated with laboratories where such work can be properly done. Dr. Lusk's paper demonstrates among several other things that, in very nearly every case that can be handled in that way from the first days, the diagnosis and prognosis can be early and surely made; and then, with this accurate, day by day watching of the case there is a step by step improvement.

DR. GRAHAM LUSK—It is known that alcohol helps the digestion of proteids in the stomach when fat is present. I might add that this patient was put on alcohol as soon as he passed out of the laboratory. The low acidosis also enabled us to dispense with the customary administration of sodium bicarbonate, which was freely allowed after the conclusion of the experiment.

A CASE OF DARIER'S DISEASE.

PSOROSPERMOSE CUTANEE FOLLICULAIRE VEGETANTE OR
KERATOSIS FOLLICULARIS (WHITE).*

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In the last fifteen years, since this affection became known under the above names, there was published in all thirty cases.¹ Cases under this heading demonstrated or published by Mansuroff, Zeleneff, Kroesing, Savill, Gra-

ham, Little, Sokoloff, Bogroff and Huber lack many essential features, and can not therefore be considered as cases of this affection.

HISTORY OF THE AUTHOR'S CASE.

Our case, which represents the thirty-first of all cases, and the sixth of the cases occurring in the United States, concerns a young man of 25, born in a small town in the south of Wisconsin. His parents are German, and claim that they do not know of any skin disease occurring in their family except the present case. They themselves have always enjoyed excellent health, as did their two daughters of 17 and 18 respectively, and their younger son of 14. The patient passed through an attack of measles in early childhood, but was otherwise well, except for accidental injuries. He was vaccinated at the age of one year, and soon afterward the first pimples were noticed on the scalp, on the face and behind the ears. They gradually and slowly increased in number until the age of 12, when they spread over the chest and back, some appearing on the arms, and very numerous on the legs. His condition grew steadily worse, especially on the legs, where three years ago the first signs of horny growths appeared. His nails became thick and broke at the free edges. Itching was scarcely noticed. He enjoyed good health, but was annoyed by the dark coloring of his face.

The patient appears strong and healthy. His hair is black, his eyes dark brown, and the whole integument rather dark. Accessible mucous membranes and internal organs normal; inguinal glands slightly enlarged. On close approach to the legs, a slight odor was perceptible. On inspection of the integument, the following symptoms were noted: The scalp showed a thick growth of healthy hairs, which appeared as if imbedded in a thick layer of dirty white brittle masses, after the removal of which the scalp looked as if worm-eaten. The face was intensely dark and greasy. The hand, on gliding over it, felt a rough surface. This roughness was caused by minute horny elevations, closely aggregated. Over the brows, around the alae of the nose and on the chin were found elevated brown papules, forming plaques. These papules were of pinhead size or slightly larger, the greater number of these showing a central horny mass.

The ciliary margins of the upper eyelids were beset with sparse horny nodules pierced by ciliae, resembling ciliary blepharitis. Behind the ears, in close proximity to the insertion of the auricles, there were located dark, almost black, tumor-like formations, fissured in different directions resembling papillomatous growths. These plaques were composed of numerous coalescing papules, with central horny plugs.

On the nape of the neck, along the hair line, on the back in the suprascapular regions and along the spine, as well as over the sternum, numerous densely arranged papules of sizes to that of a split pea were found. They were either of the color of the surrounding skin, or yellow or brown, containing a central horny plug, which latter could with difficulty be pressed out, leaving behind a crater-like opening, the base and margins of which looked as if torn. Nowhere was there found a pink or red areola around the papules. Intermingled with the papules were comedones.

Other parts of the trunk showed scanty single lesions of the above-described type, but the axillae and inguinal regions were free.

The upper extremities showed here and there a scattered lesion. The dorsa of the hands and of the fingers

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Cutaneous Medicine and Surgery, and approved for publication by the Executive Committee: Drs. H. W. Stelwagon, J. A. Fordyce and H. G. Anthony.

1. The following is a list of these thirty cases:

1. Darier et Thibault: *Annales de Dermatologie*, July, 1889, and *Thèse de Paris*, 1889.

2. Darier: *International Dermatological Congress*, Paris, 1889. (These two cases were subsequently published in the *International Atlas of Rare Skin Diseases*, Part 8, 1892, II.)

3-4. White: *Journal of Cutaneous Diseases*, June, 1889, and January, 1890.

5-8. Boeck: *Archiv f. Dermatologie*, vol. xxiii, p. 857, 1891.

9. Lustgarten: *Journal of Cutaneous Diseases*, January, 1891.

10. Buzzi and Miethke: *Monatshefte f. Dermatologie*, vol. xii, p. 9, 1891.

11. Boeck: *Second International Dermatological Congress*, 1892. *Ref. Archiv f. Dermat.*, vol. xxiv, p. 1000.

12. Schwimmer: *Archiv f. Dermat.*, vol. xxiv; *Ergänzungsheft*, p. 76, 1892.

13. De Amicis: *Second Internat. Dermat. Congress*, 1892.

14. Schweninger and Buzzi: *International Atlas*, Part 8, 1892, II. (One of these two herein published was previously reported by Buzzi and Miethke, under 10.)

15-16. Pawloff: *Archiv f. Dermat.*, vol. xxv. *Ergänzungsheft*, p. 195, 1893.

17. Fabry: *Archiv f. Dermat.*, vol. xxvi, p. 373, 1894.

18. Mourek: *Ibid.*, vol. xxvii, p. 361, 1894.

19. Jarish: *Ibid.*, vol. xxxi, p. 163, 1895.

20. Neumann: *Wiener klin. Wochenschrift*, No. 3, 1896.

21. Bowen: *Journal of Cutaneous Diseases*, June, 1896.

22. Hallopeau et Darier: *Annales de Dermatologie*, 1896, pp. 737-742.

23. Bowen: *Ibid.*, 1898, p. 6.

24. Melle: *Giornale Ital. delle Malattie*, etc., 1898, p. 365. *Ref. Annales*, p. 506, 1899.

25. Jacobi: *Verhandl. d. Deutschen dermat. Gesellschaft*, VI Congress, p. 406, 1898.

26. Caspary: *Festschrift*, Kaposi, p. 199, 1900.

27. Ehrmann: *Wiener med. Presse*, No. 46, 1901.

28. Hallopeau et Fouquet: *Annales*, p. 228, 1902.

29. Schwab: *Inaugural Dissertation*, Freiburg i. Breisgau. *Ref. Annales*, p. 627, 1903. (This case seems to be identical to that of Jacobi.)

30. Weidenfeld: *Archiv f. Dermat.*, vol. lxiv, p. 275, 1903.