QUOTATIONS

DARWIN AND DOWNE HOUSE

DOWNE HOUSE, in which Charles Darwin lived for nearly forty years, is now a gift to the nation, entrusted to the British Association for the Advancement of Science. More than a quarter of a century ago Andrew Carnegie thought of buying it and putting up a sum of money to settle, as he phrased it, one way or another, the question of evolution. But those whom he consulted felt bound to advise him that, as a business proposition, the idea was unsound. Later on Sir Arthur Shipley, Master of Christ's College, Cambridge, where Darwin had passed his undergraduate career, urged that some way should be found of making Downe House a national possession. But the times were unpropitious. A few years ago Professor H. F. Osborn, of New York, again propounded a scheme for transforming Darwin's home into an endowed center for evolutionary research, and suggested that part of the funds might be supplied from America if the Royal Society would adopt and develop the idea. The council of the society, after friendly and detailed consideration, came to the conclusion that a very large sum of money would be required to transform a comparatively small country house into a research institution and to provide for its staff and maintenance. Even if the sum were available, it could be spent to greater scientific advantage in the development of some of the existing research institutions. At Leeds last year Sir Arthur Keith, then president of the British Association, issued an appeal, with the authority of the council, for the more modest object of preserving Downe House simply as a memorial of England's greatest naturalist.

The appeal had a swift and fortunate response, for Mr. Buckston Browne, a distinguished London surgeon, offered to buy the house, provide funds for its maintenance and make it a gift to the nation in the custody of the British Association. With the generous cooperation of the Darwin family, the end has been achieved and the house and the eighteen acres in which it stands are now vested in the British Association. Some of the actual pieces of furniture used by Darwin in his study have been presented by the family, and Mr. Buckston Browne is collecting other pieces of the same period so as to reproduce as closely as possible the actual environment in which "The Origin of Species" and many other great books were written. All the editions of Darwin's books are being got together, and as soon as the lease can be acquired from the present tenants Downe House will be opened to the public. There is a superstition that the aura of evil deeds lingers in the premises in which they were committed. If there be no supernormal vestige left by great men, at least our imagination is quickened and our sympathies attuned to gracious memories by seeing the simple surroundings in which they thought and worked. The rooms in which Darwin wrote, the garden paths on which he paced, and the simple greenhouses in which he conducted his experiments, if only because they are homely and undramatic, can make us realize the possibilities of human achievement. For there patience and genius, the most faithful devotion to pedestrian fact, and the most daring imagination combined to bring about a stupendous revolution in human thought. Access to Downe House will preserve for all time the inspiring personality of the man who, in the words of Mr. Punch's inspired epitaph, was

> Recorder of the long Descent of Man,
> And a most living witness of his rise.

—*The London Times.*

A RELATION BETWEEN THE INCIDENCE OF COMMON COLDS AND NUTRITIONAL HYDRATION

THE subject of colds has been of personal interest for over twenty-five years, inasmuch as it was noticed in early youth that I seemed to catch colds more frequently than others in my environment. The hypersusceptibility probably has a constitutional or hereditary basis. However, the rôle of nutritional factors has been emphasized in the last twenty years, as colds never developed during periods of experimental fasting or undernutrition. The fasts of from one to forty-one consecutive days now total over five hundred days. Periods of undernutrition have been longer. Colds never developed during the fasts, although I then often felt extremely uncomfortable upon exposure to cold or cool drafts—evidently because of the lowered heat production at such times. But a fact for which no explanation suggested itself until about a year ago was the almost invariable development of colds shortly after the prolonged fasts. That is, these colds came on with the liberal post-fasting feeding, but before the pre-fasting nutritional level was restored. Moreover, they developed when the general state of well-being seemed to be better than the pre-fasting physical state.

An explanation for this peculiar susceptibility to colds after fasting was suggested by the finding that the colds were caught when post-fasting edema or hydration was most prominent. Some edema was observed after all my longer fasts and also after

periods of undernutrition. It has been observed in others who have fasted and explains the common rapid post-fasting increase in weight which can not be attributed to the food intake alone. It seems to be similar to the "war edema," "jail edema," "epidemic edema" or "nutritional edema" which have been reported from time to time. It tends to clear up with an adequate food (particularly protein) intake but persists in milder form under some circumstances. In my experience it began promptly with a slight ascites, and subcutaneous or generalized edema became evident a few days later. The greatest degree of hydration was manifested by about the fifth day after the close of the last two prolonged fasts of thirty-three and forty-one days, respectively.

Some data regarding the state of hydration before, during and after the thirty-three-day fast were obtained with the intradermal salt solution test of McClure and Aldrich,[1] by Kunde.[2] Further data were secured in connection with the forty-one-day fast. The disappearance time of the wheals, in otherwise normal skin areas, decreased from about sixty minutes before, to fifteen minutes a few days after, fasting. At the ankles, which have been affected by a circulatory deficiency (varicose veins in the legs), the disappearance time decreased from about twenty minutes before fasting to less than one minute at the peak of hydration. The disappearance time returned to normal within a month after the thirty-three-day fast, which was followed immediately with a relatively high protein intake, but the test showed edema for at least three months after the forty-one-day fast, which was followed by sixteen days of protein restriction. This test was not used longer because, among other things, it did not seem to yield better data regarding variations in hydration than close observation of weight fluctuations and of changes in degrees of swelling and pitting. Nevertheless, it is noteworthy that I caught one cold after another as long as the test of McClure and Aldrich indicated some edema.

The liberal use of protein immediately after fasting seems to mitigate the edema, but I have never succeeded in thus preventing it. After post-fasting edema is well established, the excessive use of protein or of other food in addition to sufficient protein appears to prevent it from clearing up. I have never tried a purely carnivorous diet or carbohydrate restriction immediately after prolonged fasting. However, under more normal circumstances, I had two experiences of about ten and three weeks, respectively, with meat alone. On these occasions a slight previous edema decreased. The intradermal salt solution test also showed decreasing hydration *during* the course of the forty-one-day fast. This finding is contrary to the reports of increased hydration of the organism during starvation, but it should be borne in mind that the test of McClure and Aldrich reflects only local conditions directly and the hydration of fasting is probably not an edema. But here it is of interest to note that with a carnivorous regimen as well as after the first few days of a prolonged fast one lives practically on proteins and fats alone. Nevertheless, distinct edema did not follow the carnivorous diet periods as it followed fasting. This appears to show that the carbohydrate starvation during fasting was not responsible for the post-fasting edema and it also suggests that the prevention of protein starvation protects one from such edema. This view is also supported by the work of Kohman.[3]

However, I caught a cold at the beginning of my first carnivorous diet experiment. This cleared up quickly, although the amount of meat eaten was increased to an average of about four pounds (1.8 kg.) daily. This cold may have been the consequence of the preceding mixed diet, but an attempt to confine myself as much as possible to lean meat may also have been responsible. As Stefánsson has repeatedly stated,[4] a carnivorous diet without a fair proportion of fat is not well tolerated by man. In a study of the effect of variations in the protein intake on gastric acidity,[5] I also found evidence of a limit to the amount of protein that could be used. But bearing more directly on the present problem is the fact that an excess of protein serves as a source of carbohydrate and nitrogenous waste products which may be stored or retained with a considerable amount of water. In a second experiment with a carnivorous diet, I aimed to use as large a proportion of fat as possible. Nevertheless, I found it necessary to take more protein to satisfy myself than with a mixed diet under conditions otherwise similar. Evidently the protein intake must be sufficient to replace losses due to tissue breakdown and also to furnish the carbohydrate fraction which is necessary to burn the fat and prevent ketosis. But I was particularly impressed, during this period, that I became freer than usual from a persistent nasal catarrh, which was often evident between colds.

On the other hand, I tried vegetarian diets and followed the low protein idea of Horace Fletcher,

[1] McClure, W. B., and C. A. Aldrich, *Jour Amer. Med. Assn.*, lxxxi, 293, 1923.

[2] Kunde, M. M., *Arch. Int. Med.*, xxxviii, 57, 1926.

[3] Kohman, E., *Amer. Jour. Physiol.*, li, 378, 1920.

[4] Stefánsson, V., "My Life with the Eskimo," New York, 1913; "The Friendly Arctic," New York, 1921.

[5] Hoelzel, F., *Amer. Jour. Physiol.*, lxxvii, 166, 1926.

Chittenden and Hindhede for nearly ten years without noting any decrease in the tendency to catch colds unless the protein restriction amounted to protein starvation. Then the addition of salt to the diet and occasional increases in the protein intake (due to instinctive compulsion) gave rise to considerable edema. Furthermore, the susceptibility to colds was increased and pleurisy developed under such circumstances in the winter of 1917–1918. During the next year, as a result of a change in diet occasioned by military service, I found that the continued use of a higher protein intake decreased the tendency to develop distinct edema from additions of salt or more protein. However, the army diet did not confer immunity to colds, nor did evidence of slight edema decrease to the extent that it decreased later with the carnivorous diets or with a low carbohydrate diet such as I have adopted more recently to control both hydration and the susceptibility to colds.

The restriction of the carbohydrate intake as a means of keeping the hydration of the organism at a low level is based upon the fairly well-established fact that along with carbohydrate a considerable amount of water is stored. At least, with the carbohydrate reserve kept at a relatively low level, I find that ordinary colds do not develop. A limitation to about five hundred calories from carbohydrates in a diet of about twenty-five hundred calories daily seems satisfactory. The protein intake has been kept adequate (1.2 to 1.6 gm. per kg. of body weight) and the balance has been made up with fats. With this regimen, I have caught no distinct cold but have noticed a little sneezing from time to time, or an excessive secretion of nasal or pharyngeal mucus which generally cleared up within a few hours without anything being done about it.

It may seem idle to speculate at this time about the mechanism of catching a cold. But presumably, with the organism hydrated to a high degree and with the tissues in general already under some degree of tension, a sudden cooling of the skin may throw an overload of fluid on internal structures, including the upper respiratory tract. Undoubtedly the process is not simple. A specific nervous or vasomotor reaction seems to be involved in the chill which often initiates a cold. A factor in the development of this reaction may be an increased sensibility of the cutaneous nerves in nutritional edema.

Although quantitative data on this subject were not secured, I have repeatedly observed the variations in skin sensibility with changes in the degree of hydration. In shaving, the "pulling" due to a razor which is not very sharp is far more painful with edema than under normal conditions. A difference was often seen here between morning and evening, as the hydration of the face which is greatest in the morning (after reclining) decreases during the day with the maintenance of the upright position. This change may, however, become reversed if the diet used during the day leads to a considerable retention of fluid. Pinching of the skin has shown similar fluctuations in sensibility in other skin areas. This has been so constant that I am inclined to regard the return of normal sensibility as a better index of the complete disappearance of edema than other tests. In using the edema test of McClure and Aldrich, the pain incident to puncture with the needle was also greatest with the most pronounced edema. This discouraged the use of the method. The change in sensibility may be qualitative rather than quantitative, as the pain in edema reminds one of the pain of mild inflammation. The theory that there is a nervous factor in the development of edema is therefore hereby supported.

The above explanations would harmonize the theories that refer colds to dietary excesses with those that refer them to changes in the weather or to exposure. The oft-quoted freedom from colds of Arctic explorers would be regarded as the consequence of a decreased carbohydrate intake rather than of outdoor life or relative absence of bacteria. The effectiveness of remedies, such as food restriction, sweating and bed rest would be explainable as being due to dehydration. However, it is hard to understand why sodium bicarbonate should be beneficial, as Cheney[6] recently reported. Perhaps the other measures he uses are more directly responsible for the results. Cheney's implication of the protein intake as a cause of colds is supported if it is remembered that this is a protein excess in a diet otherwise excessive.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

PARAFFIN SECTIONS OF TISSUE SUPRAVITALLY STAINED

THE use of Nile-blue sulphate for staining living Amblystoma embryos which will furnish grafts for transplantation in the study of many problems in embryonic development has been popular for some time (Detwiler, 17).[1] Its main drawback has been that

[6] Cheney, V. S., *Amer. Jour. Pub. Health*, xviii, 15, 1928.

[1] S. R. Detwiler, "On the Use of Nile-blue Sulphate in Embryonic Tissue Transplantation," *Anat. Rec.*, V. 13, 493–497, 1917.