AN ACCOUNT
OF THE
LAST ILLNESS AND DEATH
OF
PROFESSOR
H. BENEDICT DE SAUSSURE.

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THE history of the disease which, in January 1799, prematurely terminated the life of Professor De Saussure, a philosopher whose name will ever be illustrious in the annals of science, contains circumstances, the detail of which has appeared to me, worthy of being presented to this learned Society.

De Saussure was endowed by nature with a frame of body bearing every indication of health and strength, and calculated to support an hereditary claim to longevity, which he derived from both his parents, and which seemed, indeed, to belong to the race from which he sprung. He appeared in every way destined to accomplish a long career of glory in the field of scientific discovery, and to

continue to an advanced age a living object of emulation to his cotemporaries in the philosophic world. To me, who have followed the unfortunate series of circumstances which have concurred to frustrate all these hopes, and to bury them in an untimely grave, more properly belongs the task of detailing them to the world, and of cherishing the only consolation that can be now offered to his friends, by shewing that the evil was too deeply rooted to have been within the reach of art, and that, even if its nature had been previously known, the resources of medicine would have been of no avail.

De Saussure had been accustomed, from his earliest childhood, to explore a mountainous country, to bid defiance to the inclemency of the weather, and alike to disregard the extremes of heat and cold; and he had been inured by constant habit of every kind of bodily fatigue. His health had been uniformly good, till the time when he took a voyage to the Boramean Islands, about 30 years ago; on which occasion having eaten a large quantity of acid fruits, he was seized with a long and serious disorder, which was supposed to have had its seat in the stomach, or in the pancreas, and which rendered him incapable of retaining any species of nourishment. All remedies were ineffectual, excepting Starkey's soap, which was of great service to him. Ever after the period of this illness, he was subject to symptoms of deranged

digestion, was tormented with flatulence, and with so inveterate a disposition to generate acid in the stomach, that although he lived, for a great number of years, almost entirely upon meat, and other animal food, and avoided with the greatest care fruit, green vegetables, and acid liquors, he regularly experienced for some hours after dinner every day, a kind of pyrosis or burning sensation, which obliged him to have recourse to chalk, or other absorbents, and to reject by vomiting a great part of what he had eaten. He had fortunately acquired the power of thus emptying the stomach without any particular inconvenience. If he at any time endeavoured to resist this urgent call to vomit, he used to feel a great sense of weight pressing on his stomach, accompanied by strong acidity, and a species of anxiety so oppressive, that nothing could assuage it but immediate vomiting, to which he was always at last obliged to have recourse. In general, however, he did not wait till the distress had attained this degree of severity, and he chose so well his opportunity for relieving himself, that most of his friends, and even his relations, never knew that he was subject to this infirmity. From the age of fifteen he had been liable to the hæmorrhoids, which occasionally bled profusely. His skin was rough and coarse, the result of an herpetic disposition, which appeared to be constitutional.

Some years ago, he was troubled for the space

of several months, with an affection of the skin on the nose, which, beginning with a small pimple, soon degenerated into a malignant ulcer, with hard callous edges; and assumed in process of time so alarming an aspect, that it was deemed absolutely necessary to destroy it by the actual cautery. The operation, which he bore with great courage, succeeded perfectly, and delivered him from his danger. At this period an issue was inserted in his arm, and was kept open ever after.

At the close of the year 1793, after a long continuance of painful exertions in endeavouring to stem the torrent of our political revolutions, and much domestic anxiety, he was suddenly attacked with vertigo, followed by a distinct feeling of numbness in the left arm and leg: a feeling which nothing could ever remove, though the vertigo was not of long duration. It was to no purpose that I had recourse to blistering, purgatives, frictions with flannel, and with mustard; followed by a long catalogue of antispasmodic and tonic remedies. This affection of the limbs appeared to be seated more in the sentient extremities of the nerves, than in the moving fibres. The arm executed with facility every kind of movement, but conveyed no distinct sensation of touch. He felt always as if a quantity of sand were interposed between his fingers and the objects to which he applied them. This sensation was even to a certain degree painful and agonizing; as if the

chief morbid affection of the hand had consisted in an excess of sensibility, so that he was afraid to use it without the protection of a glove. A sensation somewhat analogous to this was also felt in the cheek and the mouth of the same side, which, when he passed his hand across his face, made him sensible of a line of demarcation, very distinctly defined between the right and left side; a sensation which was extremely disagreeable. In other respects he enjoyed good health, and shewed no symptom of plethora, or of debility. He also retained, for a long time, his wonted presence of mind, and the full vigour of his intellectual faculties. Many months elapsed without the least change, although this interval was occupied with trials of a multitude of remedies. The cold bath, the hot bath, electricity, arnica, valerian, blistering, embrocations, travelling, hot mineral baths, both artificial and natural, such as those of Aix, Bourbon, and Plombieres; vegetable juices, change of diet, &c. all were ineffectual. The disorder grew worse, but almost always by sudden accessions more or less distinct and severe. One of the most violent of these seizures occurred at the baths of Bourbon, and was brought on by a *douche*, that had been made too hot; and so complete was the attack, that the whole of the left side, from the foot to the tongue, was affected by it. His speech became gradually confused, and almost unintelligible. His legs, especially the left one, were

raised or bent with difficulty. This was most perceptible when he attempted to walk in a straight line, following the junctions in the floor of his apartment, a kind of exercise, in which, from constant practice, he had become very expert, having pursued it with the view of accustoming himself to tread with security on the narrowest ledges of mountains, and borders of precipices. But his disorder had now deprived him of the power of preserving his balance, and his limbs were no longer obedient to the determinations of his will. The most remarkable circumstance, however, attending this state, was that after he had become so infirm as to require the assistance of a stick in walking, it was in going in or out at the door of a room, that he experienced the greatest difficulty. He could cross the room with a tolerably firm step; but the moment he reached the door, although open on both sides, and leaving a space much wider than his body, and without any difference of level in the floor, it was a most arduous undertaking for him to pass through. He tottered, and precipitated his motions, as if he were preparing for the most perilous leap: no sooner was the difficulty surmounted, than he recovered his former confidence, and proceeded with ease across the passage, until he came to another door, when the same unaccountable terrors again assailed him, and the same caution and trouble were requisite to achieve the steps by which the

invisible barrier was to be passed. On his return to Plombières, he had a copious herpetic eruption on the forehead and about the eyes: it was hoped that this would relieve his other complaints. A similar expectation was entertained from the effects of a hæmorrhoidal colic, which suddenly attacked him; but all these hopes were delusive. The disease continued to gain ground. The only remedy which appeared at all times to exert some power over it, though this was but transient, was blistering; recourse was had to it whenever the headach, or vertigo, to which he had now become very subject, were particularly distressing, and apparently always with relief. About fifteen months ago, I was induced, on the suggestion of Dr. Beddoes, to give a trial to the respiration of an oxygenated air; but before a proper apparatus for this purpose could be procured, he tried the effects of drinking water impregnated with a small quantity of oxygen gas, which his youngest son prepared carefully under his own inspection. I soon, however, advised him to desist, because it appeared to increase the secretion of urine to an immoderate degree; so much so, that it exceeded in quantity the whole amount of the liquor he drank, and aggravated considerably his debility. The roughness of the skin, the swelling of the legs, the proneness to the acid fermentation which had subsisted for such a length of time, his great appetite, and the thirst which he at this time experienced,

gave me a suspicion that he was becoming diabetic, an idea which a recent total change in his diet, tried by the advice of Dr. Tissot, tended to corroborate. As soon as the paralysis had been completely established, the vomitings had entirely ceased, and his food had consisted principally of vegetables and fruits, which no longer produced any inconvenience, and which appeared to have assisted in a remarkable degree the disposition to herpes. These threatenings of diabetes, however, soon vanished: the evaporation of the urine afforded but little extractive matter, but a great deal of saline residue, similar to what is contained in the urine of hysterical persons; and the discontinuance of the use of fruit, and of oxygenated water, were followed by the disappearance of the diabetic symptoms. Some time after this we at length obtained an apparatus for administering super-oxygenated air. It was tried, but could not be breathed without great and fatiguing efforts; and on this account, as well as from its giving no sort of relief, it was abandoned.

The disorder advanced rapidly, though by very insensible gradations; the powers of intellect became impaired; he was hardly able to walk; his features sunk, and his body became more and more bent to the left side. He fell into a sort of apathy, from which he only occasionally revived, and for the moment was able to take a part in

conversation. He laboured for a time under incontinence of urine, and next had a spasmodic contraction in three fingers of the left hand; and then a gangrenous ulcer appeared on the prepuce. From these complicated infirmities he was soon delivered, by a tranquil, and somewhat sudden dissolution. He had supped on the preceding evening with good appetite, but had been restless in the night. In the morning he turned his head on one side, and breathed his last without a struggle.

The body was opened thirty-two hours after death. The dura mater was strongly adhering, particularly along the longitudinal sinus. Between the pia mater and arachnoid coat we found a considerable effusion of a gelatinous substance, similar to what is often met with in the brain of persons who have died of comatose affections. It had the same bluish tint, peculiar to that substance; excepting that here and there circular spots of a different colour were observed, being of a greyish yellow, and about three or four lines in diameter. They appeared as if encrusted within the membranes, and breaking down into small detached spheres, each of which was surrounded by a small circular border of a blackish red colour. We took these spots, at first sight, for hydatids; but when we attempted to separate them from the membranes, their red margins were found to be blood-

vessels, connected with the other vessels of the head; and contorted, from what cause I know not, into circles. There were no separate pouches, or solution of continuity in the membranes; only in these places they were more transparent than in others, and the serosity which was underneath communicated freely with that which was spread over the whole surface of the brain, being of the same nature and of the same colour, namely yellowish. This colour was apparent in these places on account of the transparency of the membranes, whose opacity in the rest of the surface gave it a bluer tint. From whichever of these places the membranes were opened, the serosity flowed out like water, and we thus collected about two or three table spoonfuls. We heated it by the flame of a candle: there was no coagulation, but a strong ebullition with large bubbles, and the whole fluid evaporated without leaving any sensible residue.

The effusion had taken place, not only on all the surface of the cerebrum, but also on that of the cerebellum, in which latter, it was much more considerable on the right than on the left side. We here and there perceived a few air bubbles, mixed with the blood in some of the blood-vessels.

The ventricles were also entirely filled with the

same kind of serosity, and in such quantity as to dilate them considerably. We estimated that on the whole there was about five ounces. The choroid plexus appeared to be almost entirely composed of clusters of hydatids: an appearance which is indeed very common, depending altogether on the dilatation of the very delicate vessels which form the plexus, and not on detached hydatids. The pineal gland was hard, and crumbled like earth between the fingers; but this is also no uncommon appearance. The examination of the head presented nothing further worthy of notice, except that the brain was a good deal flattened at the temples, and deeply furrowed by the arteries.

The abdomen presented a singular conformation: for when the integuments and peritoneum were opened and turned back, so as to expose the viscera, neither the stomach, the liver, nor the colon could be seen, nothing but small intestines and cæcum presenting themselves. This last was of enormous size. Its circumference measured fifteen inches, while that of the ileum at its termination in the cæcum was not more than four or five inches. The appendix vermiformis was four or five inches long, and adhered by its extremity to the posterior surface of the cæcum. The colon, entirely hid by the small intestines, was also much dilated, and ascended to the right side, over the

liver, to the diaphragm as far as the sixth seventh rib, then passed to the left side, where reached as high as the fifth rib, immediately under the nipple, so that in this place it was nearly contiguous to the apex of the heart, being separated from it only by the diaphragm, which it had pushed considerably upwards. Thus the colon instead of passing as usual below the liver and the stomach, passed above these viscera. It bestrode the stomach at its superior orifice, and compressed it so much the more, as instead of descending as in the natural state on the left side, it passed down obliquely to the right side, so that its sigmoid flexure was contiguous to the cæcum : at length it terminated in the rectum, which was also dilated to such a degree, as to equal the ordinary size of the colon. All the other abdominal viscera were sound. There was no trace of obstruction, hardness, or other morbid affection of the pancreas.

With regard to the viscera of the thorax, the lungs were small, but in other respects healthy, as were also the heart and the large vessels. But as the diaphragm was pushed considerably upwards, so as to admit of very little room for the expansion of the lungs in respiration, if the dimensions of the thorax had been confined within its ordinary limits ; this was compensated for by the lungs being extended under the clavicles to some height

along the neck. We had not sufficient time to examine minutely the attachments of the pleura and mediastinum in this singular conformation.

It appears from this examination :

1st. That the proximate cause of the disease and death of Professor De Saussure, was the effusion of a great quantity of serosity in the ventricles, and between the membranes of the brain ; which effusion produced a great compression, and consequent injury of the functions of that organ. I presume it had commenced between the membranes of the cerebellum, because it was only in that situation that we found any difference between the right and left sides : and the disease, though general towards its close, had been for a long time confined to the left side, which, as is well known, leads to a presumption that the right side of the brain was the most affected. An effusion similar to the one above described is a very frequent cause of apoplexy, but in general it takes place suddenly, and the disease lasts only a few days. I have lately seen a gentleman of 61 years of age attacked with apoplexy, which proved fatal in sixty hours, whose head presented on dissection exactly the same appearances as in the case of De Saussure, in whom the disease was of five years' duration. It is singular that so great a derangement in the organization of the brain, and existing for so long a period,

should have occasioned so little alteration in the intellectual powers : another singular circumstance is that, with the exception of some transient dimness of sight, the eyes had never been affected ; and that the pupil had always contracted readily. The usual consequence of effusion in the ventricles producing the hydrocephalus of children, is a dilatation of the pupil ; and it may be understood how in the case of Mr. De Saussure, the disease having increased only very gradually, the optic nerves might have accustomed themselves to a degree of compression, which, had it been sudden, would have affected them ; but in the illness of the gentleman above-mentioned, which lasted only three days, no dilatation of the pupil was observed. On what does this difference depend ? It will probably be long before this question can be determined. Affections of the brain to all appearance perfectly identical often produce very different effects, and, conversely, effects that are perfectly similar arise frequently from very different morbid affections. In most cases we are equally in the dark with regard to the cause of the effusion. But in this instance we may reasonably attribute it to the cares, the anxieties, and the struggles with which the mind of our illustrious countryman had been harassed by the eventful political revolutions above alluded to. On the other hand, I have learned since his death, that at the beginning of 1793, he had met with a severe fall down a stone staircase, a cause which, it is well known, often lays

the foundation of hydrocephalus ; but his son has assured me, that long before this period, his father frequently mistook one word for another, without being conscious of his mistake, so that he was irritated at not being understood, a circumstance which would appear to indicate that his illness should be dated prior to the first attack in 1793. Lastly, it may also be conceived that the displacement of the intestines may, to a certain extent, have compressed the great vessels, and thus have impeded the freedom of circulation in the head.

2nd. If we next consider the state of the abdominal viscera, I may remark that the displacement of the colon, and the compression that it exercised on the superior orifice of the stomach, present a very natural explanation of the habitual vomitings, which the patient experienced some hours after his meals. The extreme dilatation of the large intestines may have been the consequence of the great appetite, which his frequent mountain excursions tended to create ; especially as he was in the habit of satisfying it by food that was coarse and calculated to afford a large quantity of fæces, which the exercises he took would tend to accumulate, and to harden in the track of the large intestines. I had long ago been convinced of the dilatation of the rectum, from its producing symptoms of compression on the vesiculæ seminales, which the patient had often mentioned to me, and which I could explain on no other supposition.

This circumstance also, perhaps, contributed to the incontinence of urine, which had tormented him for the last months of his life ; but what I certainly could not foresee was, the displacement of the colon. I do not pretend to decide whether this displacement was coeval with birth, or was the gradual effect of dilatation. I am, however, inclined to the latter opinion ; and the perfectly healthy state in which we found the pancreas, leads me to think that this organ never had been affected as Dr. Tronchin had believed ; and that the symptoms referred to that organ as their seat, were owing to the displacement of the colon, which I presume took place at this period. For these symptoms had continued ever after, although with much less irritation, from the influence of habit ; and it is besides difficult to conceive, that a disease of the pancreas so serious as the one which was supposed to exist, should have left no traces behind. I must at the same time acknowledge that an accidental displacement of the colon in this direction, is a phenomenon which I have never witnessed, is unprecedented in the records of medicine, and is apparently in opposition to the natural tendency of the gravity of the contents of this intestine, which would be that of depressing its curvature and of drawing it down towards the pubis, instead of pressing it against the diaphragm. It must, however, be considered that the great muscular strength of De Saussure, and the continual exercise which had become habitual to him, especially that of ascending steep acclivities,

in which the abdominal muscles are in strong action, would contribute powerfully to increase their tension, and would tend to overbalance this effect of gravity, and to force the intestine upwards by the obstacle opposed to its descent.

Lastly, the diminished capacity of the lungs might be supposed to explain the affection of respiration which Mr. De Saussure experienced on very high mountains; but this cannot be admitted as the sole cause, since other philosophers, whose chests were amply capacious, suffered greater inconvenience from the rarefaction of the air at much less considerable elevations. The symptoms which he describes as having felt in these exalted regions, are, besides, nearly the same as those which are stated by the French academicians who ascended the Cordilleras: and there is no likelihood that any similar organic defect existed in them, for I have never seen any other example of the same kind. It is still, however, remarkable that it produced no sensible effect on his habitual state; and there is, perhaps, still more difficulty in understanding how the immense quantity of fæces which must have passed through the colon so near to the heart, had never interfered in the least with its action.