LIV. *The Caſe of a Man, whoſe Heart was found enlarged to a very uncommon Size, by Mr.* Richard Pulteney: *Communicated by* W. Watſon, *M. D. R. S. S.*

Read Dec. 17, 1761.

THO. C. aged about thirty-two or thirty-three years, had the rickets in his infancy, and continued very weakly for ſeveral years after. In the winter of the year 1759, upon taking cold, he was afflicted with peripneumonic and pleuritic ſymptoms; which had ſcarcely left him, when he was ſeized in the ſummer of the year 1760, after great exerciſe in walking, with a fever, and very violent rheumatiſm: this, after affecting moſt of his joints, remained the longeſt and moſt troubleſome in his knees. When he was ſomewhat better of his rheumatiſm, but before the pain and ſtiffneſs of his joints had left him, he was adviſed to go into the cold bath: he did ſo; but, upon coming out again, inſtantly felt ſuch an increaſed load, fainting, and anxiety about the præcordia, that he thought he ſhould ſcarcely have recovered the ſhock it gave him: nevertheleſs, he ventured in again a day or two after; but experienced the former ſymptoms, in an aggravated degree; and from this time dated the diſorder which terminated his life. A palpitation of the heart, to which he had been ſubject for ſome years before, became now much ſtronger, and gradually increaſed with his other complaints, to a very great degree. His rheumatiſm continued to affect his breaſt, and all his joints, particularly his knees; eſpecially, upon taking

taking cold, or any irregularity in the non-naturals, he became weaker, breathed ſhorter, eſpecially upon walking a little, or talking rather more or higher than uſual, any of which exertions put him out of breath preſently.

When he firſt applied to me, in the beginning of March 1761, I found him labouring under the above-mentioned complaints; and upon examining his pulſe, found it ſoft, and extremely quick: it commonly went at the rate of 110 in the morning, and in the evening 120, pulſations in a minute, as I repeatedly obſerved. The palpitation of the heart ſtruck me inſtantly, as it ſhook his whole body at every ſtroke. I could never obſerve any inequality of the intermittent kind in the pulſe, under any the moſt accelerated motion thereof, or in whatſoever ſituation the body was placed.

At this time the chylopoietic organs were all tolerably good. Stimulating food, or fermented liquors, had, for ſome time, always increaſed his anxiety and load upon his breaſt, and this experience had induced him to refrain from them.

He had ſlept very ill for ſeveral months, ſometimes not more than an hour or two during the whole courſe of the night. He could not ſleep on the left ſide at all, and was always eaſieſt in an erect poſture. He was commonly awaked with a ſenſe of ſuffocation, from the vaſt load and oppreſſion upon his breaſt, and from the ſtrength of the palpitation.

From his firſt application to me, I had no hopes of doing him any real ſervice, as I thought it evident, from his complaints, and particularly from the great and uninterrupted palpitation, and the feel of the

pulſe, that there was ſomething very extraordinarily diſordered in the heart itſelf, or in ſome of the large veſſels near it. The regularity of the pulſe inclined me to ſuppoſe an aneuriſm, rather than polypoſe affections. All this time, however, no outward appearance ſtrengthened this ſuppoſition.

No remedies alleviated his complaints in any degree, except bleeding, which afforded a relief; but very temporary, and weakened him too much to be repeated more than once. All that it ſeemed to do for him was the procuring him rather more ſleep the night after, than he uſually had, and eaſing a little tickling cough which had remained with him, ever ſince the year 1759, at times; and particularly ſince his rheumatiſm, but which was never very troubleſome.

Soon after I firſt ſaw him his legs became œdematous, and by the beginning of April his thighs were much enlarged, and at length his belly in ſome degree. At this time he began to cough more from having taken cold, inadvertently as he thought, but he ſoon expectorated freely. By the middle of April he was too weak to ſit up, nor could he ſpeak or ſtir without being ready to expire for want of breath. On the night of the 20th of April, as he was coughing an hæmoptöe ſuffocated him inſtantly.

About two quarts of a thin coffee-coloured liquor were found in the cavity of the abdomen. The omentum was very ſmall, perhaps it would not weigh more than two ounces. The ſtomach and inteſtines were greatly inflated. In all other reſpects, the viſcera of this cavity, as far as an haſty examination would permit us to obſerve, were in a ſound ſtate.

In the thorax we found the lungs very ſound, but extremely turgid with blood: they adhered very firmly to the pleura on both ſides, and particularly on the left, where the adheſion was almoſt total. The heart, as might be expected, appeared to be the organ principally affected. The pericardium adhered almoſt every-where ſo cloſe, as to form, as it were, the external coat thereof. The heart itſelf was of an enormous ſize, and of a very pale colour, and looſe and flaccid in its texture, to a very remarkable degree. As far as I could judge, from the moſt careful examination and compariſon, I could not find that either of the auricles or ventricles bore an extraordinary proportion to the other. The whole heart might be ſaid to be entirely aneuriſmatical. The parietes were every-where thin, in proportion to the ſize of the whole. There was no particular enlargement of the aorta, as far as I traced it, which I did to ſome diſtance; but its texture, as that of the heart, was very lax and flabby. I could not find the leaſt polypoſe concretions in any part whatſoever. When the heart was cut ſhort from the great veſſels, emptied of the coagula, and waſhed as clean as poſſible, it weighed upwards of twenty-eight ounces avoirdupoiſe weight.

Observations.

The ſize of the human heart, in a natural ſtate, is known to differ greatly in different ſubjects. Diſſections prove this beyond all controverſy, and it is uſually ſuppoſed, that the capacity of the blood-veſſels bears a general proportion to the ſize and capacity of

the heart itſelf (1). Very few anatomiſts, in deſcribing this organ, have eſtimated its ſize by its weight. Dr. Haller (2), where he treats ſo amply and profeſſedly upon the heart, does not, from his own knowledge, mention its weight. From Tabor, he ſays, it is eſtimated at ten ounces; but this is ſuppoſed to be when freed from the auricles, as well as the extremities of the larger veſſels. Its mean weight by ſome other anatomiſts is reckoned at thirteen ounces.

Aneuriſms of the heart, both with and without polypoſe concretions, are not unfrequent; many inſtances occur in the writers of obſervations. Dr. Douglas (3) ſaw a young man, who died of a palpitation of the heart, the left ventricle of which was found three times larger than the right. This caſe bears a conſiderable analogy to the inſtance before us; and is quoted, among ſeveral others, by the Baron Van Swieten, in treating upon aneuriſms of the heart (4). The baron alſo relates a caſe from Lanciſi, in which the left ventricle was twice as large as the right; and the whole heart weighed two pounds and an half. Hoffman, in his ſyſtema, when treating upon the palpitation of the heart, gives us a caſe, where the heart was greatly diſtended; but he does not aſcertain to what degree, by any method whatever: he only ſays, *cor miræ fuit magnitudinis* (5).

(1) Hoffman. Opera omnia, Tom. I. lib. i. cap. vi. De Sanguinis Circuitu. Suppl. II. Part. iii. p. 65. Hiſt. Corp. Human. Anatom. § 641.

(2) Element. Phyſiolog. Vol. I. p. 326.

(3) Phil. Tranſ. abridged by Jones, Vol. V. p. 229.

(4) Comment. in Aphor. Vol. I. ad ſect. 176.

(5) Opera omnia, Tom. III. p. 92.

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De Haen, in his Ratio Medendi (6), tells us, he was preſent at the opening of a man, whoſe heart was three times bigger, at leaſt, than in its natural ſtate. The dilatation was in its left ventricle, which was ſo thin as to reſemble a whitiſh membrane only; and the heart was broader at its apex than at its baſe.

De Haen likewiſe, in his ratio Medendi (7), informs us, that the heart of a woman, who died of a fever, with extreme debility, weighed twenty-four ounces, even after it was waſhed, and wiped very dry. This increaſed weight and magnitude aroſe more particularly from the left ventricle. The extenſion of ventricles was ſo great, that they both together contained more than a quart. Though this woman was no more than thirty-ſeven years of age, the aorta at its baſe was degenerated into bone, and was four inches in circumference. Beſides the whole portion of the aorta at its baſe being oſſified, there were interſperſed in ſeveral parts of its length, what our author calls *inſulæ oſſeæ*. In one, who lived ſo long as the excellent Wepfer, ſuch appearances are not extraordinary; but in one ſo little advanced as the woman in queſtion, theſe oſſifications are very unuſual.

It would be endleſs to quote inſtances of the preternatural dilatation of this organ: to name no more, we have a very recent and ſtriking one of this kind, in the body of our late Moſt Gracious Sovereign, whoſe ſudden death was owing to the rupture of the right ventricle of the heart: a circumſtance, which cannot be conceived to have taken place, without a

(6) Cap. xxx. De Aneuryſmate.
(7) Pars ſexta, p. 143.

previous

previous gradual dilatation of the ſame, and that, probably, to a very conſiderable degree.

In caſes of this kind, commonly one of the ventricles is found diſtended to a monſtrous ſize, while the reſt of the heart remains nearly in its natural ſtate. It is but rare, perhaps, that the heart is ſeen ſo equally and univerſally enlarged, as in the caſe under conſideration.

This man, I have obſerved, had the rickets, when a child: in this diſorder, the whole ſyſtem is found to be in a very lax debilitated ſtate; and the heart is ſaid to be ſo in particular. The conſtitutions of rickety children frequently amend as they grow up, and particularly about the age of puberty. But, in this caſe, I think we may ſafely conclude, that this man's heart never recovered its due tone, after he grew up. It is ſcarcely to be ſuppoſed, that the heart could ſuffer ſo great an enlargement during the laſt year or two of his life only: the more ſo, as I remember to have heard him ſay, that, for many years before his death, a very little exerciſe put him out of breath. Doubtleſs it was increaſed greatly during the latter years of his life, by his buſineſs, which obliged him to exerciſe much, particularly in walking; ſo that before he got his rheumatiſm, he came home ſo weak, and ſo much fatigued with his uſual day's exerciſe, that he has been almoſt unable to ſtir for a day or two. We may add to this, the increaſed force that the heart ſuſtained during the time he laboured under his inflammatory diſorders, both before and after his rheumatiſm ſeized him.

The great increaſe of his diſorder, upon going into the cold bath, is not ſurprizing. Theſhock of the cold

cold water, and the reſiſtance neceſſarily given, by that means, to the circulation, muſt occaſion a vaſt ſurcharge of blood in the auricles and ventricles of the heart, already too weak to perform its office with ſufficient power. Beſides the impropriety of ſuch a ſtep, while there was reaſon to think, that the inflammatory ſpiſſitude of the blood was by no means overcome, the preternatural diſtention was doubtleſs increaſed by this means.

From hence, however, may be deduced an uſeful hint in practice; namely, where, from the ſtate of the pulſe, from a palpitation of the heart, a faint weak voice, an aptitude to fall into lipothymies from ſlight cauſes, or from the concurrence of any other ſymptoms, we have reaſon to ſuſpect, that the heart is too weak; in ſuch caſes, not to direct cold bathing, until the patient has been prepared for it, by going into water between the degrees of tepid and quite cold water; nay, probably, it might be better to wait, before cold bathing be preſcribed at all, till the effect of medicines ſeems previouſly to have invigorated, in ſome degree, the cardiac ſyſtem.

The conſidering the heart as a muſcle capable, like all others, of great alteration reſpecting its tone; and, at the ſame time, that ſuch alteration muſt eſſentially affect the whole animal œconomy, from the very great importance of the organ itſelf, is evidently of great uſe in medicine. It muſt aſſiſt us in accounting for ſeveral phænomena that occur in various diſorders, which are utterly inexplicable by other means; and of conſequence, muſt lead to a more ſucceſsful practice. In nervous diſorders, and in Fevers of the putrid malignant kind for inſtance, we find the heart ſo extraordinarily

extraordinarily weakened, that it is in many inſtances dangerous to ſubject the patient to an erect poſture, even though it be but for a very little time (8). Syncopes and even fatal deliquia and comatoſe affections have been the conſequence. In ſcurvies too where the whole ſyſtem is become very lax and tender, and has loſt much of its tonic and vital elaſticity, the ſame phænomena have occurred (9). In theſe caſes the neceſſity of the horizontal, or at leaſt the recumbent poſture, is manifeſt; as it is obvious how much more force is requiſite to throw the blood up into the head in an erect than in an horizontal poſition.

It is probable that the extreme weakneſs and ſlow recovery of ſome women, particularly ſuch as are of a delicate conſtitution, after a hard labour depends often upon the weakneſs of the heart, occaſioned by the force it ſuſtained during the throws of labour. In theſe caſes, though reſt is among the firſt methods of recovery, yet I think I have obſerved the uſe of the quinquina to be attended with good ſucceſs.

To conclude, it is probable that caſes of this kind occur much oftener than we are aware of; as, doubtleſs, the diſſection of morbid bodies, were that but more frequently allowed of, would teach us. There is room to think, that this is the caſe, though not in the degree of the inſtance before us, in almoſt all diſeaſes ariſing from a weak and lax fibre. Cheſelden tells us, in his Anatomy, that in perſons "that died "of a dropſy, he always obſerved the heart large, its

(8) Vide Hoffman. Opera, Tom. II. p. 72. Tom. VI. p. 169. De Situ erecto in Morbis periculoſis valde noxio.

(9) Engalen. De Scorbuto, p. 226. et paſſim.

"fibres

" fibres lax, and the veſſels about it immoderately " diſtended."

Ariſtotle (10) expreſly ſays, that timid people, and thoſe of cold conſtitutions, have large hearts; on the contrary, that the bold, and thoſe of a warm temperament, have ſmall ones. Nor does this opinion of that excellent philoſopher ſeem ill founded; as women, children, and weakly men, from whom much courage is not looked for, are lax-fibred, and, conſequently, more liable to an enlargement of this organ, than thoſe of the human ſpecies, who are robuſt and tenſe fibred, from whom a manly exertion of courage is more to be expected.

LV. *An Account of ſeveral Experiments in Electricity: In a Letter to Mr.* Benjamin Wilſon, *F. R. S. By* Edward Delaval, *Eſq; F. R. S.*

SIR, Old Palace-yard, June 8, 1761.

Read Dec. 17, 1761. IT appears by the experiments mentioned in my letter to you, publiſhed in the fifty-firſt volume of the Philoſophical Tranſactions, that ſtones, and other earthy ſubſtances, are convertible by ſeveral methods, and particularly by different degrees of heat, from non-electrics into electrics.

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(10) Lib. iii. De Partib. Animal. cap. iv.