

chromium, to which vanadium was at one time supposed to be chemically related, exerts a very different action from that of vanadium.

Dr. Gamgee then gave the account of a series of experiments made at his suggestion, and under his direction, by H. G. Brooke, B.A. Lond., and E. O. Hopwood, B.A. Christ Church, Oxford, Platt Exhibitioners in the Physiological Laboratory of Owens College, on the changes in the circulation which are observed when blood is expelled from the limbs by Esmarch's method. It occurred to Dr. Gamgee shortly after Esmarch's method had come into use in England, that it would be interesting to study the changes in the pulse of individuals whose limbs are compressed by Esmarch's method. He seized the opportunity of the presence in Manchester of Dr. Paul Albrecht, Professor Esmarch's former assistant, to commence the experiments, which have been continued by Messrs. Brooke and Hopwood. The experiments were performed on a number of perfectly healthy young men. In each experiment, the individual under operation being stripped and reclining in bed, sphygmographic tracings of the radial pulse were taken. Then Esmarch's elastic bandage was applied to one lower extremity, the pulse being carefully observed the whole time, and after the limb had been completely bandaged, another set of sphygmographic tracings was taken. The other limb was then bandaged, and a third set of tracings taken. At a given moment the blood was allowed to return into the limbs and careful observations made. All the observations have led to the same results. It appears that the expulsion of blood from the lower extremities is always accompanied by a quickening of the pulse; the heart, however, does not continue to beat quickly for any length of time, for it soon returns to its normal rate. The sudden loosening of the bandages also always leads to a quickening of the heart, which, however, very rapidly becomes as slow as normal. This quickening is most marked in the fifteen seconds which immediately follow the removal of the impediments to the circulation, less marked in the succeeding fifteen seconds, whilst it may be no longer perceptible a minute after. How can the initial quickening of the heart, when the limbs are first compressed by Esmarch's bandage, be explained? Before attempting an explanation, Dr. Gamgee analysed the changes which must be produced in the limb. Esmarch's method will, he maintained, expel more venous than arterial blood from the limb, because the area of the veins is greater than that of the arteries; it will, no doubt, expel from the compressed tissues much of their capillary blood; it will, too, expel a considerable quantity of lymph. It was pointed out that the blood sent out from the arteries of the compressed limb, and added to that contained in the arterial system, would affect the pressure of the blood throughout the whole arterial system, and, therefore, the rise of pressure in it would not be as great as in the venous system; in the case of the latter the blood expelled from, say one lower limb, would affect the pressure of the blood contained, not in the whole venous system, but in that portion unprovided with valves. For this reason, then, as well as because the quantity of blood contained in the veins is greater than that contained in the arteries, and because the contents of the venous system have the lymph of the compressed lower extremity added to them, the authors maintain that the result of the application of Esmarch's bandage will be to increase temporarily the blood pressure in the right side of the heart more than that of the left side—i.e., to diminish the normal difference which exists between the pressure of the right and left sides; they believe that the effect of such an increase of pressure in the right side will be, in this, as in some other cases, to cause the heart to beat more quickly; as soon as the normal difference in pressure has, however, become re-established, the heart will return to its normal rate. The quickening when the limbs are suddenly unbandaged is more easy to explain. Whilst the effects of increased vascular pressure on the heart are more variable, we know that a sudden fall of arterial pressure does lead to the heart beating more quickly. According to Dr. Gamgee and the authors of this paper, both the initial and final quickening of the heart observed in their experiments are due to the same cause—viz., to a temporary diminution of the normal difference which exists between the arterial and venous pressures.

Professor Kroenecker, of Leipzig, who took part in the debate, expressed his sense of the value of these new expe-

riments, which would probably throw considerable light on a subject which is far from being elucidated. He thought the influence of the lymph expelled from the compressed limbs upon the composition of the blood on the right side of the heart ought not to be lost sight of, as very slight variations in the quality of the blood might influence in a remarkable manner the character of the heart-beats.

## Correspondence.

"Audi alteram partem."

### DISEASED BONES IN THE INSANE.

To the Editor of THE LANCET.

SIR,—In an annotation in your last number on the recent "Death in a Lunatic Asylum," you conclude by stating that the condition of the bones in the insane requires further investigation, and that you intend to return to the subject on a future occasion. I therefore venture, as a contribution to the point under discussion, to remind you that the late Dr. Ormerod, F.R.S., and myself went into the question about six years ago; that Dr. Ormerod published a paper in the St. Bartholomew's Hospital Reports (vol. vi.); that I recorded two cases in THE LANCET for Sept. 3rd, 1870; and that at the quarterly meeting of the Medico-Psychological Association, held on January 22nd, 1873,\* I read a paper "On the Softening of the Bones in the Insane," exhibiting specimens of the same, which led to a very interesting discussion. The morbid specimens I showed were all ribs, and were ten in number, taken from ten different patients who had died in this asylum during the previous four months. This led me to infer that *nearly half the chronic insane have bones more or less diseased*, and I went on to state that I presumed this was due to feeble health and exhausting bodily disease rather than to the mental symptoms. A rough analysis of some of these bones showed that in most instances, contrary to the normal state, the animal matter much exceeded the earthy, and the walls of many were so brittle that they could be crushed in between the finger and thumb. Indeed, the marvel appeared to be, not so much that the ribs of the insane were occasionally fractured, as that violent excited cases should ever escape without injury more or less severe.

To all interested in this subject I would strongly recommend the paper of Dr. Ormerod already referred to.

I am, Sir, yours faithfully,

S. W. D. WILLIAMS, M.D.,

Medical Superintendent, Sussex Lunatic Asylum,  
Haywards Heath.

Sept. 25th, 1876.

### CHLORIDE OF LEAD AS A DEODORISER.

To the Editor of THE LANCET.

SIR,—On the 11th of December last I was allowed to ventilate the subject of the use of lead chloride as a deodoriser, with directions for its practical use, and I am pleased to find that it has been extensively tried, and found as satisfactory as I had stated that it would be.

I expected that it would meet with criticism and objections, though I find none from anyone who has tried it, and I should be only too glad to hear any reasonable objection by anyone capable of throwing any light upon the subject, as I have no wish to establish a theory, but to call the attention of my medical brethren to a fact which, if true, must be universally accepted, and will be of great value to them in particular, and universally to the public; for what can be more desirable, in a sanitary point of view, than to be able, at will, to establish a pure atmosphere with little trouble, no expense, and perfect safety? All other objections but the last may be easily tried by experiments, but the safety has been a matter of so much anxiety to me that it was not till after many years of anxious observation and experiment that I ventured to propose it for general use, though I think the problem was pretty fairly worked out on scientific as well as practical grounds. The

\* See Journal of Mental Science, vol. xix., p. 160.

prejudice against lead is a reasonable one, lest any error in manipulation should set free even a very small quantity in a soluble form; but if my directions are fairly carried out by weight and not by measure, or the rule of thumb, such an accident is physically impossible. I may state that I have now a stone tank in which I have a fine perch, three gudgeons, three carp, and some other river fish, and two frogs, which have been swimming about in the lead chloride solution for the last seven days, and all in perfect vitality, and none the worse for it. A butcher's dog, in the town in the neighbourhood of where I am staying, has for the last six months been drinking out of a pailful of the fluid which is kept at the door of his slaughter-house, and is perfectly well; and a lady of my family drank some of the solution, which had been put into a bottle with the label of fluid magnesia upon it, and the only effect it had was to relieve her from flatulent distension, for which she took the draught. But I do not propose that experiments should be tried upon the human subject before we have more experience than we have at present, though it may turn out to be a very useful remedy in cases of excessive tympanites.

I wish also to call the attention of practitioners to the sediment formed in the mixture of the solution. That is only due to the presence of bicarbonate of lime in the water. It is thrown down as a carbonate. When distilled or rain-water is used, there will be no precipitate. There may be a slight quantity of lead carbonate, so that I have directed that it be thrown away and not used, but in sewers it would be converted into the insoluble sulphuret. The Thames water contains a very large quantity of the lime, and I regret to say an enormous quantity of organic matter, as tested by the permanganate; and the refuse from the paper-mills flowing into the river poisons the fish to a large extent. The lead nitrate is used now in several districts of England, introduced by sanitary officers in country villages and towns, and in several Board Schools. In this neighbourhood a chemist prepares powders of nitrate of lead, half a drachm, and two drachms of salts, which he sells to the clergy and farmers and others at a shilling a dozen, and he has such a demand for them and orders from the country that he has to work all hands to keep up the supply. The surgeons and the clergy carry them about in their pockets for ready use, and find them answer the purpose. A little powdered charcoal is put in the lead paper to prevent its being mistaken for seidlitz.

Your obedient servant,

Sussex-gardens, W.

R. H. GOOLDEN, M.D.

## MEDICAL EDUCATION AT CAMBRIDGE.

To the Editor of THE LANCET.

SIR,—Having graduated at Cambridge as a non-collegiate student, I have necessarily acquired some knowledge of the expense of residence in Cambridge as such, and of the working of the non-collegiate system. It was with regret that I noticed in the Rev. R. B. Somerset's recent letter a tendency (unintentional, no doubt) to give an erroneous idea of the real cost to medical students of the 'Varsity course, this danger being considerably increased by the writer's official position having given him ample means for forming a correct judgment on all points connected with the non-collegiate society. I have more than once heard men complain that they had been misled by statements showing how the entire cost of obtaining a Cambridge B.A. degree need not exceed £150; whilst, after a term or two, they have found that to them it was impossible, and that, *ergo*, they were either committed to a much greater expenditure than they had calculated for, or must relinquish the University, and thus throw away both the time and money already spent. It is usual to state that a Cambridge undergraduate requires about £120 a year if in college, and £50 or £60 if a non-collegiate student. Now, it is evident that either the college charges are excessive, or that matters are misstated. I think that the latter is the case, for although in college a man will have to pay about £15 a year more for tuition than the average non-collegiate does, his other college dues will not amount to more than £10 a year, whilst a non-collegiate must pay £5 5s. per annum to the Board; thus £20 a year will cover the entire difference of cost in fees between being in college and out.

The next principal item of difference is dinner, which may be said to cost the college man 2s. 6d. a day, whilst the non-collegiate can do without altogether if he likes. In other meals there need be no difference, and charges for attendance &c. will be the same. Altogether £10 a term is quite as much as it need cost a man more to be in college than to live as a non-collegiate. £120 a year is considered a moderate allowance for a collegian, and if the above results of my observations are correct, £90 will not be out of the way as an estimate of what an unattached student requires; yet it is commonly stated that a man may graduate at Cambridge for £150. Well, Sir, I quite think he may, and even get that professional instruction which Mr. Somerset does not include in his £150, but which surely no sane medical medical student would omit. I will show how this may be accomplished; but I must state first of all that there is no hope of high honours at this price, for a good place in a tripos means, as a rule, £60 or £80 spent in coaching, and £150 will not afford any coaching (even for the ordinary examinations) or the preparatory lectures which for moderate fees are open to unattached students at various colleges. The man who is to graduate on £150 should be well up at least in the "little go" subjects prior to entrance, and if he has any books he must take them with him (it will help matters considerably if he will sell every book as soon as he can spare it. He ought also to be a good hand at borrowing books). He must buy no clothing in Cambridge, nor reckon his travelling expenses as part of the cost of his degree, any more than he would charge for living &c. during the vacations. Then he must make up his mind that he is not to be "ploughed" in any examination, as in such cases the fees are repeated. And he must take his degree in June (unless an honour man), or it will cost him £3 10s. more than we can allow for. He must also shut up his bowels of compassion and give not a cent. to any of the numerous charitable collections, whilst an utterly deaf ear must be turned to all solicitations to join cricket, football, boating, or other clubs, as he will not have a shilling to spare for recreation; and, finally, as he cannot afford more than the very minimum of residence, he must pay no attention to the advice of such men as Professor Humphry, who urge medical students to stay up during the entire term and part of the long vacation. £32 19s. will go for fees to the Board and University—i.e., £15 15s. to the Board, £2 11s. Capitation Tax, 15s. Matriculation fee, £2 10s. previous examination fee, £1 5s. general examination fee, £3 3s. to the Registry for professional certificate (this, through want of a kindly word of caution, has often to be paid twice), and £7 fee for degree. (Mr. S. says £10 a year will meet all this.) £49 will be required for instruction, books, &c.; without allowing a penny for coaching or "little go," or "general" lectures—viz., £15 15s. for attending hospital, £6 6s. anatomy and physiology, £6 for dissecting purposes, £3 3s. each chemistry, materia medica, and the principles and practice of medicine, £1 1s. each for botany and comparative anatomy; whilst £10 is not a large allowance for books, stationery, and instruments. This will leave only £67 9s. for household and personal expenses—i.e., about £1 a week; and as he will be very fortunate if he obtain rooms, fire, lights, and attendance for 15s. a week, he must live on 5s. a week. Of course a divinity student can manage much better on the stated amount than it is possible for a student of medicine to do, as his expenses under the second head are considerably lighter than those above stated; but on £150 even his diet would be limited, and his life would have to be somewhat like that of a recluse, otherwise he would feel perpetual pecuniary pressure, and that continual concern about copers which worries a man, and is far from conducive to intellectual progress. I think that to be at all sociable, and to live in anywise comfortably, any non-collegiate student requires £80 a year, and that a medical non-collegiate student cannot be happy at Cambridge on less than £100 per year.

Apologising for trespassing so far on your valuable space,

I am, Sir, your obedient servant,

W. H. BLACKETT CROFTS.

Kettlewell, Skipton, September 25th, 1876.

P.S.—It will be observed that in the above no account has been taken of the cost of the academical costume, comprising at least one cap, two gowns (undergraduate's and bachelor's), and a hood, costing altogether, say, £3 10s.