in a house to which no food had been brought, and were still capable of moving off when disturbed, so it is rational to suppose that they could have existed throughout the winter.—I am, etc.,

A. WINKELRIED WILLIAMS, M.B., C.M., D.P.H.
Brighton, Jan. 8th.

MENTAL EXERTION AND THE PROTEIN RATION.

SIR,—It won't do. It will not do at all to trust that the protein will take care of itself if only we give or take sufficient calories. The cases I have published show that a man may consume enough calories to keep him in physical health and ample weight, and yet his mental health may suffer from lack of protein. And the experiments of Atwater and Benedict won't do either. They found, you say, that the intensity of metabolism is not affected by mental work. This denies what I did not assert. I do not say that the intensity of the general metabolism is affected by mental work; but if, as we most of us think, the amount of mental activity is a measure of the activity of the brain, the metabolism of the brain must *a priori* be increased during mental activity. All that Atwater and Benedict's experiments show is that they did not find evidence of increased metabolism of the brain. But if, as I contend, the working metabolism of the brain is mainly a protein metabolism, were they likely to find an increase in it? Protein is not, as the carbohydrates are, stored in the body until wanted, and its products excreted in proportion to the activity of the body. Any excess of protein intake beyond what is needed for the service of the body is reduced to urea and excreted at once, along with the urea reduced from the protein that has been utilized. The amount of CO₂ that is excreted is a measure of the sugar that has been used. The amount of urea that is excreted is a measure of the protein that has been absorbed; and what proportion of the absorbed protein has been used we have no means of knowing. It is customary to assume that the activity of the brain may be measured by the amount of phosphates excreted, but this is a pure assumption, and rests on no evidence that I know of. It was made in Germany.

It would seem that the only way to determine whether the protein excretion is increased by brain activity would be to stop the intake of protein and compare the excretion of urea during a period of mental activity with the excretion during a period of mental rest; but the stoppage of the protein intake would so disturb the conditions that the result would not be trustworthy.

We are here reduced to speculation, and must speculate as best we can on the basic fact that a certain minimum amount of protein, over and above the amount necessary to preserve the physical health, is necessary to the minimum of normal mental exertion. This is proved by my published cases. I submit that it is reasonable and safe to suppose that more mental exertion means the using up of more protein, and that better mental work will be done on a liberal ration of protein than on a bare minimum. I do not wish to convey the notion that a dullard can be converted into a genius by stuffing him with meat, but I have a strong opinion, based on my own experience, that the dullard will be less dull on a liberal protein ration than on a scanty one. I think it probable, also, that the genius will be nearer the top of his form in the same circumstances, but as to this I have no personal experience.

Finally, Sir, let me repudiate the aspersion that I have any quarrel either with you, or with the Food Controller, or with any one. My record is surely sufficient evidence of a nature almost morbidly averse to quarrelling.—I am, etc.,

Parkstone, Dorset, Jan. 7th.

CHAS. MERCIER.

*** Dr. Mercier says he has no quarrel with us, and we have certainly no quarrel with him. We did not quote the experiments of Atwater and his colleagues as evidence that the metabolism of the brain was not increased by mental activity but as evidence that the magnitude of any change, whether in terms of energy or of protein, was not such as need be brought into account when the question is one of rationing. Dr. Mercier may be quite right in thinking that more protein is needed by a man engaged in mental work than by the same man physically fit

although mentally inactive; but the interval between the minimum amount of protein necessary for physical health (less than 40 grams according to Rubner and Thomas) and the amount provided by a war diet which also yields the *needed energy*, is so great that we still hold, *pace* Dr. Mercier, that calories *will* do, if we can get them; but with the material now before them readers will be able to form their own judgement.

THE SANATORIUM TREATMENT OF TUBERCULOSIS.

SIR,—Your leading article of December 8th, 1917, clearly emphasizes the failure of sanatorium treatment for tuberculosis as a whole, and one cannot emphasize too strongly that the treatment of such cases very much resolves itself into one of environment.

Many of the sanatoriums have done good work in arresting the disease, and it is equally true that too many of the sanatoriums are little better than boarding houses—thus the treatment is not what it should be. It is comparatively easy to forecast a cure or arrest of the disease in the haemorrhagic type, but in the catarrhal forms the outlook is very different, and to obtain amelioration of the symptoms a differentiation has to be made and a distinct line of treatment enforced; this, I believe, is not systematically carried out in many of the so-called sanatoriums, so, from a public point of view, failures arise.

The treatment and experience of Brehmer and Walthers are frequently traded upon, and too little adopted in their true and practical aspects. Brehmer not only selected a proper site for his sanatorium, but he lived the life of his patients; he not only understood his cases, but enforced his treatment; even then disappointments occurred, and plainly due to "environment"—namely, the return to old associations and a lesser resistance.

Possibly the effect of exposure to strong "rainy winds," as Dr. Gordon says, has its influence, and no doubt he writes with knowledge of the conditions in his own district. I write with some experience, and I agree with him in saying sanatoriums are valuable when properly situated and skilfully handled; for this purpose there must be a dry subsoil, moderate rainfall, no dust or fog, but sunshine and protection from wind.—I am, etc.,

Bournemouth, Dec. 13th, 1917.

A. KINSEY-MORGAN.

MEDICAL STUDENTS IN AND OUT OF THE RANKS.

SIR,—May I call attention again to the injustice which is being done to some of those medical students who, in 1914, sacrificed their future to the need of their country? I refer to those students who, in their first and second year, responded *at once* to the urgent call (how urgent seems to have been forgotten) of those dark days. A cynical Government now says, "Fools! why did you not wait until you had passed your second professional examination? Because you were over-hasty, you must give way to those who, with much greater sense, looked before they leaped. Besides, if you had been more careful you need not have come at all." Others, more loftily, say, "Be content! look at the great satisfaction your noble patriotism will bring to you in after-life." Which, of course, is quite true. Pure patriotism is, without doubt, an excellent thing, and carries with it a noble and pure reward, even if it lands you in the workhouse. It would appear, however, that the reward is much more tangible if your patriotism is seasoned with a little self-interest.

My son, who was within six months of passing his second professional when he joined the army in 1914, is now told that, had he been a little less hasty in the exercise of his patriotic instincts, he would now have been free to return to his medical studies. As it is, he has suffered the horrors of Gallipoli and Mesopotamia, only to find that his claims are disregarded in favour of those who chose to "wait and see," and now find themselves rewarded by the gift of both the substance and the shadow by a grateful country. Is the army in such need of men that this injustice to these brave men is to continue? Surely not!—I am, etc.,

January 6th.

J. A. A.