the "Kew Question" has assumed proportions, and may have consequences, meriting for it a thorough ventilation; and I permit myself to believe that you may not be unwilling to receive further remarks on those points in my "Statement" to which Dr. Hooker has condescended to reply.

Sheen Lodge, Oct. 30 RICHARD OWEN

Physics for Medical Students

I AM and have been a "medical student" for many years, and hope to live in that capacity for some years more. I admit that I *ought* to know "the relation between the surface temperature of the body, the quantity of heat passing away from it, and the amount of heat generated in the body by the food given to a patient," but I do not know all this, and I have never discovered anyone who can tell me where I can learn it or how I can find it out by any efforts of my own.

Moreover, I have been unable to get a clear and satisfactory answer to the following simple questions, and have failed to find anyone who will explain to me accurately how I am to set to work to get the information so much desired:—"What is the quantity of heat generated in the body by the food, and how is it to be determined? How is the quantity of heat that passes away from the body in a given time to be estimated with anything approaching to accuracy?" If my friend and colleague Prof. Adams will be so kind as to give answers to these questions in NATURE, I can assure him he will confer a great favour upon many workers and thinkers in my profession, besides proving the value of such questions as that objected to by Mr. Heath for medical students. At this time we doctors are much in need of physical help. I have no doubt that physicists will be much astonished at our ignorance, but never mind that; we are quite ready to learn, and don't mind being laughed at or even spoken of with slight contempt by our physical friends if they will only help us. Nay, we will suffer anything from those who will instruct us so that we may be able to set to work upon living people who are "generating" and giving off heat, and determine with accuracy the different rate at which heat is "generated" and given off under different circumstances.

Prof. Adams asks whether "the production of heat in the human body by the consumption of food" is "carried on on principles entirely different from those of the production of steam in a boiler," and seems to regard it as one of the "mildest of questions" in heat that can be proposed for a medical student to answer. Will he answer his own question by asserting that the principles are the same in the two cases? Heat in the body, steam in the boiler—heat, steam; body, boiler!—or shall the question be revised before it is proposed to the student?

I have not the slightest doubt about the usefulness of a knowledge of physics to those who are working at medicine, and quite agree that the rising generation of medical students should be taught physics. But this is a very different thing from teaching people to fancy that living things are mechanisms, machines, galvanic batteries, or molecular apparatuses. I venture to think that some of the most distinguished physicists are too fond of deserting their own department for the purpose of trying to make people believe that there is an analogy between steam-boilers and human bodies, when no one has yet succeeded in proving that there is any true analogy whatever.

King's College, London LIONEL S. BEALE

IN the last number of NATURE Mr. Adams, of King's College, criticised the remarks made by Mr. Heath in his introductory address upon the character of the London University medical examinations, and of the first, the preliminary scientific, more especially. It scarcely needed a column and a quarter of close type for Mr. Adams to tell us that a medical man should be acquainted with physical laws and phenomena, and that in his opinion the mathematical question quoted by Mr. Heath was not too difficult to be fittingly placed in the examination paper. The former point is beyond question, and the latter is not to be settled by declaring the statement of the editor of the *Lancet* to be "shallow." As to the view that a medical man should be able to estimate precisely "the amount of heat lost through a blanket or a seal-skin coat," I will only say that it seems to me that a slight consideration of the physical and physiological conditions involved, and their variations in different instances, will suggest the hope that he will not waste his time in attempting such feats, simple as they may be deemed in physical laboratories. I will not take up space in commenting upon Mr. Adams' arguments and illustrations in support of his position, since they do but go to show that a medical man should have some knowledge of natural philosophy and its applications to the conditions with which he has to deal, and not that he should be driven to expend his time, already overcharged with much more that is of no possible use to him, upon mathematical processes which concern astronomers, chemists, and engineers. There is no doubt that to give a scientific character to medicine, exact quantitative methods must be applied to physiology and pathology, but it should be the work of men specially trained and devoted to the purpose. It has for some time past been commonly agreed that the medical student's education is such that he is urged to acquire a quantity of information with little regard to its use and digestibility. He has a great deal to learn in a short time. The chief part of his education consists, or should consist, in observing and comparing morbid conditions, and in learning or devising means for their relief and cure. Whatever time he spends upon what is not requisite, or has little direct bearing upon his art, implies time mis-spent and injury to the sufferers he will later attend. Prof. Huxley did not go too far in saying that the conduct of those who impose useless knowledge upon medical students is simply criminal.

F. LYNDON ATTWOOD

Junior Athenæum Club

NORTH POLAR EXPLORATION

IN the last number of the *Mittheilungen* Dr. Petermann publishes his 67th paper on the Geography and Discoveries of the Polar Regions, in which he gives an abstract of what has been done during the last three or four months.

The two projected Norwegian expeditions into the Siberian Seas, under the guidance of Captains Jensen and Mack, have at present been unfortunately frustrated; the former from a damage to the screw of the steamer, the latter from inability to penetrate the masses of ice. However, a projected scientific expedition for next year is exciting much interest at Tromsö. The French Expedition, under Ambert and Mack, has not yet put to sea, having been detained by the delay in settling the estate of Lambert, who left a large sum to be devoted to this purpose. This is much to be regretted, as Captain Mack has already distinguished himself by penetrating farther than any other discoverer into the Siberian Sea.

However, the much-talked-of and bold expedition under M. Octave Pavy, has, it is understood, at last left San Francisco, with what results remains to be seen. He expects to reach Wrangell Land by September 1, making his way farther northward in sledges, and hoping to come to open sea about May 1873. He will then proceed towards the Pole by means of a raft of somewhat novel construction, consisting of four hollow cylinders provided with a deck, and capable of holding all necessary provisions for Pavy and his small party for two years, by which time he expects to have reached the Pole, and returned to San Francisco. His companions are Dr. Chesmore, who has travelled much in Alaska; Captain Mike, who a few years ago attempted to cross the Atlantic in a vessel of somewhat similar construction to Pavy's; Watkins, a renowned Rocky Mountain hunter; and two sailors of whaling experience: in all, the expedition will consist of six men.

The latest news from the North American Expedition is contained in a letter from Dr. Bessels to Dr. Petermann, dated August 23, 1871, at which time the expedition had reached Tessinsak, the most northerly Danish settlement in Greenland, in lat. 73° 24′ N., and long. 56° 12′ W. Further details as to this expedition will be found in NATURE for September 19.

One of the most important and best fitted out expeditions is the Austrian one under Paver and Weyprecht, which left Tromsö in July, for the purpose of exploring the unknown region north of Siberia, to which they are prepared to devote three years. By the latest advices, about the end of July, the expedition was fairly on the road to its field of labour, and Count Wiltschek