

the material necessary to carry on their work, and were important educational institutions. I have mentioned the case of Japan as specially interesting, in its desire that scientific knowledge shall be spread amongst great masses of the people. So eager did we find our Japanese students to learn the sciences of the West that a rule had to be made in the college compelling them to take daily exercise out-of-doors. Nowhere could it be more necessary to instil the lesson of the old Latin poet: "*Mens sana in sano corpore.*"

Our experience in Japan gave us considerable insight as to the best way of teaching science, and especially physics, with which I am more specially concerned. You might think that it was very hard to make our students study science in a foreign language. This on the contrary was the very best thing for them. When we arrived in Japan we came amongst a people who were totally ignorant of the very simplest scientific instruments with which in this country you are familiar from your childhood; a people who had no means of telling differences of temperature other than by the rude and imperfect method of touch; who didn't know that you might go on heating water until it boils, but that after that, however much heat you apply, it gets no hotter; who could hardly form an idea of what was meant by weighing the air around us; and knew no better method of measuring the height of a mountain than by the length of the road to the top of it. The magnet, the directive property of which was first discovered by the Chinese, was perhaps the only physical instrument known to them, if we except such as are used in the mechanical arts—rude turning appliances, pumps of a simple nature, bellows, etc. I might give you some amusing instances of how the universal ignorance of differences of temperature was brought to our no-

tice. In travelling in the country, having been accustomed to tea prepared in China for the European market we daily required boiling water to infuse our tea. But we everywhere found that the people had no idea that boiling water differed in any way from very hot water which was far from the boiling point, and to get what we wanted we had either to go to the kitchen ourselves to superintend the infusing, or get brazier and kettle in our rooms, where we could infuse it ourselves. The Japanese merely dry well their tea leaves as a sufficient preparation, and in this partially green state experience has taught them, that water of a medium temperature (if you will pardon such an unscientific expression) is the best to bring out the full flavour of the tea. When water boils it is said in Japanese to "stand," but even "standing water" doesn't bear along with it the idea of having a maximum temperature.

Such a people, you might imagine, not only had no words to express our modern scientific ideas, but their language was not even capable of expressing them. In these circumstances it was much better to use words already invented by the discoveries of the ideas themselves, and indeed by doing this they did nothing more than Europeans have themselves done, for nearly all our scientific terms are of Greek origin. To learn the English language was to the Japanese student the greatest boon, for thereby a great literature was made available to him, and in no better way could the store of modern scientific knowledge be thrown open to him.

In teaching physics to the Japanese I found that by far the best way was to make them thoroughly familiar with at least the simplest scientific instruments, such as balances, thermometers, pumps, magnets, etc., and to measure for themselves some of the simpler physical quantities, such as specific gravities, temperatures, dew