has been appointed to the chair of chemistry in the University of Aberdeen in succession to Professor Frederick Soddy.

SIR J. J. THOMSON, master of Trinity College, Cambridge, who recently resigned the Cavendish professorship of experimental physics, has been elected into the newly established professorship of physics. This professorship is without stipend, and will terminate with the tenure of office of the first professor unless the university determines otherwise.

DISCUSSION AND CORRESPONDENCE

FIRE-WALKING IN JAPAN

DURING my four years' residence in Japan I had several opportunities of witnessing the spectacular religious or quasi-religious ceremony periodically observed at the Ontake Temple, Tokyo, in the course of which the officiating priests walk barefoot over a bed of live charcoal, throw boiling water over themselves and climb a ladder of sharp swords set edge upward. All these pretended miracles, however, are susceptible of scientific explanation, and it is only with regard to the first-mentioned—the fire-walking—that I venture to ask the privilege of making a brief statement in SCIENCE.

To the great mass of the spectators in the temple enclosure, who do not usually include more than the merest sprinkling of the more intelligent and better educated classes of the Japanese people, the supposed miracles are the clearest demonstration of the supernatural power of the priests, who would have it believed that it is solely to their incantations that they owe their protection from injury. But it is not necessary to be a very close observer of their movements to perceive that the priests are not content with their perambulations, genuflexions and prayers, but are careful to rub their bare feet with salt, *ostensibly for purificatory purposes,* before walking over the fire. This fact brought to my recollection the occasion, forty years ago or more, when Tyndall astonished a distinguished audience at the Royal Institution by plunging his bare arm into molten metal, the then Prince of Wales, afterward King Edward VII., who was present, being prevented from following Tyndall's example only by the determined opposition of his wife.

So sure did I feel of the efficacy of the salt as a protective agent that on my second visit to the temple I determined to follow the priests in their apparently hazardous adventure, and so after rubbing my feet well in the pile of salt, I walked rapidly over the bed of glowing coal, some eighteen feet long. My confidence was not misplaced. In my feet I felt only a sensation of gentle warmth, but my ankles, to which no salt was applied, were scorched.

After a careful examination of such of Tyndall's works as I had access to at the Yokohama Club, without finding any reference to the demonstration at the Royal Institution, I wrote to Sir William Crookes, who not long before had mentioned to me his association with Tyndall in some of the experiments that preceded the delivery of the latter's famous "Lectures on Light." In due course I received Sir William's reply, in which after reference to certain matters of no special interest in this connection, he said:

> I do not know of any published account of Tyndall's putting his bare arm into molten metal, but I can well believe it, as I myself have plunged my hand into molten, almost red-hot, lead. I was in a profuse perspiration at the time, and, immediately before, I dipped my hand into strong ammonia, to increase the spheroidal effect. I do not think the extra precaution was of much use, but I did not like to take a risk when looking at the cauldron of hot metal.

To physicists there is nothing new in all this, but not every scientific man is a physicist, or hypnotism would not have been suggested to me, as it has been, as the secret of the remarkable immunity I experienced.

JOHN HYDE

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MARCHING IN STEP

TO THE EDITOR OF SCIENCE: In regard to Walter Moore Coleman's note in the April 18 number of SCIENCE concerning variations in phase in the step of a column of soldiers it

would seem hardly necessary to attribute the perfect marching in the absence of sound signals to any mutual subconscious force passing betwen the men. Would it not be reasonable to infer that in this case the rhythm is sight-transferred? To be sure, in a long straight column any particular squad would not be able to see far down the line, but in getting the time of the step from those somewhat in advance of them there would seem to be as much likelihood of the slight error having either sign, so that there would be no accumulation in error back through the column, as occurs in the case of establishing the rhythm by means of sound signals at the head of the column. That there is, in the absence of sound signals, a sway and swing absent at other times, may be solely a result of perfect rhythm, rather than a result of any difference in the marching of any one man. It is conceivable that in a column of men every man would be marching with rhythmic step, and with dash and enthusiasm, and yet there would be no satisfactory swing and sway to the column if the men were in slightest amount out of step. Synchronize their movements, and the result becomes immediately rhythmic and inspiring, although each man may be taking the same steps in exactly the same way.

That a marching column accepts audible signals in preference to visual signals in case both exist is, I should suppose, a matter of common knowledge. The writer had occasion to drill on the grass-covered Ellipse at Washington many mornings last summer before the heavy dew had gone. The dominant note caused by marching was not that resulting from the planting of the foot, but rather that from the movement through the heavy wet grass—a sound exactly out of phase with the former which ordinarily, in a small body of men, gives the sound signal for the rhythm. The strenuous West-Pointer who was conducting the drill never seemed to realize why he could not keep the men in step at such times. There was a continual wave of changing of step passing back through the column, in an everlasting but hopeless endeavor to make the step coincide with a signal automatically and inescapably out of phase with it.

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SCIENTIFIC BOOKS

The Elementary Nervous System. By G. H. PARKER. Philadelphia, J. B. Lippincott Co. 1919. Pp. 227, figs. 53.

With characteristic lucidity, Dr. Parker has written the second of the Monographs on Experimental Biology of which Dr. Loeb's "Forced Movements, Tropisms and Animal Conduct" is the first. Limited by the plans already outlined for subsequent volumes of the series to subject matter "drawn almost entirely from the three simpler phyla of the multicellular animals, the sponges, cœlenterates and the ctenophores," this book is nevertheless an illuminating introduction to the more fundamental problems of nervous systems in general. Anatomy and histology are not neglected. The author, however, has attacked the subject frankly as a physiologist, by the method of quantitative experimental analysis that in recent years has been revealing a more and more intimate kinship between biology and the maturer sciences of physics and chemistry. The bibliography at the end of the volume contains one hundred and sixty-six titles, and the author has been exceptionally careful, by frequent references throughout the text, to acknowledge his appreciation of the work of others. Yet, owing to the comprehensiveness of his own researches, he has been able in the development of his theme to review many of his own experiments. In this way, though these reviews are necessarily brief and untechnical, he makes of the reader a co-investigator who shares with him his own keen interest in the problem, his rare skill in devising experiments that are masterfully direct and simple, and who feels the confidence in the results that clear-cut workmanship inevitably inspires.

In an introductory chapter the neuromuscular mechanisms of the higher animals are analyzed into receptors (sense organs), ad-