the attached membrane to vibrate in exact correspondence with the variations of the current.

The following interesting letter from Sir Isaac Newton was recently shown for the first time at a *Conversazione* in London given to entertain Professor Helmholtz.

London; *Dec.* 15, 1716.

"Dear Doctor: He that in ye mine of knowledge deepest diggeth, hath, like every other miner ye least breathing time, and must sometimes at least come to terr; alt for air.

"In one of these respiratory intervals I now sit doune to write to you, my friend.

"You ask me how, with so much study, I manage to retene my health. Ah, my dear doctor, you have a better opinion of your lazy friend than he hath of himself. Morpheous is my best companion; wthout 8 or 9 hours of him yr correspondent is not worth one scavenger's peruke. My practizes did at ye first hurt my stomach, but now I eat heartily enow as y' will see when I come down beside you.

"I have been much amused by ye singular *φενομενα* resulting from bringing of a needle into contact with a piece of amber or resin fricated on silke clothe. Ye flame putteth me in mind of sheet lightning on a small—how very small—scale. But I shall in my epistles abjure Philosophy whereof when I come down to Sakly I'll give you enow. I began to scrawl at 5 mins frm 9 of ye clk, and have in writing consmd 10 mins. My Ld. Somerset is announced.

"Farewell, Gd bless you and help yr sincere friend

"(Signed) ISAAC NEWTON.

"To Dr. Law, Suffolk."

Mr. W. Grylls Adams describes in *Nature*, certain electrical effects experienced during a storm on a mountain:

"We reached the top of the Jungfrau Joch at 10.5 A. M., and were met by a violent hail storm, which came rolling up from the northern side of the Col. We at once started to return, and had been walking for two hours down the centre of the Aletsch glacier when the electrical effects began to be felt; we reached the Mërjelen See at 3.15, so that at the time of the occurrence we had reached the lower part of the *névé* which is farthest from surrounding mountain tops, where the glacier is widest. We were enveloped in cloud, above which there were no doubt other clouds charged with electricity, and as they approached we were gradually being charged more and more strongly by induction from the lower cloud, and when the discharges or thunder occurred we were suddenly relieved by an electric shock. A kind of *brush discharge* of gradually increasing intensity went on for some minutes, followed by a sudden shock, and this process of bringing us up to the right state of excitement, to be relieved by a sudden shock, was repeated over and over again several times.

The hissing sounds were first heard in the alpenstocks, and gradually increased in loudness up to the sudden discharge. There were clear indications that as condensers of electricity we were not all of the same capacity. We were roped together in threes: in one set of three I was in the middle, with a guide in front and Mr. Sowerby behind. Whilst the charging was going on I felt the pricking sensation at the waist on the side where the cord was knotted, showing that those who were more influenced by electrical induction were charging the others through the rope which acted as a conductor. Judging by his actions, our guide (a young and active man) was strongly influenced by the charge, whilst Mr. Sowerby, the most staid and venerable of the party, was certainly influenced the least. In the other set of three the elderly J. M. Claret of Chamouni was least affected, whereas Mr. Watson, who was not the youngest of the party, was the most powerfully affected. These facts point to a direct relation between the temperament of the individual and his capacity for being excited electrically or his inductive capacity.

I should add that Mr. Packe has had similar experiences, but apparently, to a less extent, in his walks in the Pyrenees.

NOTES.

STORAGE OF ELECTRICITY.—A new secondary battery, of greatly enlarged capacity, is now attracting attention in Paris. It is the invention of M. Faure, but is confessedly a development of the well-known secondary battery of M. Planté, which is formed of sheets of lead immersed in acidulated water. The latter gains in capacity as the process of charging and discharging is repeated, through increasing thickness of the layer of peroxide of lead that is slowly formed by the currents. M. Faure has conceived the idea of coating the two electrodes with layers of minium, or the red oxide of lead, and by this means the capacity is greatly increased. The Faure battery is stated to have forty times the power of accumulation of the Planté. A battery weighing 75 kilogrammes will develop 75 kilogrammètres, or one horse-power, during one hour. As to the nature of the action, the electric current appears to change the minium to peroxide on the positive electrode, and to reduce lead on the negative. In discharging, the reduced lead is oxidized, and the peroxidized lead is reduced. The battery was lately exhibited by M. Reynier to the Society for the Encouragement of National Industry. There were 24 couples, weighing seven kilogrammes each, connected to a Siemens machine of medium size; these furnished a work of 47 kilogrammètres, which is about a third of M. Reynier's figures; but the conditions were unfavorable. Next, a band of platinum, three mètres long, 12 millimètres broad, and 4-10ths of a millimètre thick was made to glow; then two incandescence-lamps were lighted. The superiority to the Planté battery was well demonstrated. Some competent physicists speak hopefully of M. Faure's battery as a means of distributing electricity to any house or workshop independently of others that may be supplied, and free from the drawbacks of a system of canalisation. The method is also regarded as very promising for domestic electric lighting. A company, it may be added, has been lately started in Paris by M. Philippart, for obtaining force and light by electricity, by combination of the Reynier and Faure batteries. M. Hospitalier has pointed out the expensiveness of charging the Faure battery with electricity from chemical action.

THERMAL ELECTROLYSIS.—Dr. J. H. Gladstone and Mr. Alfred Tribe found that when sheet silver was plunged into fused silver chloride, or iodide of silver, crystals of silver formed on the sheet. Similarly, when copper was immersed in fused cuprous chloride, copper crystals were deposited on it, and when zinc was placed in melted zinc chloride, or iron in melted ferrous chloride, these two metals crystallized on the plates. They found this to be due, not to a difference in the physical condition of the rolled metals, but to the unequal heating of the different parts of the immersed metals. By the contact theory of voltaism, there will be a difference of potential between the metal and the liquid chloride in contact with it, and this difference of potential will vary with temperature. Since all parts of the immersed metal cannot be supposed always at the same temperature there is the possibility of a current being set up and consequent electrolysis of the salt. This view was corroborated by heating the fused salt unequally, when a crop of crystals appeared on a silver rod plunged in the cooler part of the liquid. Again, two silver rods connected together were plunged, the one in a hotter the other in a cooler part of the fused silver chloride, and at the end of fifteen minutes the latter was studded with crystals of silver, whilst the former was clean. A galvanometer showed a stronger current between the rods the greater the difference of temperature between the parts of the fluid in which they were placed; and transposing the rods reversed this current.

LIGHTNING WITHOUT THUNDER.—M. d'Abbadie.—The author describes a phenomenon of this kind which he witnessed in Africa when a thin fog occupying a narrow valley was suddenly illuminated by sheet lightning. He points out that in this case the ordinary explanation of so-called "heat lightning" as the mere reflection of a storm below the horizon is inapplicable.