It is a question of a certain amount of interest as to whether there is any evidence of the actual fall of a shower of meteorites over a large extent of the earth's surface. Such evidence has long been supposed to be furnished by the plentiful occurrence of meteorites in the Desert of Atacama, a term applied to that part of western South America which lies between the towns of Copiapo and Cobija, about 330 miles distant from each other, and which extends inland as far as the Indian hamlet of Antofagasta, about 180 miles from the coast.

The generally received impression as to the occurrence of meteorites in this desert is well illustrated by the following statement of M. Darlu of Valparaiso, read to the French Academy of Sciences in 1845:—

"For the last two years I have made observations of shooting-stars during the nights of Nov. 11–15, without remarking a greater number than at other times. I was led to make these observations by the fact that in the Desert of Atacama, which begins at Copiapo, meteorites are met with at every step. I have heard, also, from one who is worthy of trust, that in the Argentine Republic, near Santiago del Estero, there is, so to say, a forest of enormous meteorites, the iron of which is employed by the inhabitants."

A study of the literature indicates that "the forest of enormous meteorites" near Santiago del Estero, understood by Darlu as significative of infinity of number, is really a free translation of a native statement "that there were several masses having the shape of huge trunks with deep roots," and that not more than four, or perhaps five, masses had really been seen in the Santiago locality at the time of Darlu's statement. There is a similar misunderstanding relative to the Atacama masses: it is clearly proved, that, at a date long subsequent to 1845, the desert was virtually untrodden and unexplored. In Darlu's time it was only crossed along definite tracks by Indians travelling between San Pedro de Atacama and Copiapo, and between the inland Antofagasta and the coast. In fact, it is established that the only Atacama meteorites then in circulation were all got from a single small area, three or four leagues in length, in the neighborhood of Imilac, one of the few watering-places on the track between San Pedro and Copiapo.

Since that time the discovery of rich silver-mines in the centre of the desert, and the working of the nitrate deposits, have led to vast changes; the desert has been more or less closely examined, and other meteoritic masses have been found. Still, the number of meteorites yet discovered, distinct either in mineralogical characters or locality, is shown to be, at most, thirteen.

One of them, Lutschaunig, is distinct from all the rest as being a chondritic stone; a second, Vaca Muerta, likewise differs from all the others in that it consists of nickel-iron and stony matter, both in large proportion; a third, Imilac, is a nickel-iron with cavities, like those of a sponge, filled with olivine; a fourth, Copiapo, is a nickel-iron with irregularly disposed angular enclosures of troilite and stony matter; the remaining nine consist of nickel-iron, virtually free from silicates, some of them showing no Widmanstätten figures when etched, others showing excellent figures more or less differing in character.

Now, in every meteoritic shower yet observed, the individuals which have fallen simultaneously have been found to belong to a common type. Hence it is reasonably certain that several distinct meteors are represented in the desert, and that the above masses are the result of several falls; and, this being accepted, the assertion of simultaneity of fall of two or more masses on the purely geographical ground that they have been found in the same desert, can be allowed no great weight.

It is thus clear that the meteorites of the Desert of Atacama afford absolutely no proof that enormous meteoritic showers have ever reached the earth's surface.

The general dryness of the air of the desert, and the rarity of rain, have been sufficient to insure the preservation of masses which have fallen in the course of many centuries unto a time when an exploration of a large extent of the desert has taken place.

That the meteoritic masses are far from being so plentiful as has been imagined is conclusively proved by the experience of Mr. George Hicks, one of the earliest explorers of the 23d and 24th parallels. Although much interested in their occurrence, he never found a mass himself, and he only obtained his first specimen after years of persevering inquiry from the Indians.

THE PULSION TELEPHONE.

A CURIOUS scene was enacted recently at a place called Child's Hill, on the Midland Railway, near London, England. What took place there, as vouched for by *Engineering*, was as follows. A party of gentlemen alighted from the train and ascended the embankment. Here one of them reached up to a wire stretched along the telegraph poles, and, placing the crown of his hat flat against it, he commenced a conversation with some unseen correspondent. The answers to his questions and remarks came back quite audibly to the group gathered around him, while those who felt sceptical as to the reality of what was being enacted before them, removed to a distance, and, pressing the wire against their ears and cheek-bones, heard the return messages for themselves. After some desultory conversation, the unknown speaker was asked to give a good shout, and in reply he jodelled with such vigor that a boy plodding his way along the cutting, at the opposite side of both up and down lines, looked up with amazement. He was at least eighty or one hundred feet distant, and yet he evidently heard the yell transmitted along the wire and received into the crown of an ordinary silk hat. It was quite impossible that he should have caught the original sound, for it was uttered in a cabin built on the side of the line at the Welsh Harp station, more than a mile away, and probably was not directly audible for one hundred yards. Those who were on the embankment knew that it was transmitted by means of a new mechanical telephone, for they had already listened to the same voice at Finchley-road station, which is 3½ miles from the Welsh Harp.

When every one had satisfied himself that spoken words, whistling, and musical sounds could be received without special apparatus, the party re-entered the train, and went on to the Welsh Harp station, where they found several lines erected in the grounds of the local hotel. One of the lines starts from a small cabin in the grounds; it then proceeds to a post on the margin of the lake, and goes right across to a hut on the opposite bank. The distance is between a fourth and a third of a mile; and as this wire is not particularly tight, and only starts at a height of about ten feet above the water, it will be readily understood that it must lie for nearly its entire length in the mud which forms the bed of the lake. Another line traverses the gardens; its supports are formed by branches of trees, around several of which it is wound three times, and is then led off at an angle to its original direction. In another instance a row of statues are made to carry a line, which is laid upon any part of them which furnishes a convenient guide. This line is so slack that it can be bent into S form by the thumb and forefinger. The very various circumstances appeared, however, to make but little difference to the instruments, and in all cases conversation could be carried on with the greatest ease, and often could be heard a foot or two away from the receiver.

The instrument by which these curiously constructed lines were made to give such remarkable results is the property of the British Pulsion Telephone Company. It is the invention of Mr. Lemuel Mellett of Newton, Mass., and already several hundred instruments are at work in Boston and elsewhere. The construction is so exceedingly simple, that one is filled with wonder that it can effect so much. The receiver, which also acts as a transmitter, consists of a wooden case, divided into two parts by a metallic diaphragm held by a clip-ring and screws. In the centre of the diaphragm is a hole through which there passes the line wire, having at its end a button to take the pull. So far there is no special novelty to distinguish the telephone from the old pill-box and string. The new feature consists in a set of resonators placed over the diaphragm to re-enforce its vibrations. These resonators may be made in many different forms; those used on this occasion are spiral springs of various lengths, and made from wire of different gauges. One set of springs is festooned between the screws which hold the diaphragm, while others are held at one end only, and project upwards and inwards within the case. These resonators are chosen experimentally of such dimensions that each will be set into vibration by some one or more of the tones which are usually

found in the human voice. Consequently the faintest vocal tremor imparted to the disk is immediately taken up by them, and immensely magnified. This is done both at the transmitting and receiving ends, the result being that the wire is put into intense molecular vibration of a hitherto unappreciated character. It is evidently not merely lateral vibration, like that of a guitar string, for such motion would certainly be damped in the wire laid in the lake; it would also greatly suffer in the case of a span strung so slackly that at the centre it rests for many feet on the ground, yet such a span was shown to work reasonably well. It is evident, however, that the vibration is not purely longitudinal, for if it were it should be transmitted through a coil of wire flung loosely on the ground; and this, we understand, is not the case. It would, however, be a waste of time to try and formulate a theory apart from experimental investigation. What principally concerns us now is the fact that a mechanical telephone has been constructed, which will speak with absolute distinctness for three and a half miles, and which is simple, cheap, and, most important of all, free from induction. It is easily conceivable that its performances may be much improved; new forms of resonators may be found that have a nearer affinity to the tones of the voice than those already tried. Two vocal chords form the source of all the sounds we can utter, even if we be as gifted as Patti, and it seems possible that some material may be found more nearly allied to their action than wire helices. Although these can vibrate in harmony with the tones of human language, they have not the same quality of sound, and the metallic resonance which they impart to the articulation they transmit is not altogether an improvement.

HEALTH MATTERS.

Preventive Inoculation for Yellow-Fever.

WE are indebted to the *Medical Record* for the following translation of a report which was presented to the Academy of Sciences, Paris, by Dr. Domingos Freire, professor of organic chemistry and biology in the faculty of medicine of Rio de Janeiro, Brazil.

The epidemic of yellow-fever that developed in Rio de Janeiro in 1888 and 1889, and which propagated itself in several other places in the interior of Brazil, has been the means of demonstrating for the fourth time the value of inoculations by means of the attenuated microbe of yellow-fever. The maximum of the epidemic was between the months of December and March, the first sporadic cases having appeared about the end of the month of May, 1888, and the last in June, 1889. During this period there were inoculated 3,570 people; to wit, 988 strangers and 2,582 Brazilians, divided thus: the city of Rio, 2,138; city of Campinas, 651; town of Vassouras, 199; city of Nicteroy, 166; city of Santos, 133; Desengano, a village of 425 inhabitants, 102; Serraria, a small town, 80; city of Rezende, 54; Cataguazes, a village of 2,000 inhabitants, 50. The disease swept with great intensity in all of these spots, and the vaccinations were made, for the most part, during the height of the epidemic.

Of the 2,582 Brazilians, there were 1,740 that should be added to the 988 strangers, as this figure embraces not only individuals coming from the interior and resident in the city of Rio for less than six years,— that is to say, non-acclimated,— but also children, who, according to our experience, are just as susceptible as the strangers themselves.

The rate per hundred of mortality among the vaccinated was 0.078: at Santos, at Rezende, at Serraria, and at Cataguazes, the immunity from the disease was absolute. Here is the rate per cent from each locality: Rio, 0.98; Campinas, 0.46; Vassouras, 0.05; Nicteroy, 0.75; Santos, 0.00; Desengano, 0.09; Serraria, 0.00; Rezende, 0.00; Cataguazes, 0.00. The mortality from yellow-fever among the non-vaccinated was 4,135, divided thus: city of Rio de Janeiro, 2,407 (this includes the dead from the Marine Hospital); Campinas, 812; Vassouras, 15; Nicteroy, 177; Santos, 650; Desengano, 221; Serraria, 21; Rezende, 11; Cataguazes, 20. Among the 4,135 there were about 2,800 strangers, of whom, 1,176 died in Rio (and 750 of these in the Marine Hospital), 63 at Nicteroy, 500 (about) at Santos, 300 (about) at Campinas, 7 at Desengano, 3 at Rezende, 3 at Vassouras.

Thus one-fourth of the deaths were among Brazilians who were unaccustomed to the poison, inasmuch as they resided in localities where the epidemic appeared for the first time this year. In order to make the efficacy of the inoculations more marked, it suffices to remember the proportion established by M. Jemble in Senegal; namely, that among the strangers who had been there from one to three years, 75 per 100 were attacked by yellow-fever, and 68.06 per hundred died.

Applying these facts to the vaccinated strangers, or the provincials who had from a few days' to three years' residence in the infected locality, the following results were obtained. At Rio were vaccinated 1,183 people under the above conditions, of whom at least 591 should have succumbed to the disease, but only 18 died. Thus 573 lives were saved. At Campinas, a city that never before had an epidemic of yellow-fever, and where the 651 inoculated might be considered as new arrivals, of whom 325 should have died, the unsuccessful inoculations were but 3. At Vassouras, 5 should have died; one only died, who was not a recent arrival. At Nicteroy the 11 strangers, under the conditions cited above, should have furnished five deaths; one only was a victim. At Santos, of 57 persons under the same conditions, 28 should have died, but the immunity from disease was absolute. At Desengano, the two unsuccessful inoculations were among strangers who had lived from six to eight years in the country. But in view of the fact that the disease obtained for the first time, all of the 102 persons inoculated were as susceptible as strangers who had just arrived. Among them 51 should have died. At Serraria, according to the main calculation, 39 should have died, whereas the immunity from the disease was absolute. The same reflections apply to Rezende, where the 54 vaccinated should have furnished 27 deaths, and at Cataguazes, where the 50 vaccinated should have furnished 25 deaths, in view of the fact that the epidemic made its first appearance in these two localities; still the immunity was perfect, without exception.

There were vaccinated, between 1883 and 1889, 10,524 people, with a mortality of 0.04 per hundred.

Vaccinations made in 1883-84	418
" " 1884-85	3,051
" " 1885-86	3,473
" " 1888-89	3,582
	10,524

Dr. Freire ceased vaccinating in 1887, owing to his trip to Europe and in the United States. The mortality from yellow-fever among the non-vaccinated, during the four epidemics mentioned above, was close on to seven thousand. It may be added, in closing, that all the results given have been authenticated by a large number of medical men, and municipal and police authorities. The vaccinations were made without fee. This succinct statement proves, without question, the truth of all the doctrines founded by the eminent master, M. Pasteur.

ANTIPYRINE HABIT. — To the already long list of drugs the use of which, under proper restrictions, is both beneficial and proper in combating the various ills to which flesh is heir, but whose abuse becomes a curse to humanity, another has recently been added. Scarcely have we learned to properly use antipyrine, says the *International Dental Journal*, than the tocsin of alarm must be sounded against its abuse. The recent discovery of its value as a nerve-tonic places it on the list with morphine, chloral, cocaine, etc., so seductive is its gentle, soothing influence upon the overstrained nerves. Its victims are already found, especially among society women, whose nerves, strung up to a high pitch by the overwhelming demands of a winter season of gayety, seize eagerly upon any thing that will afford relief from the headaches and other disorders arising from prolonged fatigue and overtired nerves. So pleasing is the effect, that it is soon used for every trifling ill feeling, until the patient finds herself unable to live without it, and the fascinating "antipyrine habit" is formed. Properly used as a nerve-tonic, its effects are admirable, but abused, the victim becomes even more hopelessly entangled than the morphine or cocaine victim. The effects vary with the dose. In large doses it produces complete relaxation with loss of reflex action. In moderate doses, continued, it induces convulsions. As a stimulant its effect is much like that of quinine.