

carried too far. It has been of great value, though it may now fail to meet new demands. Electric thermometry is receiving especial investigation at the signal office, particularly from the meteorological stand-point, with some promising results. Professor Mendenhall reported the progress which had been made in the study of atmospheric electricity during the past year. It is not time to begin to think of the origin of atmospheric electricity. The problem is its distribution and the relation, if there be any, to weather changes. Some very interesting results have been reached. In ordinary weather the electrical condition is undergoing constant and rather wide variations, which are very local, as two collectors only a few feet apart may give curves differing considerably, though similar in their wider variations. When an electrical storm occurs, the curves over a wide area may be similar in general outline.

Professor Mendenhall also noted a phenomenon entirely new to him; namely, that resistance coils, after a current is passed through them for some time, upon short-circuiting, will yield a reverse current for hours. This phenomenon can no doubt be classed under the general head of polarization, yet by simple polarization it would be difficult to account for persistence of current. This makes caution necessary in the use of resistance coils, in order that any effects of this kind may be carefully noted. In one instance the apparent resistance of a coil was found to increase fourfold when the current was reversed.

Prof. W. A. Anthony reported the results of experiments showing an increase in the torsional elasticity of metallic wires. In the case of a certain phosphor-bronze wire, it has been increasing, at a decreasing rate, for nine months. Various metals have been investigated. Steel is scarcely better than brass and other substances, and they all show a much wider change than the bronze. To determine whether the phenomenon is dependent upon the age of the wire and the condition to which it is subjected, a piece of wire was freshly drawn. A portion forty centimetres long was used in a torsion pendulum. The period changed from 9.575 seconds to 9.526 seconds in four days. The curve representing the time of vibration shows that the change occurred less rapidly each day. Another piece of the wire, which had been drawn at the same time, and which had been subject to no strain of any kind, was then tested. The curve for this wire was not a duplication, but was almost an exact continuation of the former curve, showing that the same changes had been going on in the two wires. The temperature co-efficient seems to change with the change in torsional elasticity.

The following papers were also presented: 'Counteracting the effect of change of level of the torsion balance,' by Prof. Wm. Kent; 'Time of contact between the hammer and the string in a piano,' by Prof. C. K. Wead; and 'Registering small variations of speed of machinery,' by Prof. W. A. Anthony.

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#### PARIS LETTER.

M. PENNETIER, at a recent meeting of the Academy of sciences, gave the results of experiments of fourteen years' duration concerning the revivification of small animals, such as rotifers and *Anguillula tritici*, after a protracted state of apparent death due to dehydration. The results are the following: *Anguillulae*, which M. Pannetier had kept, year after year, in a state of apparent death and in great numbers, have ceased to be subject to revivification, upon being put in moist conditions, after fourteen years. Up to this date, they regained movement and life easily enough, but after it none of them could be brought back to life. M. Vulpian remarked, *à propos* of M. Pannetier's experiments, that he had noticed that every year the number of dehydrated animals that can be recalled to existence decreases regularly, and that most likely the process of desiccation works in the animals some progressive alterations of an unknown nature, which lead to results incompatible with life. M. Vulpian argues also that it cannot be death that desiccation induces; it can only be some sort of lethargy during which life-phenomena and manifestations are at the lowest. This conclusion will be indorsed by most biologists.

This question of the revivification of desiccated animals was treated in a very interesting manner some twenty-five years ago by Broca. Leuwenhoeck was the first who noticed the fact, and Needham and Henry Baker (1743), Spallanzani and Fontana, soon followed. During the present century, Doyère, Pouchet, and Davaine investigated the subject with great care. They found that the facts were quite true; but while Pouchet, following Leuwenhoeck, believed that there was no real death in the case, and that it was only a very good imitation of it, Doyère, following Spallanzani, believed that the desiccated animals were really dead, and that their revivification was a real resuscitation, a new creation of life. In 1860 a committee was appointed by the Société de biologie for the purpose of investigating the question. Brown-Sequard, Balbiani, Berthelot, Dastre, and Robin were members of this committee: Broca had charge of summarizing the results and drawing up the report of the committee. This report was published in 1860, and it remains one of the

most accurate statements, and the most scientifically written papers on the subject. After a long series of experiments, the conclusions obtained were that rotifers can be brought back to life after having remained ninety days in a dry vacuum, and having been submitted to the influence of a thirty-minutes' sojourn in an oven heated to 100° Celsius, that is, after having been as completely desiccated as can be. These are precise and accurate facts: the committee remarked, also, that the revivification of *Anguillulae* may be effected at least twenty-eight years after desiccation; and, following Leuwenhoeck's opinion, M. Broca believed that during desiccation vital phenomena were much reduced, but not wholly suspended. Upon the whole, M. Penetier's experiments do not give any new result, but they confirm what has already been said. This power of revivification is a very singular one, concerning which a great deal remains to be learned, especially as regards other species. It certainly cannot be believed that desiccated animals which can be re-animated by moisture are really dead: they are in the state called by Preyer *vitae capax*,—a state that is not real actual life, but potential life; a state intermediate between life and death, but much nearer the former than the latter.

A new monthly paper has been recently issued in Paris, of which only two numbers have yet appeared. It is the *Revue de l'hypnotisme*, and is edited by Dr. E. Berillon, with the co-operation of many scientists, such as Bernheim, Hack-Tuke, Grasset, Treland, Luys, Ochorowicz, Magnin, Voisin, Liégeois, and others. M. Berillon has behind him no works to speak for his competency, and is a rather young man. His co-operators are, generally speaking, very able men; but it must be confessed that hypnotism is as yet a rather young science, and requires to be pushed somewhat further before a paper can be usefully devoted to it. The *Revue de l'hypnotisme* contains, however, some valuable contributions, among which we notice especially a paper by Dr. Voisin on therapeutical applications of hypnotism in cases where the disease is more a moral than a physical one. The author relates a case in which hypnotism has been of great use, and has evidently improved the morals of the patient. M. Liégeois contributes an interesting paper on hypnotism induced by telephone: the experiments succeed as well as if the different acts had been directly suggested, without any telephone. These two papers excepted, there is nothing new nor interesting in this young periodical.

M. Molliere of Lyon recently made known an old and very rare book, published a century ago, in which one may find the beginning of Pasteur's theory of pathogenetical germs, or microbes. This

book was published at the time of the Marseilles pest, and its title is 'Observations faites sur la peste qui régné a present à Marseille et dans la Provence.' The author was Goiffon, a botanist and physician of Lyon. According to Goiffon, the disease is due to some poison which comes into the body from outside. The poison is believed by him to be some living creature which can multiply without losing its pathogenetic properties. Having never seen any microbes, he considers the cause of the disease as residing in some worm or insect brought from foreign countries with foreign goods. "Measles," says he, "and small-pox, which are recognized as contagious diseases, are perhaps due, as well as many epidemical diseases, to some special sort of little worms, or imperceptible insects, which force themselves into the body of those who become sick, and stick to the clothes of those who propagate the sickness." He believes also that *bovine vert* is "caused by small worms deposited on the hay and grass the herds eat; and the ulcerations that most diseased animals show on the tongue and in the mouth confirm this view." Further on he says that the spread of the disease, when once introduced into a country, is due to the dissemination of the eggs of these worms or insects. The fact that more than a century ago the cause of different contagious diseases was believed to be some living organism, is all the more interesting that it was entirely forgotten. Manget, the Swiss author of many important medical and anatomical works, was the only one who believed in Goiffon's theory; he even remarks that Father Kircher, the well-known scientist and alchemist, had proposed a similar theory. Goiffon's work is a very interesting one, and M. Molliere has done well in republishing this forgotten old book.

MM. Charbonnel-Salle and Phisalix of Besançon have recently published the results of their experiments concerning the pharyngeal and oesophageal secretion of pigeons and other birds, which is used by them to feed their young. It was Hunter who discovered this phenomenon, and first described it. Cl. Bernard compared this secretion with milk, and believed it was caused by a very active cellular multiplication of the epithelium of the oesophageal tract. Other physiologists attributed the secretion to some glands. MM. Charbonnel-Salle and Phisalix show that Cl. Bernard's opinion is correct. They find no glands at all; and the secretion is made up of epithelial cells of the oesophagus. It is known that the edible bird's-nest substance found in the nest of *Collocalia nidifica* and other swifts, is, on the contrary, the secretion of special glands described by Sir Everard Home in 1817, as Bernstein's and J. R. Green's researches also prove. The origin of the

two substances is entirely different, but it may be that their chemical nature is less different than might be supposed.

Some days ago, in a saloon of Vincennes, about fifty persons were seated at a dining-table. A passer-by would have remarked that they were very quiet. Not a word was said by a single person. As the dishes went around in due order, the passer-by would have thought, after some twenty or thirty minutes, that the meeting was a very ungenial one, or that the assembly was troubled with some mysterious ailment. On walking into the saloon, he would have understood, however, — as the reader perhaps already surmises, — the cause of this silence. The guests were deaf-mutes. No hurrahs, no laughing, no toasts or speeches, that is, in spoken language. But in gesticulated speech a good deal was said. These people are united in a society to celebrate the memory of Abbé de l'Épée, the charitable and devoted instructor of deaf-mutes, and they meet each year to rejoice over their instructor's useful work.

The same day a very amusing meeting was held in Paris by some five or six persons, and attended by a rather large crowd. It was a meeting to protest against Pasteur's method of healing rabies. It is not useful to review all the foolish speeches that were made in this assembly. The public has sufficiently shown what it thinks of them. It was a very funny scene to witness, and one can form no idea of the ignorance and lack of intelligence displayed by the orators. They were perpetually interrupted by the shouts of the crowd, who were intelligent enough to know when truth was spoken, and when error. It is, however, a pity to hear such ignoramuses discuss in such a way scientific questions they do not understand. Sweet Louise Michel was one of the orators, and was well hooted.

A much more interesting and useful meeting was that of the committee appointed to witness M. Marcel Desprez's experiments on the transmission of force by means of electricity. The problem was to take two hundred horse-power at Creil, fifty-six kilometres from Paris, and to deliver half that amount in Paris. In fact, the horse-power in Creil was eighty-eight; in Paris it was forty. Upon the whole, the experiment succeeded well enough, and the results are satisfactory.

Some sensation was recently created here by the application of the law requiring that all professors aged over seventy or seventy-five, if members of the institute, shall be deprived of office, or, as we say here, *mis en retraite*, retired. Among the victims of this law we notice MM. Hardy, Gavarret, and Sappey, of the medical school, and M. Duchartre of the faculty of sciences. M. Hardy is not a lazy man, and he still works a good deal;

but all he can do, as his best friends say, is to give a lecture dated 1850. That is very well, but in 1886 science is much advanced, many things having been discovered since 1850. Students require present-day notions, and do not care for old discoveries. M. Sappey is also a conscientious worker; but he teaches anatomy in such a very tedious and uninteresting manner that his retirement cannot be much regretted. As to M. Gavarret, he has not lectured for some years. M. Duchartre has never done any personal original work worth speaking of. He has written a very unpleasant 'Botany,' and that is all. His departure will create no sensation, and students have nothing to lose by the change, whoever may take his place. M. Sappey's place will most likely be filled by M. Farabeuf, a man very well informed on human anatomy, but entirely ignorant of comparative anatomy. M. Gavarret will be succeeded by M. Gariel, an able scientist and very good teacher. It is not known who will take the two other places, but M. van Tieghem, professor at the Museum d'histoire naturelle, might be called upon to teach botany in the Sorbonne. The choice would be a very good one. No choice will be made at present, and, when it is made, I will inform you.

The annual meeting of the Association for the advancement of science is to take place to-morrow at Nancy. A great number of interesting communications are announced, and the volume recording the proceedings at last year's meeting has been issued to-day.

The competition begun some three months ago for fellowships in different medical schools is just over. As usual, the successful competitors for fellowships in anatomy and physiology are surgeons. Surgeons, as a rule, are familiar with anatomy, that is, human anatomy; but they know nothing about physiology, and the lectures they give on the subject are quite insufficient. It is a great pity for the students, and yet more so for the medical schools. There is little yet to be done in anatomy, so they do not do any personal or original work. They go on practising surgery, and are of no use at all to science. In five years, only one real physiologist has been appointed to a fellowship. Ch. Richet; since then only surgeons or anatomists have been appointed. This is a very unfavorable thing for medical schools, and one easily understands the criticism of foreigners, who remark that the fellowships are always obtained by persons who add nothing, or next to nothing, to the stock of human knowledge. The critics are entirely justified, it must be confessed, and it will be necessary to find some remedy for this state of affairs, which is all the

more unsatisfactory because the surgeons who compete for these fellowships do not dare compete for surgical fellowships. Upon the whole, they are not learned enough to depend entirely upon their surgical knowledge. They are neither entirely surgeons nor completely anatomists.

Preparations are being made for the celebration of M. Chevreul's centenary on the 31st of the present month. The National agricultural society is to present him with a gold medal (he has been a member for fifty years), and on the 1st of September there will be a festival tendered him by different persons in the natural history museum. It is not exactly known what will be done, but at all events there will be an exhibition recalling all M. Chevreul's works concerning coloring-matters, dyeing, *corps gras*, candles, glycerine, dynamite, porcelain, and colors. This exhibition is a very good idea, and will meet with great success; for, among the public at large, the notions concerning Chevreul's works are exceedingly vague and uncertain. People all know he is very old, but they do not know how useful he has been, and what service he has rendered to science and industry. In the evening a large dinner will be given, when the ministers of public instruction and of trade will assist, as well as delegates of the faculties and learned bodies, and also delegates representing the branches of industry that have been improved by Chevreul's work. In my next letter I shall have to resume the subject. Many professors and scientists are remaining in Paris to assist at the ceremonial, such as Pasteur, Frémy, Milne-Edwards, Bertrand, Jansen, de Quatrefages, etc.

Yesterday there started for the United States quite a number of travellers of an interesting nature, — a number of splendid horses bought at the last trotting match at Nogent sur Marne by Americans from Illinois, Kansas, Minnesota, Michigan, Wisconsin, etc., for the purpose of keeping up the Percheron breed in America. Your countrymen, such as Messrs. Dunham, Degan, Bowles, and many others, come every year at this time to visit the Perche, and buy the best horses they can find. The medium price is two thousand dollars (ten thousand francs). The first horse so exported crossed the Atlantic in 1839, with Edward Harris of New Jersey. The horses of that breed are very much appreciated still. In 1851, M. Fullington took across the ocean another horse of the same breed; he called it Louis Napoleon, but his friends preferred naming it Fullington's folly. The folly was profitable, however, and the sons of Louis Napoleon are as much valued as those of Philippe Egalité, as Harris's acquisition of 1839 was called. The Percheron stud book is very well kept, only horses born from Percherons in

Perche can be recorded. M. M. Dunham, who was here a few days ago, offers each of his stallions some fifty amiable wives, and as each year he buys some three hundred Percherons, one may judge of the importance of his Illinois stud. This year some twelve hundred stallions are leaving France for the States.

The vacations have now begun: most of the professors are out of town. M. Faye was some days ago on the seashore at Villers; Professor Vulpian is in his usual summer resort of Trouville; others are scattered here and there, in mountain or country, or travelling abroad. A great many are in Nancy, for the meeting of the Association for the advancement of science; some are in Germany or elsewhere, awaiting different scientific meetings. It is a happy time for them, and they enjoy a well-deserved rest after a long year's work. V.

Paris, Aug. 11.

#### NOTES AND NEWS.

THE report of the wide-spread earthquake comes as we go to press. It is probable, that, on account of the extent of country over which the shock was felt, it may be possible to arrive at valuable estimates of the rate of propagation of earth-waves. From Washington we learn that Professor Simon Newcomb furnishes the following figures regarding the earthquake: First shock occurred at 9:53:20; second shock about 9:54:30; lasted until 9:59. Major Powell is quoted as saying that there is a line of weakness in the crust of the earth beginning somewhere south of Raleigh, N.C., and extending in a line along the tidewater, past Richmond, Washington, Baltimore, and Troy, N.Y.; that this line of weakness is marked by a displacement; in some places this displacement being a flexure in the rocks, in other places a fault; and in the neighborhood of this displacement are found the principal waterfalls which constitute the water-power of the Atlantic slope. "It will be interesting," he adds, "to discover the relations of the point of origin of this earthquake to this line of displacement or weakness." The officials of the signal-service bureau report that four distinct shocks were felt there. The first began at 9:54, and lasted 40 seconds; the second shock was felt at 10:04, and was followed by another at 10:10, and by another at 10:30.

— The topographical work of the geological survey is progressing in a most satisfactory manner, and the following summary is given of the results attained up to the first of August. Mr. Natter's party in Massachusetts have finished the Framing-