

## SPIRITS AT A DISCOUNT.

In ancient times every unusual freak of nature was attributed to the influence of invisible spirits. If there was anything which could not be explained upon ordinary principles, it was very convenient to ascribe it to these mysterious agents; and as one after another of the phenomena yielded to the touchstone of science, the domain of the spirit was more and more narrowed down until of late years they have almost exclusively been confined to table turning and mysterious communications from the other world. We now hear of a vigorous attack being made upon the last stronghold of spirits by the inventor of what is proposed to be called "Psychic force." Henceforth tables will be turned, musical instruments played, rappings heard, photographs taken, all of which proceed from the soul of the medium who exhibits the performances, and there will be no further occasion to call up any assistance from the vasty deep. This psychic force, proceeding from the will of the operator, it is said, can exert power over matter, it can overcome the force of gravitation and do many things that would require the intervention of the steam engine, or magneto-electric machine, or some other contrivance known to mechanics and physics. It is proposed to dispense with spirits hereafter and to explain the phenomena hitherto attributed to them upon common every-day principles. This is hard on the spirits, and will greatly interfere with a large class of persons, who have lived off them for a number of years. We are led to these observations on account of the publication of an elaborate article, by William Crookes of London, on the new force, reprinted in the SCIENTIFIC AMERICAN. Mr. Crookes has had an interview with the celebrated medium Home, and appears to have been regularly taken in by that adroit performer. As a result of the interview we have an article in the *Quarterly Journal of Science*, describing how an accordion was played without being touched, or how a lever was made to excite a force of six pounds by the simple laying on of hands.

As Mr. Crookes is unwilling to ascribe these performances to spirits, he proposes to establish a new force, to be called "Psychic," and to admit that by the simple exercise of will we can cause bodies to move and musical instruments to be played. Mr. Huggins, who was present, does not venture to express an opinion as to the cause of the results that occurred; but Mr. Cox, a lawyer, was so impressed by them that he wants to have a "Psychological Society" at once established for the promotion of the study by means of experiments, papers, and discussions, of the new science. We shall now probably hear of an animated contest between the psychologists and the spiritualists. The latter will naturally object to being so summarily dismissed from the stage, and will make a bold fight for the rescue of their faith. And it is possible that some good may result from the discussion. What the precise difference between the psychic force of Crookes and the odic force of Reichenbach is, we are unable to say. We have our suspicions that they will prove to be one and the same thing, and that it will only be necessary to unearth the Reichenbach literature to obtain all that we may wish to know on the subject. A psychic engine would be a marvelously convenient thing to have about the house, provided some member of the family proved to be a medium capable of running it at will. If there is anything in the new force we see no reason why such an engine may not be invented as a substitute for steam or water power.

Seriously, it appears to us that the constant recurrence of so-called spiritual manifestations in one form or another ought to be made the object of special study on the part of physiologists, to whose department this class of phenomena appears to belong. In what way a portion of the brain can be made unusually active, while other portions are asleep, and how to explain unconscious cerebration, are matters quite worthy the attention of physiologists.

Instead of founding a psychological society, it would be more appropriate to establish a physiological: in either case it is time to let the spirits rest, and to account for all phenomena on scientific principles.

## WAGNER'S REPORT ON TECHNOLOGY.

The sixteenth annual report on the progress of chemical technology, by Professor Rudolph Wagner, has just appeared. It is a good specimen of the exhaustive research and careful study of the Germans, and is the best book of reference for recent discoveries with which we are acquainted. We have here a volume of 824 closely printed pages, illustrated by 122 handsome woodcuts; giving an account of the latest improvements in chemical technology, not in mere catalogue form, but in abstracts, and with critical observations and reference to previous authorities on the same subjects. The author classifies his subjects into eight groups: 1. Chemical metallurgy. 2. Chemical manufactures. 3. Chemical preparations, organic and inorganic. 4. Glass, porcelain, lime, gypsum, cement, mortar. 5. Technology of food. 6. Technology of textile fabrics, aniline colors, calico printing and bleaching. 7. Dye stuffs, varnish, cement, and rubber. 8. Fuel and light. All of these topics are carefully discussed, and we doubt if anything of importance has escaped the scrutiny of the author. All important facts are authenticated by reference to the original sources of information, and in every instance the journal is cited in which the reader can find the whole subject. There is no book in the English or French language corresponding to Wagner's report; and it is a pity that the great expense must deter any publishers from attempting its translation. The book opens with an account of the rare metals thallium, zirconium, magnesium, aluminum, jargonium, natrium, strontium and iridium. Seven pages suffice to tell us all that has been done for these metals during the year. Thallium can be best preserved sealed

up in a tube in water which has been previously boiled; it then remains bright for years. Zirconium is easily prepared by reducing the double fluoride of zirconium and potassium with metallic aluminum. Magnesium is recommended to be used as a reducing agent for nearly all metals, and aluminum is also highly commended for the same purpose. Jargonium is said to have no existence. Strontium is best prepared from its amalgam, by means of hydrogen gas, and is a yellow metal of 2.4 sp. gr., but of no value thus far in the arts. Iridium is still chiefly confined to zinc blends, where it occurs in minute quantities. A new and neat way of roasting the blends for the purpose of obtaining this metal is suggested. The pulverized ore is mixed with burnt gypsum, and formed into cakes, which are perforated, and easily roasted by placing them upon any open fire. By subsequently treating the cakes with hydrochloric or sulphuric acids, and boiling in an excess of metallic zinc, all of the iridium will be precipitated as a spongy mass, capable of being fused and reduced ready for use.

The subject of iron in all of its relations occupies seventy-five closely printed pages. A good deal of the matter has been anticipated by us during the year, but for convenience of reference it is a pity that the whole chapter as it stands could not be translated and printed in separate form. The principal points are methods for determining the amount of carbon in iron, also phosphorus, silicon, manganese, and other impurities; then follow important analyses of ores and slags.

Under the caption of "The Manufacture of Iron," we have a sketch of all the latest methods, from which it would be difficult to prepare an abstract. In reference to silver, the author gives a history of the desilverization of lead by means of zinc, which is now regarded as the best process in use. The most careful comparative tests have been made, in which preference is given to this method over Pattinson's, so long employed. A full description, with cuts, is given of Stetefeldt's furnace, now so popular in the West. Miller's chlorine process for refining gold, which we described some time since, is spoken of in high terms of commendation, and all the new things about gold and silver are mentioned in detail. Copper and its alloys, galvano-plastic, zinc, lead, nickel, cobalt, platinum, manganese, bismuth, tin, and mercury, have their proper places in the literature of the metals. Under chemical manufactures, sulphur and sulphuric acid naturally occupy the chief attention. The recovery of sulphur from soda waste, by Mond's process, now appears to be an accomplished fact, and it is difficult to overestimate the mercantile value of the improvement. Another matter of importance is the increased attention now bestowed upon the manufacture and uses of the bisulphide of carbon. This valuable product is largely employed in Europe in the extraction of oils, and has other uses which ought to receive more attention in this country. Soda ash, chlorine, hydrochloric acid, bromine, iodine, nitric acid, and phosphorus are heavy articles of manufacture in Europe, and ought to be more firmly established in the United States. Whatever may be the right or wrong of protection, as the advocates of this doctrine have had their own way for many years, and these industries are not yet established, how would it do for them to step aside and give the other side a chance? There would appear to be no valid reason why these manufactures should not flourish in the United States, and the want of them is felt in every branch of trade.

Wagner affords us much important information in reference to the production of potash from sugar residues, and from the deposits of the Stassfurt mines; he also gives a sketch of the history and progress of the various explosive compounds recently introduced. Baryta salts, so much used in France and Belgium, are fully described, and it seems a pity that the information should not be more widely disseminated. In the department of organic chemistry, such products as are of use in the arts are mentioned in detail, and we are surprised to see how many of them there are, and how little is properly known of them.

The improvements in the manufacture of glass, porcelain, and cements have been considerable during the last few years, and Wagner gives us a fair review of them. Under food, fuel, light, textile fabrics, and dyes we have much important matter.

It is impossible in one short notice to refer to half the new matter contained in a book of this character, and if the authors of some of our school books on technology would carefully peruse the sixteen volumes of Wagner's reports, they would see how wonderfully behind the age they are in their compilations. For that matter, if they have not access to the German, a perusal of the columns of the SCIENTIFIC AMERICAN, would be the next best thing to enable them to correct many errors.

## THE LATE PROFESSOR PAYEN.

M. Pierre Thomas gives a sketch in *Les Mondes* of his uncle, Professor Payen, which discloses a life of such extraordinary industry and usefulness that we cannot do better than translate it for the benefit of our readers.

Payen's first great work was to fix the rational application of manures, in 1824. He gave the theory of the decoloration of liquids by means of animal black, and proposed the employment of the residue for agricultural purposes. In 1830, he established the principle, now universally accepted, of computing the nutritive value of composts according to their contents of nitrogen; he studied thoroughly the exact structure, mode of formation and transformation of starch, and this conducted him to the determination of cellulose in the vegetable tissue, to the remarkable indications of the secretion of mineral substances in the organs of vegetables, to the

manufacture of dextrine by the kiln, and also to the discovery of the principle of diastase, which plays such an important part in the process of fermentation.

These conspicuous discoveries afford but a faint idea of the enormous amount of work accomplished by Payen. It would be difficult to conceive of a man more indefatigable, more anxious to accomplish something. There was not a scientific society of which he was not a member; not a meeting at which he was not present; not a commission of which he did not form a part, and usually as the reporting secretary. The works of Payen, so far from being confined to his personal publications, are found spread out in the transactions and proceedings of all learned societies. And yet to form an idea of his prodigious activity, it is well to recall that he was to be encountered on all occasions of ceremony, taking a part in public and private entertainments, and in general fulfilling his duty as a member of society to the minutest particular.

One fact, often related of him, shows to what an extremity he pushed his economy of time. His carriage was made into a perfect workshop; he wrote in it, he had in it reagents and a few simple pieces of apparatus, and he used it as a dressing room to avoid the necessity of the loss of time required to return home and change his toilet for a reception. Payen taught industrial chemistry at the *Ecole Centrale* for forty-one years, and at the *Conservatoire* for thirty-two years, without losing a single lecture. Last year, when attacked by a severe illness so that he could take no nourishment for several days, he could not be persuaded to intermit his lectures, out had to be carried fainting from the rostrum. The disease to which he finally succumbed, and which carried him suddenly away, was apoplexy. It will be difficult to replace Payen. He was the only professor who united, to a grand scientific knowledge, complete practical information of the subjects taught, derived from thirty years of personal technical work.

## PSYCHIC FORCE.

Mr. Coleman Sellers, of Philadelphia, Pa., well known as an able mechanical engineer, and among his intimate friends as an amateur prestidigitator of unusual skill, has, in a brief article in the *Franklin Journal*, thrown considerable doubt over the genuineness of those manifestations of "Psychic force" which have lately been announced by Dr. Crookes, supported by the well known astronomer, Mr. Huggins, and others.

Mr. Sellers first draws attention to the fact that scientific men have not as a rule "been unwilling to investigate" facts (?) of the class under discussion, but have only insisted that these facts should be produced under conditions excluding facilities for sleight of hand and other related deceptions.

Such requirements, however, have not been complied with generally, nor in the case related by Dr. Crookes, therefore Mr. Sellers argues that the right sort of "expert" to investigate such phenomena would be one skilled in legerdemain and the intricacies of complex mechanism.

He further alludes to the floating accordion, and suggests a striking parallel in the case of Hermann's floating wand, and in reference to the music from the same instruments, calls attention to a whole class of performances related to ventriloquism, which serve to explain the means by which the recorded effect was probably produced.

The writer of this has seen Mr. Sellers among a company friends perform a feat, which, with a change of instruments, would be identical with that described by Dr. Crookes, and which, without the aid of an ear trumpet, which was not applied by our English friends, would defy detection on the part of the uninitiated.

## Robinson's Breech-loading Rifle.

In our description of this invention, published on the first page of No. 9, current volume, an error occurred in describing the method of filling the magazine with cartridges. It is not necessary to take out the screw,  $\odot$ , as therein stated. This screw does not pass through a hole in the outer plate, but simply fits into a slot. It is, therefore only necessary to turn the plate down into the position shown in dotted outline. No screw has to be taken out, as erroneously stated. Also in the seventh paragraph, the link,  $\odot$ , is referred to Fig. 1. It should be Fig. 4.

A CORRECTION.—In the article in our issue of the 26th of August, in commenting upon the testimony of Mr. McMurray, we styled him the Inspector of the New York and Hartford Steam Boiler Assurance Association, this being the title applied to him in the reports of his evidence as printed in the city papers. We now understand there is no such organization as the one named, and that the gentleman in question is the chief Inspector of the New York Branch of the Hartford Steam Boiler Inspection and Insurance Company.

THE SUEZ CANAL.—General C. W. Darling, of New York city, has received a letter written by Baron de Lesseps, President of the Suez Canal Company, stating that the report of the canal being rendered comparatively useless by the filling up with sand, is incorrect. M. de Lesseps says: "The deposits of sand brought by the wind are insignificant, and the sides of the basin are so solid that the most exposed portions of the work, after eighteen months' use, present scarcely a perceptible variation."

CANNOT AFFORD TO STOP.—An advertiser in answer to our enquiry if he wished his advertisement continued, says:—"Every week we sell machinery, the profits on which will pay for our advertisement for six months, that we should not sell but for your paper; so you see we cannot afford to stop, so please keep on as heretofore."