

excitement produce brain diseases as frequently in the pulpit as in Wall street. How often are people engaged in charitable work stricken down by disease incurred in the fulfillment of a holy mission! Most undeserving of such a fate, we are inclined to exclaim; but Nature accepts no excuses. Violate her laws, and ye die!

But what is the great harm in excuses? we think our reader begins to inquire. First, it encourages story telling, untruth, prevarication, and white lies. Second, it makes people careless. Railway trains are our best examples of punctuality; if you reach the *dépôt* but 15 seconds too late, you are left and must wait, perhaps for hours. It is of no avail to tell the doorkeeper that your delay was unavoidable, that the omnibus broke down, or the street was blockaded, or the car ran off the track. People know that the rule is as inflexible as the law of the Medes; they do not flatter themselves, as does the tardy school boy, that their excuse is a good one, and thus loiter along at a convenient gait. One of the blessings of railway travel is that it makes people more prompt and more diligent. The banks are another class of institutions that will not accept excuses; if your note is not paid by three o'clock, it goes to protest. It matters not that the money promised you fails to come to hand in time, the train bringing your draft was delayed by snow drifts, or the telegraphic remittance was stopped by a broken wire, or the messenger on his way to the bank fell into an open coal hole and is maimed for life: the bank asks none of these questions, it listens to none of these excuses; the law is carried out.

The publishers of the SCIENTIFIC AMERICAN discontinue sending it to a subscriber as soon as he stops paying. The forgetful subscriber, who would continue forgetful if his paper kept on coming, arouses from his lethargy, and the next year he does not forget to renew it in time to avoid any loss.

The poorest of all excuses is forgetfulness, and the best method of cultivating the memory is to resolve never to accept this excuse from yourself nor make it to others. "I forgot" and "I didn't think" have caused untold misery, and should be stricken from the vocabulary of every ambitious youth. Conductors and switchmen sometimes forget that a certain train is due, and the next morning we read in heavy head lines: "Fearful Railroad Accident! Dreadful Loss of Life." The innocent (?) conductor is acquitted of the murder because he renders an acceptable excuse, and history goes on repeating itself. In some eastern countries, it is said, when a house burns down, the owner, instead of getting paid for it, loses his head. Fires are not of frequent occurrence there.

The old saw, that where there is a will there is a way, is true more frequently than is generally supposed. Let a man know that no excuse will avail for the omission of duty, and nine times out of ten he will contrive to accomplish what he had supposed to be impossible.

WEAK SPARKS.

Poggendorff's *Annalen* for February, 1875, contains an interesting account of many experiments by the celebrated German electrician, Professor Reiss, concerning a new form of electric spark, which he discovered several years ago, and which he denominates "weak sparks." He states that they differ from the ordinary strong electric sparks, not only in form, light, and sound, but in other and very various properties. For example, the length of the conductor makes no difference in the production of the weak sparks; in reference to length, light, and sound, they are independent of the composition of the circuit in which they occur; they produce no marked indication of heating in the circuit, and no magnetization. So far as we have examined the accounts of M. Reiss's results, he appears to have experimented chiefly with the Holtz frictional machine; but doubtless he has tried other apparatus. We however do not observe that he anywhere suggests any form of apparatus for telegraphy or other practical uses of the weak sparks.

It would naturally follow, from what we know of electricity and from the extensive series of experiments and the careful investigations of the nature of the weak sparks by the author, that they might be produced by any of the various known forms of electrical apparatus; and this would appear to be confirmed by certain recent experiments of Mr. T. A. Edison, the well known telegraph engineer and inventor, of Newark, N. J. Mr. Edison has recently ascertained that the weak sparks may be produced by means of an ordinary electro-magnet, and has also put the new sparks into working harness in the form of a telegraph apparatus. As before intimated, we have not carried our examination of Professor Reiss' experiments far enough back to determine whether he describes any method of obtaining them from magnets, and will therefore leave that branch of the subject for further consideration, giving briefly an account of Mr. Edison's new experiments, and what he supposes he has discovered.

The method by which Mr. Edison generates the weak sparks is so simple that any telegrapher or electrician can test it. A bar of metal (cadmium seems to be best) is placed on or over an electro-magnet in an electric circuit: attached to the metal is a wire (of iron or copper, possibly any other metal) which conveys the current of newly discovered force. On breaking the electric circuit with an ordinary telegraphic key, sparks are observed when the free end of the wire is brought in contact with any metallic substance. When the wire from the cadmium is attached to a gas pipe, sparks may be drawn from any part of the entire system of gas pipes simply by touching it with a piece of metal. By this simple means signals have been sent for long distances, as from Mr. Edison's laboratory to his dwelling house, in another part of the city, the only connection being the common system of gas

pipes. Mr. Edison states that signals have also been sent the distance of seventy-five miles on an open circuit, by attaching a conducting wire to the Western Union telegraph line.

For some time Mr. Edison has been industriously studying the weak sparks, and the developments, he thinks, are unceasingly novel and surprising.

Thus far his examination has resulted chiefly in determining the fact that the weak sparks, first supposed to be a phase of inductive electricity, have really no further likeness to electricity than similarity of origin, the power of furnishing sparks, and the ability to transverse electric conductors. On the other hand, the sparks seem to travel over electric non-conductors with equal facility, a glass rod or a strip of hard rubber conveying them as well as a bar of metal. They require no closed circuit. They cannot be grounded, and seem to be incapable of insulation. They are retroactive, sparks appearing when the conducting wire is turned back upon itself, just the same as when the free end of the wire is brought in contact with any other metallic substance. They have no polarity, and apparently no mechanical power. With carbon points and points of several metals, the spark is highly actinic; yet the current seems to have no physiological effect, and does not influence in any way the most sensitive of electrosopes or galvanometers.

Such, in brief, are the leading points of Mr. Edison's observations concerning weak sparks from magnetism, and they closely correspond with the long prior observations of Professor Reiss.

We shall recur to the subject in our next.

WORKING MEN'S READING ROOMS.

We are very much in favor of the plan, which some contemporaries are just now discussing, of free evening reading rooms for workmen; and if such resorts could be started and maintained in every manufacturing village, we believe that an immense amount of good would be done, both in educating the men and checking the spread of intemperance. The average workman gets very little time to read except during the evenings; and if he be single and live in a boarding house, the lack of light, fire, and other necessities for comfort effectually precludes his doing so there. The tavern is, however, open to him, well lighted and well warmed; and there, perforce almost, he spends his evenings in idleness and in the acquisition of habits which are the reverse of beneficial. The trouble with most reading rooms which we have seen in country villages is the fact that they are generally the work of excellent and pious people who unfortunately imagine that a selection of religious literature and a pious cast over the general surroundings of the place are beneficial. However good the motive, this often fails to induce workmen to visit the places. The effect is indeed ordinarily the reverse; for working men are but human beings, and prefer the joviality and lack of restraint at the tavern to the perusal of tracts or the mental digestion of Sunday school books, be the morals and precepts of the last never so good.

The true way of making a reading room both successful and useful is first to render its advantages absolutely free, and secondly to make the room both comfortable and attractive so that every man of average intelligence may avail himself of its privileges. The literary fare may consist at the beginning of periodicals alone, leaving the formation of a library to the future, when a membership becomes established and the members feel like subscribing to enlarge its scope of usefulness by adding a library. Publishers will generally send their journals to such reading rooms at reduced prices; or the charitable in the town or village may often be successfully appealed to for contributions of papers, magazines, and sometimes books which they have read. If there be a local journal, and few towns in this country exist where one is not published, the editor will gladly contribute such of his exchanges as he does not need. In this way, it will be found, plenty of good reading matter can, with a little energy, be collected, and it will prove serviceable in benefiting the community without much expense.

Our plan for a working men's reading room is a plain apartment, as easily accessible to everybody as the tavern. There is no need of costly appointments of any kind; but plenty of good light and a warm fire are indispensable. A table and sufficient chairs, some files for newspapers, and a few shelves for books, include all the furniture absolutely necessary. If the philanthropic projectors can afford a few pictures, a tasteful paper for the walls, or any other ornamentation, so much the better; money thus laid out will not be lost, as such articles lend a home-like air which, to most people, is attractive beyond all else.

A few weekly papers and three or four monthly magazines will be enough for a start; and then, as it becomes apparent that the people of the town are growing more interested in the work, plans can be matured for a wider selection of reading matter; and perhaps, as we before intimated, a subscription among the readers can be taken towards putting the establishment on a broader basis. This is the season of church and similar fairs, for raising money for various benevolent purposes. Perhaps we may venture the suggestion that a small amount may be raised in this way, thus enlisting the cooperation of the young people in the good work. Certainly a free reading room would be a noble Christmas gift from the churches of a village to the working men residing in its limits, or from the proprietors of factories to their employees.

A PIECE of rubber belting fastened around the belt pulley of an engine will keep the belt from slipping.

THAT OBNOXIOUS POSTAL LAW.

Postmaster General Jewell, in recommending in his recent report the repeal of the Act of Congress passed last January which doubled the postage on transient newspapers, books, and similar third class mail matter, raising the same from one cent for every two ounces or fraction to one cent for every ounce or fraction, simply reflects public sentiment relative to that illconsidered and obnoxious law. It was a stupid blunder, on the part of those who framed the bill, that, contrary to their intent, by their own admission, language open to construction as affecting anything but the miscellaneous merchandise which the mails are allowed to carry should ever have entered into it; and the passage of the act shows even more reprehensible negligence on the part of those members who voted for it, in not subjecting the measure to proper examination. Except in the opinion of the express companies, who have been greatly benefited, and by whose influence the act was adopted, there was no necessity for increasing rates even on the miscellaneous matter, as the cheap postage on similar parcels, like seeds, bulbs, samples of merchandise, etc., was a great convenience to the public, and especially such to people living in out-of-the-way localities.

The Postmaster General excepts this mixed material from his recommendation to return to the old rate on printed matter, but fails to show a good reason therefore, based on a possible benefit to the Department. In fact in this respect the report logically contradicts itself flatly, for it may be justly inferred that: if, as the writer paradoxically asserts, "the sending of public documents through the mails has not delayed the delivery of ordinary mails or perceptibly increased their cost," some 200 to 300 tons being the estimated amount sent: the sending of small parcels, not exceeding, if altogether aggregating, in weight the hundreds of tons of documents which the members of Congress heretofore sent free through the mails, would, if the matter were paid for at any price, result in positive gain. It may be remarked in passing, that the sentence above quoted is unfortunate from another point of view, as it apparently offers an argument to those who are seeking the return of the franking privilege; for it is easy to predicate the assumption thereon that, if several scores of tons of matter is imperceptible in point of cost or trouble, then as many hundred tons would be practically inconsiderable.

There are rumors that Congress will act upon this subject early in the session. We trust that the same are well founded, and that our representatives will use no delay in restoring the old and popular rates, including all articles coming under what is "third class matter."

SIX GOOD REASONS WHY EVERY MANUFACTURER, MECHANIC, INVENTOR, AND ARTISAN SHOULD BECOME A PATRON OF THE SCIENTIFIC AMERICAN.

I. It is a publication devoted especially to their several interests. Every number contains sixteen pages of useful matter pertaining to mechanism, new discoveries and inventions, and themes interesting and useful to all persons engaged or interested in mechanical or manufacturing pursuits of whatever kind.

II. It is a cheap publication—furnished so low, in fact, that no mechanic, manufacturer, or inventor can plead inability to spare from his earnings or business the small sum charged for a year's subscription.

III. It is printed on a good quality of paper, in a form for binding, every number being embellished with original engravings of new machinery, new scientific and chemical discoveries, and all the important inventions.

IV. No other paper published in this country, or any other in fact, furnishes so much useful information for the manufacturer, mechanic, inventor, or man of Science, as the SCIENTIFIC AMERICAN. This is a fact admitted by all our contemporaries, both in this country and in Europe; and the wonder to all is, how a paper containing so many expensive engravings and so much new and useful matter can be furnished weekly at so small a cost to the subscriber.

V. In subscribing to the SCIENTIFIC AMERICAN, the reader receives the latest foreign as well as home intelligence on all subjects pertaining to the industrial pursuits of the world. All the best scientific and mechanical periodicals published in England, France, and Germany are received at this office, affording us facilities for presenting to our readers the very latest news relating to science or mechanics in the old world.

VI. Subscribers who preserve their numbers have, at the end of the year, two handsome volumes of 416 pages each, containing several hundred engravings, worth, as a work of reference, many times the price of subscription.

A Gas Shadow.

A striking and curious experiment, showing the superior weight of carbonic acid gas over air, may be made by projecting the shadow of the gas, as it is poured from its containing vessel, upon a screen. The latter should be of white paper and bright sunlight should fall on the stream of gas, which should be poured from the spout of a pitcher held within 10 inches of the screen. The curious result, of a shadow produced by apparently nothing, will be seen, the former resembling descending smoke, quite black at the spout of the vessel, but brightly illuminated whenever the sunlight is concentrated by passing through the gas.

To prepare tin for tinning brass, copper, and iron. Melt the metal in a crucible which has previously been slightly warmed; and at the moment the metal begins to set, and when it is very brittle, pound it up rapidly, and sift when cold to remove any large particles.