

**SALT IN ORNAMENTATION.**

C. F. HOLDER.

Some months ago a party connected with one of the expeditions sent out by the government came to camp among the curious springs that form the chief attraction of the famous National Park in the West, and several days were spent here in making a thorough examination of the place, laying out maps, etc.

Several days after their arrival, one of the soldiers who formed a part of the guard reported to the leader, a well-known scientific man, that a very remarkable object had been taken from one of the springs and was awaiting his inspection. Eager for anything new, the scientist followed the man to the edge of one of the cones, and found, surrounded by the members of the party, an object about four feet long, of irregular shape and of the greatest beauty, resembling perhaps a piece of lace or some other extremely delicate fabric. It seemed impossible that so beautiful an object should have been taken from a hot spring of pure water, and various opinions were expressed as to its nature, and the scientists of the party were divided as to its nature. When lifted, it bent easily without falling apart, and retained its regularity of structure. After several days of investigation it was found that one of the soldiers had thrown a shirt into the water and lost it for the time, thinking that some comrade had stolen it in jest; but finally it occurred to some one to break the white, lace-like object, and in the interior was found the soldier's shirt. In short, by some peculiar action of the salts in the hot spring the white shirt had become coated with a rich white deposit, giving it the beautiful appearance referred to.

Every portion of the cloth was covered with the rich white forms, a growth without life as it were. The experiment of the shirt, though an accident, was not lost upon the observers; and at a recent meeting of the New York Academy of Sciences, one of the practical results of the discovery was exhibited, the writer being fortunate in seeing it. It was a simple iron clasp, that had been placed in the spring for several hours, and when exhibited it was covered with a rich white coating resembling frost; so that the most commonplace articles can be placed in this natural bath, and in a few hours taken out resplendent in the frost-like coating.

The idea was so valuable that it is said that steps are being taken to secure the right from the government of placing rude statues formed of lead in this bath, where a few hours later they would resemble marble. In this way quasi marble statues can be produced at an extremely small cost. An iron or tin figure of a man placed in one of these springs becomes covered in three hours; a longer time would perhaps hurt the outlines of the figure, but experiment shows that it is a quite valuable discovery. We need not go to the Western country, however, to find these curious effects. The accompanying cut shows an interesting home-made method of natural decoration.

It consists simply in taking a glass or goblet, and placing in the interior a little common salt and water. In a day or so a slight mist will be seen upon the glass—hourly this will grow, until in a very short time the glass will present the appearance shown in the accompanying illustration, the glass being enlarged to twice its thickness and covered with beautiful salt crystals, packed upon one another exactly like some peculiar fungus or animal growth. It is necessary to place a dish beneath the glass, as the crystals will run over, if the term can be used.

The glass can be made additionally beautiful by placing in the salt and water some common red ink; this will be absorbed, as it were, and the white surface covered with a rich red coat, which in turn can be covered by blue or any color by the introduction of inks or tints. No more simple method of producing inexpensive and beautiful ornaments can be imagined, and by using different shapes of vases and shapes, an endless variety of beautiful forms can be produced, pleasing alike to young and old.

**Stopping Hiccough.**

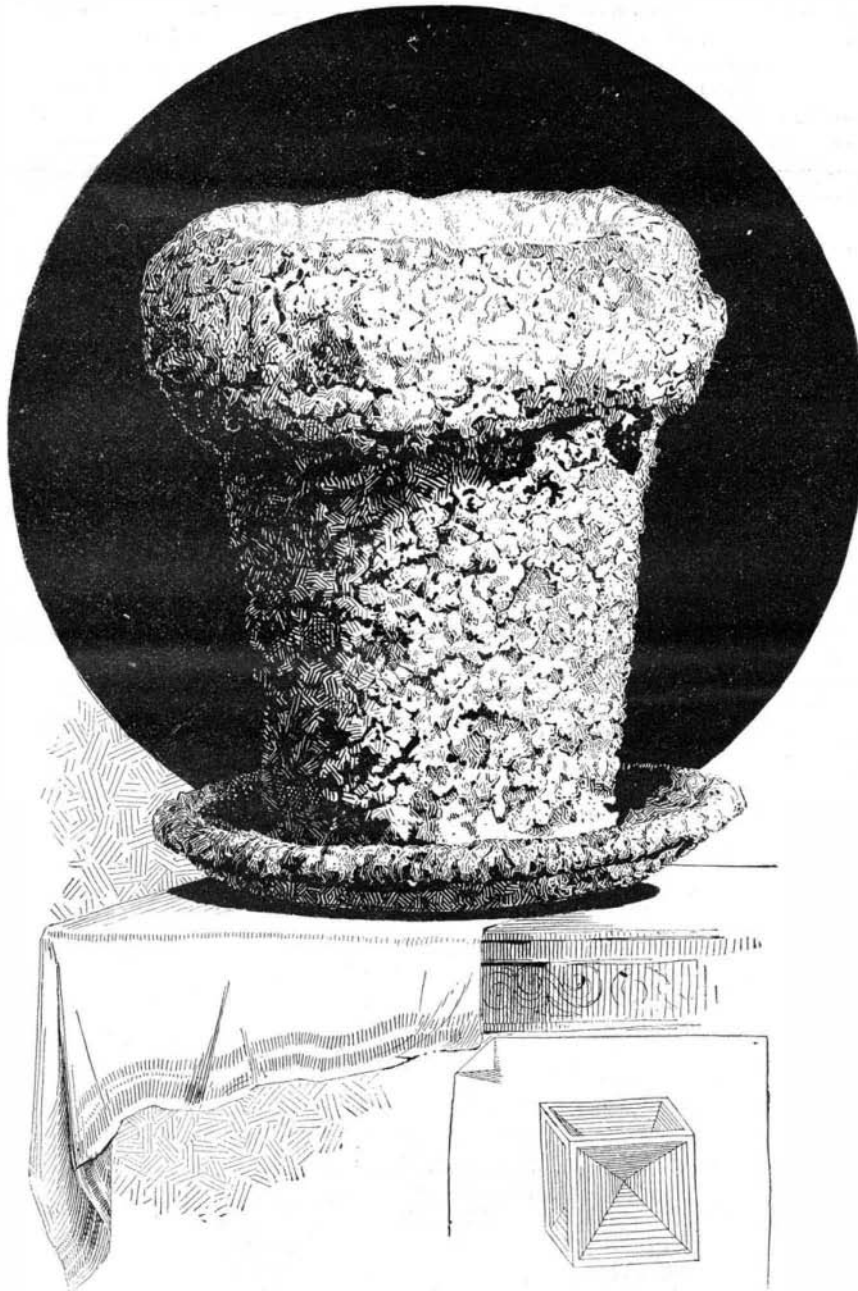
A Brazilian physician, Dr. Ramos (*Bull. Gen. de Therap.*), states that refrigeration of the lobe of the ear will stop hiccough, whatever its cause may be. Very slight refrigeration will answer, the application of cold water or even saliva being sufficient.—*N. Y. Medical Journal.*

**Poultry Blood as a Delicacy.**

A correspondent of the London *Live Stock Journal* says: There is an item in poultry keeping that seems entirely lost in this country, and that is the blood from poultry of all kinds. I have often asked the question of poultry keepers that I have come in contact with, "What do you do with the blood?" and the answer always is, "Let it run down the sink."

Now on the Continent it is considered a great delicacy (and so it is if properly cooked), as it makes an excellent dish for the table. It somewhat resembles stewed kidney, only far more delicate in taste. Several people that I have mentioned it to seemed horrified at the idea, but I hope those of my brother poultry keepers who have not heard of it before, and wasted such a profitable item, will try and give their experience through the medium of your valuable journal to encourage those that may feel prejudiced against the use of poultry blood in a healthy state.

Mode of cooking: Put a piece of butter about the size of a walnut (for the blood from one fowl) into a frying pan on a slow fire. When melted, throw in a



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chopped onion, and stir it about until nicely browned. Be careful not to burn it. Having previously cut up the blood into squares about the size of dice, and rolled it in dry flour, throw it into the pan with the onion and butter, and stir altogether until done. It will not be long before it is ready. Serve up hot; salt to taste.

**Fat or Wax Obtained from Cinchona Barks.**

From the cuprea barks the author obtains cupreol, a compound which in all points resembles a quebrachol. It crystallizes from alcohol in colorless satiny leaflets, which quickly become dull in dry air. It is readily soluble in chloroform, ether, and hot alcohol; less readily in petroleum ether and cold alcohol; and in water, ammonia, and potash lye not at all. It melts at 140°, and at higher temperatures it volatilizes unchanged in a current of hydrogen or carbonic acid. The solution in chloroform, when shaken with sulphuric acid of 1.76 sp. gr., turns a blood red, as do the chloroform solutions of quebrachol, cholesterol, or phytosterin. Cinchol occurs in all true cinchona barks, but not in cuprea bark. From hot alcohol it crystallizes partly in long, almost acicular, leaflets, partly in broad leaves, and always with 1 mol. of water. It loses a part of its water at 20° to 25°, and the rest at 100° or in the exsiccator. Anhydrous cinchol melts at 139°, and in other respects possesses the same properties as cupreol.—*O. Hesse.*

**Hope as a Remedial Measure.**

BY "OLD FOGY," M. D.

It is very hard to restrain an irrepressible old fogy, but somehow we trust our young friends in the profession may be able to tolerate us. We do not trust ourselves on the new and refined pharmaceuticals, but our last dissertations in the *Clinic*, on remedies, have been confined to castor oil and spirits of turpentine respectively, and in this issue we have selected even a less dangerous article than the two last mentioned.

It is perfectly useless for us to attempt to portray the influence that "hope" exerts upon mankind. It is a proverbial fact that a man without hope in the fight for life is already half whipped. The sick man without hope is desperately ill indeed, however slight his physical ailment may be. It is equally as true that there is a very slight chance for the undertaker to be benefited in the case of a patient who has no disposition or idea of dying. The whole system, digestive, circulatory, and nervous, is directly under the influence of the mind; and if we will ever bear this in mind in treating our cases, we will often have a more potent remedy, easy of administration and more pleasant to give and take, than anything found in the country doctor's saddle bags or upon the shelves of our metropolitan pharmacists. Bad news, grief, or sudden disappointment has been known to reduce the circulation to a minimum, to cause a strong man to become as helpless as a child, and to arrest the process of digestion and assimilation as suddenly as if the patient's throat had been cut. Just the reverse of this may be observed under the influence of pleasant emotions and the life-giving power of bright, heaven-born hope.

Old fogy will not tell his little story without concluding it with a moral. My young friends, never enter a sick room unless your countenance, manner, and words are such as to cheer and comfort your patients. However slight their hope may be, make use of that little, encourage and stimulate them to exercise that fortitude coupled with reasonable hope which has tied and will tie many a patient over dangerous shoals where medicine would have been utterly ineffective. Again, young friends, remember that with castor oil, turpentine, and cheerful hearts you can do a power of good and very little harm.—*Southern Clinic.*

**An Ironclad After Ten Years.**

The Chilean ironclad Blanco Encalada, which took part with the sister ship, Almirante Cochrane, in the capture of the Huascar, completing her surrender by a terrible raking broadside, was docked on Wednesday at Hebburn-on-Tyne, in the graving dock of Mr. Leslie, ship-builder. Much interest was attached to the circumstance on account of the ship not having been docked since she left England more than ten years ago. The iron bottom of the hull had been then covered with teak plank, fastened with iron fastenings, and sheathed with zinc sheets, in the hope that this arrangement would keep the underwater part of the ship fairly clean and free from decay. Early on Thursday morning the Blanco Encalada was visited at Hebburn by Sir

Edward Reed, member of Parliament, under whose care she was originally built and is now being refitted and rearmed, and with him was Admiral Latorre, who fought the action with the Huascar; Captain Montt, who now commands the ship; Mr. W. H. White, of the firm of Sir William Armstrong & Co.; Mr. Leslie, representative of Messrs. Penn, the engineers; and numerous other persons. It is worthy of record that the bottom was found remarkably clean, notwithstanding its ten years' immersion, and that the waste of the zinc sheathing was scarcely as much as had been anticipated. No evidences of any injury to the iron plating of the ship's bottom, which was examined in places, could be detected. The experiment of the zinc sheathing upon a single layer of wood was thus found to have been more successful than could have been hoped.—*London Times.*

THE attempts to introduce the American brook trout (*Salmo fontinalis*) into English waters have not been attended with success. During the last ten or twelve years thousands of fry have at various times been turned into different waters, but in no instance has the fish really been established. Occasionally a specimen is taken here and there, but as years go by there is no perceptible increase, while in some waters, which were liberally stocked, they have disappeared altogether.

## Recent Legal Decisions.

**Insolvent Partnership—Liability of Retiring Member.**—Unless upon proof of fraud, the retiring member of a partnership that subsequently became insolvent cannot be held liable for any firm debts contracted after his retirement, according to the decision of the Supreme Court of the United States in the case of *Penn National Bank vs. Furness*.

**Negligence—Survival of Action.**—A cause of action given by statute to the personal representatives of a deceased person to recover damages for the negligent killing of such person after the death of the wrongdoer, cannot be continued against his representatives, according to the decision of the New York Court of Appeals in the case of *Hegerich vs. Keddie*.

**Expert Evidence—Use of Medical Books.**—In an action to recover damages for personal injuries a medical book, although shown to be a standard authority, is inadmissible in evidence to prove the nature of the injuries sustained by the plaintiff and their probable effect, though books referred to by a medical expert, to sustain the opinions which he has expressed, may be admitted in evidence to contradict or discredit him. So held by the Supreme Court of California in the case of *Gallagher vs. Market Street Railroad Company*.

**Fraud on Bank—Liability of United States.**—Where by the connivance of a clerk in the office of an Assistant Treasurer of the United States a person unlawfully obtains from that office money belonging to the United States, and to replace it pays to the clerk money which he obtains by fraud from a bank, the clerk having no knowledge of the means by which the latter's money was obtained, the United States is not liable to refund the money to the bank, according to the decision of the United States Supreme Court in the case of the *State National Bank of Boston vs. The United States*.

**Insurance Policy—Change of Beneficiary by Will.**—In the case of *Wilmaster vs. The Continental Life Insurance Company*, decided by the Supreme Court of Iowa, it appeared that the insurance company issued to Wilmaster a policy on his life, by which it agreed in consideration of the payment by him of certain premiums during his lifetime to pay to his daughter the sum of \$1,300. Wilmaster paid the premiums as agreed, but at his death left a will by which he bequeathed to his daughter the sum of \$500, on condition that she would assign to his estate her interest in the policy, and directed his executor, if she refused, to claim the amount of the policy. His daughter refused to assign her interest, and the executor sued the company. The court held that the company was bound to pay the money to Wilmaster's daughter under the policy; that Wilmaster could not alter the contract, and that the executor was not entitled to recover.

**Mining Partnerships—Assignment of One Partner's Share.**—There is no relation of trust or confidence between mining partners which is violated by the sale and assignment by one partner to a stranger or to one of the associates of his share in the property and business of the association, according to the decision of the Supreme Court of the United States in the case of *Bissell vs. Foss*. The court adopted the language of Mr. Justice Field in an earlier case before the same court, in which he said: "Associations for working mines are generally composed of a greater number of persons than ordinary trading partnerships; and it was early seen that the continuous working of a mine, which is essential to its successful development, would be impossible, or at least attended with great difficulties, if an association was to be dissolved by the death or bankruptcy of one of its members or the assignment of his interest. A different rule from that which governs the relations of members of a trading partnership to each other was therefore recognized as applicable to the relations to each other of members of a mining association. The *delectus persone*, which is essential to constitute an ordinary partnership, has no place in these mining associations."

**Railroad Conductors' Liability—Stolen Goods.**—A railroad conductor who permits a passenger to travel on his train, taking with him goods known by the conductor to be stolen, is not liable to an action therefor by the owner of the goods, according to the decision of the Supreme Court of Maine in the case of *Randlette vs. Judkins*. The court, in giving judgment, said: "The railroad is a public highway, over which all members of the public who are in a proper condition to travel in a public car, who pay the established fare, and conduct themselves properly, have a legal right to travel with luggage. It is the legal duty of the conductor to permit all such persons to enter the cars and travel over the road. For sufficient cause he may stop the train and eject a traveler from the train. He owes no legal duty to the public to stop his train and eject a traveler who is guilty of a felony, or to arrest such traveler and hold him as a prisoner and seize the property he may have in his possession. As a citizen he may have the right, if he sees fit, to arrest a traveler guilty of a felony and hold him till he can be properly prosecuted; but not being an officer charged with the duty, and having no legal warrant therefor, he is under no legal duty to do so, and thereby take upon himself the burden and hazard of justifying his act. Nor does

he owe any duty to any member of the public to arrest a thief, and seize and hold the stolen property he may have in his possession; or to seize and hold for the owner, whoever he may be, goods which a traveler on the road may have taken and is carrying away as a trespasser." The court added: "We have discussed the question involved upon principle, there being no authorities directly in point cited by the learned counsel on either side, and it is said there are none."—*Bradstreet's*.

## A Universal Commercial Language.

The idea of creating a universal language for international relations has gained much ground during the last thirty years, in France as well as in Germany and Austria. Notwithstanding that linguists call in question the possibility of composing an artificial language that shall have a real value, and that litterateurs deny the opportuneness thereof, practical minds justly say that we are living in the age of steam and electricity, in which new needs are rising every day, and in which the impossibility of to-day becomes the wonderful reality of to-morrow.

No one, however, thinks longer of adopting or creating a language that is to become one day, like the Greek of antiquity or the Latin of the middle ages, the universal organ of science and letters; that is a dream that has long been abandoned. But, since diplomats have a universal or common language for their international reports, why cannot our travelers and business men have an advantageous means of communication that shall be both simple and practical, and that shall permit them to enter into direct relations with all commercial houses, in Europe as well as in all other parts of the world?

Let but a universal language exist, and the traveler will be able to make himself understood in the most diverse countries, and the same commercial journal can be read and understood in all the producing or consuming centers of the world.

As for adopting a European language as a universal idiom, there are two strong objections to it, viz., national rivalry, and the difficulties of every nature that the very study of these languages presents. As was recently remarked by Gen. Faidherbe, in a study upon the programme of the French Alliance, the complications of the verb alone often prevent colonial populations from learning a European language.

The first attempts in the way of the creation of an artificial, universal tongue date back to Descartes and Leibnitz. Much science and patience has been exhausted in the study of this question, and yet it would be difficult, among the fifty or sixty systems that have been devised in the course of the last two centuries, to find a single one that has any practical value.

A polyglot foreigner, Mr. Schleyer, of the island of Mainau in Lake Constance, has, however, finally succeeded, after twenty years' study, in finding a solution of this difficult problem in the creation of a system which he calls *Volapük* or "Universal Language."

By borrowing from the different idioms of Europe certain characteristic traits, Mr. Schleyer has combined a well-arranged, very harmonious, and extremely simple language. For the roots of his words he has had recourse to all the languages of Europe, but principally to the Romance and Teutonic ones, and among the latter to the English especially.

Although Mr. Schleyer's publications date back scarcely to 1881, the adepts in *Volapük* are to-day counted by thousands in the different states of Europe. Fifty-three societies have been organized for the purpose of favoring its propagation, and this, too, not only in Germany, but also in Austria, Holland, Sweden, England, the United States, and even in Syria.

Any one who understands a Romance or Teutonic language can easily learn *Volapük* in a couple of months. The grammar is very simple. All nouns are masculine, save those that denote the names of females. Very simple rules allow the verb and adjective to be derived from the same noun. Every adjective terminates in *ik*: *nul*, 'novelty,' *nulik*, 'new.'

There is but one declension, and the conjugation of the verbs is of the simplest character.

In order to give some idea of what the language looks like, we present the Lord's Prayer in *Volapük*, with an interlinear translation:

<i>Fat obsik,</i>	<i>kel binol in sills,</i>	<i>mem olik</i>
Father our,	who art in heaven,	name thy
<i>pasanukomös;</i>	<i>kinün olik nekokomös;</i>	<i>vil</i>
be (it) sanctified;	kingdom thy let (it) come;	will
<i>olik jenomös su tal äslik in sül;</i>	<i>givolös obes</i>	
thy be (it) done upon earth as in heaven;	give us	
<i>tudel bodi obsik delik, e fogivolös obes nofts</i>		
to-day bread our daily, and forgive us sins		
<i>nobis äslik fogivobs utes kels enofoms obis;</i>		
our as forgive we those who sin against us;		
<i>e no letölös obis pabevikodön fa tenüd,</i>		
and not let us to be conquered by temptation,		
<i>sod delivolös obis de bad. Jenosöd.</i>		
but deliver us from evil. So be it.		

The Article is wanting in *Voiapük*.

The Noun is declined. For example, take the word *dom*, 'house':

Nom. *dom*, the house.

Gen. *doma*, of the house.

Dat. *dome*, to the house.

Accus. *domi*, house.

The plural is formed by the addition of *s* to the above cases.

The Adjective.—As before remarked, adjectives are formed by adding *ik* to the root. For example, *dom*, 'house,' *domik*, 'domestic.'

The Adverb is formed from the adjective by adding *o*. For example, *domik*, 'domestic,' *domiko*, 'domestically.'

The Pronouns are *ob*, 'I,' *ol*, 'thou,' *om*, 'he,' *of*, 'she.' Adding *s* for the plural, we have *obs*, 'we,' *ols*, 'you,' *oms*, 'they' (masc.), *ofs*, 'they' (fem.). The possessive case is formed by adding *ik*: *obik*, 'mine,' *olik*, 'thine,' *obsik*, 'our' (sing.), *obiks*, 'our' (pl.).

The Verb.—The verbs are derived from the substantive. Knowing the word *pük*, 'tongue,' we derive from it the verb *pükon*, 'to speak.' For the different persons we add the various pronouns to the radical *pük*. For example, *pükob*, 'I speak,' *pükol*, 'thou speakest,' *pükom*, 'he speaks,' *pükobs*, 'we speak,' *pükols*, 'you speak,' *pükoms*, 'they speak.'

Tenses are formed by the augmentatives or prefixes *a*, *e*, *i*, *o*, *u*. For example, *pükob*, 'I speak,' *apükob*, 'I was speaking,' *epükob*, 'I have spoken,' *ipükob*, 'I had spoken,' *opükob*, 'I shall speak,' *upükob*, 'I shall have spoken.'

From this it will be seen that the grammar is, as before remarked, exceedingly simple.

Numerous works have been composed for the study of this universal language. Along with his grammar, Mr. Schleyer has published a *Volapük-German* dictionary containing nearly 13,000 words, and both works are now in their fourth edition. Abridged editions of the grammar have been published in Latin and all the languages of Europe, and also in Chinese and in Nama, the dialect of the Hottentots. Dictionaries for the use of the French, English, Italians, Dutch, and Hungarians are being prepared, and will soon appear.

Two reviews are likewise published in *Volapük*—one, the *Volapükbled*, with a translation opposite, and the other, the *Volapükaklubs*, entirely in *Volapük*.

On the occasion of the Universal Exposition in 1889, an international congress of *Volapükists* will be held at Paris.

## Merulius Lacrimans—the Dry Rot.

A short time before his death, Prof. H. R. Goppert, of Breslau, in connection with the chemist Professor Polek, made a study of the *hausschwamm*—a fungus commonly known with us as dry rot, which had caused great injury to buildings in northern Germany. The results of their combined studies now appear in a pamphlet by Professor Polek ("Der Hausschwamm," Breslau, 1885). The dry rot, *Merulius lacrimans*, seems to be unknown in a wild state in Germany, but is confined to woodwork of different kinds, and attacks by preference coniferous timber. Strange to say, the fungus does not usually infest old structures, but generally makes its appearance in comparatively new buildings; and a startling series of figures shows the amount of damage done in the region of Breslau. Chemical analyses by Polek show that the *merulius* is particularly rich in nitrogenous compounds and fat, which is rather remarkable, when one considers the chemical constituents of the timber on which it grows. Injury to health, or even death, is said to result from exposure to air containing large quantities of the spores of the *merulius*; and several authenticated cases are reported. In a supplementary note, Polek considers the relationship of *merulius* to actinomycetes, a fungus which causes a characteristic disease in man and cattle; and he apparently comes to the conclusion that what is called actinomycetes is probably only the *merulius* altered by the peculiar matrix on which it is growing. His statements on this point can hardly be called conclusive, or, in fact, other than vague.

## A New Application of Electricity.

We recently printed an article on this subject concerning Mr. Walker's application of the discoveries of Professor Lodge and Professor Clark to the condensation of lead fume and other volatilizations met with in metallurgical works. A German contemporary, the *Berg- und Huttenmannische Zeitung*, also published an article on the subject, which has called forth a letter in the issue of the paper of July 10 from B. Rosing, of Tarnowitz, stating that the original discovery of this action of electricity on dust is not by any means recent. It was known in 1850, when Guitard published his observations as to rapid condensation of tobacco smoke in a glass, by introducing into the glass one of the wires from an electrical machine. The writer of the letter also mentions Wiedemann's work on electricity, *Lehre von der Electricität*, as referring to this in vol. i., page 33. Although the discovery thus appears to be old enough, there does not seem, says *Engineering*, to have been any practical application of it till Mr. Walker took it up.

**Medals at the Inventions Exhibition, London.**

The crop of medals harvested by Americans at the Inventions Exhibition in London was not a very abundant one. There was some complaint that the exhibits made by our countrymen were much smaller than had been expected, and this may account for the limited awards which they have received. In proportion, however, to the number competing, the results are not unfavorable. The four gold medals awarded to American exhibitors were as follows:

Adamson, Daniel & Co., "Wheelock" automatic cut-off engine.

Edison and Swan United Electric Light Company (Limited), Edison-Swan systems of electric lighting.

Thomson and Houston systems of electric lighting (exhibited by Laing, Wharton & Down).

Westinghouse Brake Company (Limited), automatic air brake and passenger communication for railway trains.

Two silver medals were awarded:

Delany Synchronous Multiplex Telegraph System, multiplex telegraphy.

Maxim-Weston Electric Light Co., electrical exhibit.

Bronze medals were also received by two exhibitors: Anglo-American Brush Electric Light Corporation (Limited), electric lighting apparatus.

Van der Weyde, electrical illumination of the sitter in photographic portraiture.

It will be noticed that of the eight awards, six are for electrical apparatus, well illustrating the prominence given in America to electrical study.

**Hints for the Workshop.**

The following suggestions, to which hundreds of others might be added, are taken from the *Manufacturers' Gazette*:

Clean and oil leather belts without taking them off of their pulleys. If taken off, they will shrink. Then a piece must be put into them and removed again after the belt has run a few days.

The decay of stone, either in buildings or monuments, may be arrested by heating and treating with paraffine mixed with a little creosote. A common "paint burner" may be used to heat the stone.

Set an engine upon three or four movable points, as upon three cannon balls. Connect with steam, and exhaust by means of rubber hose. If the engine will run up to speed without moving itself back and forth, then that engine will run a long time with little repair. If it shakes itself around the room, then buy another engine.

Safely moving a tall mill chimney has been accomplished several times. Chimneys which have been caused to lean slightly through settling of the foundation may be straightened up again by sawing out the mortar between courses of brick at the base. A chimney 100 feet high and 12 feet square at the base will be varied over 3 inches at the top by the removal of 1 inch at the base.

When you begin to fix up the mill for cold weather, don't forget to put a steam trap in each and every steam pipe which can be opened into the atmosphere for heating purposes.

For leading steam joints, mix the red lead or litharge with common commercial glycerine instead of linseed oil.

Put a little carbolic acid in your glue or paste pot. It will keep the contents sweet for a long time.

Look well to the bearings of your shafting, engine, and machines. Sometimes twenty-five, thirty, forty, and even fifty per cent of your power is consumed through lack of good oil.

When you buy a water wheel, be sure to buy one small enough to run at full gate while the stream is low during the summer months. If you want more power than the small wheel will give, then put in two or more wheels of various sizes.

When it becomes necessary to trim a piece of rubber, it will be found that the knife will cut much more readily if clipped in water.

When forging a chisel or other cutting tool, never upset the end of the tool. If necessary cut it off, but don't try to force it back into a good cutting edge.

In tubular boilers the handholes should be often opened, and all collections removed from over the fire. When boilers are fed in front, and are blown off through the same pipe, the collection of mud or sediment in the rear end should be often removed.

Nearly all smoke may be consumed without special apparatus, by attending with a little common sense to a few simple rules. Suppose we have a battery of boilers, and "soft coal" is the fuel. Go to the first boiler, shut the damper nearly up, and fire up one-half of the furnace, close the door, open damper, and go to the next boiler and repeat the firing. By this method, nearly if not quite all the smoke will be consumed.

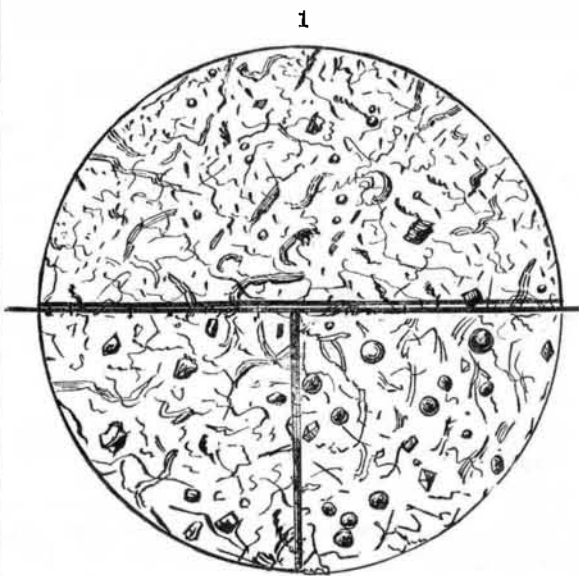
A coiled spring inserted between engine and machinery is highly beneficial where extreme regularity of power is required. It is well known that a steam engine, in order to govern itself, must run too fast and too slow in order to close or open its valves, hence an irregularity of power is unavoidable.

**THE MICROSCOPE IN THE MECHANIC ARTS.**

BY GEO. M. HOPKINS.

It is said that a workman may be known by his chips, and the same test of workmanship may be applied to an emery wheel; there is no truer index of the character and efficiency of an emery wheel than the microscopic dust which is projected from its periphery while it is in use.

An examination of this dust by the aid of a microscope shows whether the wheel is doing its work without undue waste of its substance; also whether the constituents of the wheel are disproportioned, to the extent of using too great a proportion of cement to bind the particles of emery together, or whether the cement employed for this purpose is weak and inefficient. An emery wheel is nothing more or less than a rotary cutter, whose cutting edges are composed of emery or corundum, and of course the efficiency and the durability of the wheel depend upon the manner in which these cutters are held. Each cutter must have a setting sufficient to hold it while it is doing its work. If this setting is too weak, or in other words, if the cement employed in making the wheel lacks strength and tenacity, the cutters will be readily loosened and lost; but while the wheel will be rapidly disintegrated, it will cut freely, and in this respect has the advantage over a wheel formed with an excess of cement, which completely envelops the cutter, or the particle or crystal of corundum or emery, and thereby



**MAGNIFIED EMERY WHEEL DUST.**

prevents the material being ground from being brought into contact with the cutting edges without undue pressure. The characteristics of a wheel of this kind are the rapid glazing of the surface and the slowness of its cutting.

The microscope reveals exactly what the character of the emery wheel is; whether it is composed of too great a proportion of cement, whether it is made up of materials other than emery and cement, whether it is friable and liable to rapid disintegration. An examination of the dust projected from the periphery of the emery wheel will show whether there is too great a proportion of cement employed in its manufacture; it will show whether the wheel is cutting freely; it will also indicate whether too great a pressure is required to cause the wheel to cut as rapidly as it should.

If an examination of the emery wheel dust reveals mainly fibers of iron or steel cleanly cut, with very few grains or crystals of corundum or emery, and if few fused globules of steel or iron are present, it may be concluded that the emery wheel is of a good quality, and is doing its work properly; but if such an examination shows a large proportion of the grains of emery, it indicates, of course, that the wheel is becoming rapidly disintegrated. If, on the other hand, steel and no emery is found in the wheel dust, if the iron or steel fibers are partly fused, and if the number of globules of melted steel or iron is great, we may conclude that the wheel is one that is liable to glaze, and requires too great a pressure to work upon it.

Fig. 1 shows the dust of a first-class wheel magnified about sixteen diameters. It will be noticed that there are comparatively few angular grains or particles of emery, while the iron or steel chips cut from the work by the wheel are long and clean, and carry the evidences of having been done with a good cutter.

Fig. 2 shows the dust from an emery wheel which contains a large proportion of emery, and either a small amount of cementing material, or cement of poor quality; and while the iron or steel chips appear equally as well as in the other case, the wheel in this case is being rapidly destroyed.

Fig. 3 shows the dust from a wheel having too great a proportion of cement, and exhibiting a tendency to glaze; the great pressure required to make the wheel cut also generates a heat which is sufficient to fuse the particles of iron or steel as they are separated from the main body of the object being ground.

**Photo Emulsions Spoiled by Thunder.**

The most noticeable effect of thunder upon gelatinous solutions or on emulsion is, says the *Photo. News*, to bring about a certain decomposition, which interferes, more or less, with the setting properties of the gelatine; and if the solution be kept, it quickly becomes putrid. In some extreme cases the emulsion refuses to set altogether; in others, where the injurious effect is less marked, it does set, but tardily, and then, although the plates may turn out otherwise good, they generally frill or blister to such an extent, during the fixing and washing, as to render them next to worthless. What is the actual effect, chemically, of thunder upon gelatinous solutions, at present is very doubtful. Whatever the effect may be, the cause by some is attributed to the presence of ozone, which usually accompanies violent electric disturbances in the atmosphere. But ozone will scarcely account for all the injurious changes wrought by thunder upon substances which are similarly affected to gelatine. For example, it is no unusual circumstance for ale which is stored in air-tight casks in underground cellars to be rendered both turbid and sour by a thunderstorm; and we have known an emulsion while in a closed vessel being spoiled from a similar cause. It is difficult to conceive, under these circumstances, how ozone can possibly be the cause.

Curiously enough antiseptics, which, under ordinary condition, prevent decomposition in gelatine, appear to have little or no influence in the case of thunder. It is worthy of note that thunder appears to exert little or no influence upon cold or jellied emulsions, neither has it upon concentrated solutions of gelatine, even when they are in a fluid condition. Therefore, as a piece of practical advice, we suggest that when electrical disturbances of the atmosphere are apprehended, precaution be taken that all emulsions be got into the jellied condition as quickly as possible. Also to bear in mind that it is during the emulsification, with the small proportion of gelatine, that the injury is most likely to arise.

It is a curious fact, but not the less true, that a severe storm may sometimes occur without causing the slightest inconvenience, while, on another occasion, the conditions being apparently identical, a very slight one, even a single clap of thunder, will cause an immense amount of trouble. In all cases it is wise, when possible, to defer preparing emulsions, particularly on a large scale, when violent electrical disturbances of the atmosphere are anticipated.

**A Tornado in Ohio.**

About 8 o'clock, on the evening of September 8, the town of Washington Court House, the county seat of Fayette County, Ohio, about fifty miles northwest of Cincinnati, was struck by a tornado, which destroyed a great part of the place. More than fifty of the principal stores and business buildings were ruined, besides the damage of many others, the loss upon buildings alone being computed at from half a million to a million dollars. The duration of the tornado is said to have been about two minutes, but this is probably largely conjectural, although it lasted long enough to destroy some brick and many wooden buildings, killing several and wounding a large number, and giving the place in the track of the storm the appearance of a total wreck, all in so short a time that the terrified people could hardly realize what was happening. One family of five, living six miles west of Washington, when the storm first struck took refuge in the cellar, just in time to see their house lifted above them and hurled through the air a distance of 250 feet. There were meetings being held in Music and in Odd Fellows' Hall, and they were both so ruined that it was wonderful how so many escaped. The northeastern and southwestern portions of the town were not much damaged. The tornado is described as having had the appearance of an immense rolling ball of cloud, illuminated with electricity.

**Success of Aluminum Smelting by Electricity.**

Among the valuable metals peculiarly adapted for use in the mechanical and fine arts may be mentioned aluminum, hitherto utilized only to a limited extent because of its refractory qualities and the expense encountered in its reduction.

For articles requiring great tensile strength and resistance, aluminum bronze may be considered the foremost, reaching 100,000 pounds per square inch; is susceptible of being tempered, and of receiving a high degree of finish.

By the process of "smelting ores by the electric current," recently patented by the Messrs. Cowles, of Cleveland, Ohio, the expense is so materially reduced that aluminum and its alloys will enter largely into the various branches of mechanical industry, to the exclusion of inferior metals; and the beautiful gold, silver, and bronze colors render it exceedingly valuable and desirable for small ornaments, statues, and all art metal work, and the remarkably low price at which this aluminum bronze is now produced insures for it a widespread employment in the arts.