Correspondence.

Salt as a Preservative.

To the Editor of the Scientific American:

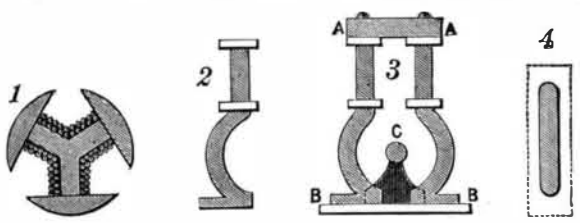
Thirty-four years since, I set four 4½ by 4½ inch oak hitching posts near my residence, 3½ feet deep in the earth, having first bored one 1 inch hole into same some 3 inches above, and another hole of like size some 4 inches below the earth's surface, and partly filling each hole with salt, and then plugging same with a dry oak plug. The posts are to-day sound and strong. Draw your own inference. WM. T. SMITH.

Oskaloosa, Iowa, Aug. 25, 1890.

WORK OF AMATEUR ELECTRICIANS.

To the Editor of the Scientific American:

I noticed in your valuable paper of July 19 an article entitled "Electrical Workers will Please Report," so I take the liberty, as a subscriber of your paper, to tell you of some attempts of mine to make electric motors and dynamos described in the SCIENTIFIC AMERICAN and SUPPLEMENT. I first made the small dynamo (SUPPLEMENT, No. 161), as directed in SUPPLEMENT; put a small grooved pulley on shaft, and run it as a dynamo from a sewing machine table, using the fly wheel to drive it by. Dynamo is coupled up as a shunt machine; have a small rheostat in field, with which I can regulate the current from nothing to full capacity of machine. I can run two 1 c. p. incandescent lamps with it easily. I made a small storage battery, and used to charge it with the dynamo. Later I made an armature out of cast iron, like sketch No. 1, having



three sections wound with No. 18 wire, and it runs nicely, especially as a motor, it having no dead center. I also made another dynamo same type, but half the size of dynamo No. 161. It will run a small fan very well on three Grenet cells. The fields are wound with No. 19, and armature No. 23, coupled in shunt.

I started to make the simple electric motor described in Hopkins' "Experimental Science;" made the armature, and made a commutator like the eight-light dynamo commutator. The field I made out of cast iron; got two pieces cast like sketch No. 2, wound them in a lathe, each leg having 12 layers No. 16 wire on it. On top of fields (see No. 3) I bolted a piece of wrought iron, A A; on the bottom, at B B, is screwed a brass plate; on this plate the two bearings, C, are screwed. The field (No. 2) bars are rounded at the edges (see Fig. 4), so as not to injure the wire in winding. I tested the machine on a six-ampere arc circuit as a series motor, and it runs splendidly. I should be pleased to give you the dimensions of the fields if you want them. I have not built the eight-light dynamo yet, but expect to do it this fall. If any of your readers have ever built a small motor (shunt-wound) for a 110 volt incandescent circuit, I would like to know size of magnets, armature, size of wire in field and armature, layers, etc., and resistance of shunt and armature, and what current it takes, type of field, etc. FRANK B. WIDMAYER.

Montclair, N. J., August 24, 1890.

Ingrowing Toe Nails—Their Treatment and Cure.

To the Editor of the Scientific American:

In a recent issue of SCIENTIFIC AMERICAN, "C. R. W." gives a "remedy" for ingrowing toe nails. The treatment is well enough for temporary relief, like almost all of the many forms of cutting the nail, but it is not a cure, and if followed up will certainly prove disastrous. Thinning the nail in any manner, or even pulling it off, as is sometimes done, makes the after growth thicker, harder and more inflexible, causing the nail to curve into the flesh more and more, making the ailment worse. The following treatment was prescribed to me thirty years ago by our family physician, and was a permanent *cure* in my case, and has been in that of several to whom I have recommended it:

1. Wear stockings that are at least one-half inch longer than the feet.

2. Wear broad-toed shoes or boots that will allow the toes to rest without lateral pressure when standing. If possible, have the boots or shoes made over a last which has an elevation—a "knob"—where the great toe comes, so as to stretch the uppers *up*, thus preventing pressure on the nails.

3. Cease cutting the nail in *any manner*, but allow it to grow until it is from one-half inch to three-quarters inch beyond the "quick," bearing the soreness and pain that will come while growing to that length, with as much patience as possible, but on *no consideration cutting any part of the nail.* Putting cloth or cotton under it will usually add to the pain, because increasing the pressure.

4. Three or four times a week (every night is not too often), before retiring, soak the feet for half an hour in soap suds as hot as can readily be borne, and with a small blunt knife blade carefully remove from under and around the nail any dirt or matter that may have accumulated. Soaking the feet will do much toward removing the soreness. After the nail has grown to the required length, it may be trimmed as occasion requires, but always in such a manner as to leave the end of the nail about the shape of the end of the toe, with the corners at least ¼ inch beyond the flesh, until the cure is effected; and even then the nail should *never* be cut back of the end of the toe.

Soaking the feet as often as once each week, and cleaning the nails as prescribed, will do much toward preventing a return of the malady.

I may add that frequent soaking the feet and scraping with a dull knife the callous places while moist, with easy-fitting shoes or boots, will remove and prevent corns and bunions.

I have not the space to give reasons for the above treatment, but they will become apparent to any who use it. C. R. J.

Norwich, N. Y.

Tyrotoxicon in Cheese and Milk.

During the years 1883 and 1884, there were about three hundred cases of cheese poisoning reported to the Michigan Board of Health. One physician reported the following symptoms: Every one who ate of the cheese was taken with vomiting; at first of a thin, watery, later a more consistent, reddish-colored substance, while at the same time the patient suffered from diarrhœa, and some complained of pain in the region of the stomach. At first the tongue was white, but later it became red and dry, the pulse was feeble and irregular. One small boy, whose condition seemed critical, was covered all over the body with bluish spots.

Samples of the cheese which proved poisonous in each of the three hundred cases were sent to Dr. Vaughan for analysis, and he reported thereon as follows:

"At first I made an alcoholic extract of the cheese. After the alcohol was evaporated in vacuo at a low temperature, a residue consisting mainly of fatty acids remained. I ate a small bit of the residue, and found that it produced dryness of the throat, nausea, vomiting, and diarrhœa. The mass of this extract consisted of fats and fatty acids, and for some weeks I endeavored to extract the poison from these fats; but all attempts were unsuccessful. I then made an aqueous extract of the cheese, filtered this, and drinking some of it, found that it also was poisonous. But after evaporating the aqueous extract to dryness on the water bath at 100°, the residue thus obtained was not poisonous. From this I ascertained that the poison was decomposed or volatilized at or below the boiling point of water. I then tried distillation at a low temperature, but by this the poison seemed to be decomposed. Finally, I made the clear filtered aqueous extract, which was highly acid, alkaline with sodium hydrate, agitated this with ether, removed the ether, and allowed it to evaporate spontaneously. The residue was highly poisonous. By resolution in water and extraction with ether, the poison was separated from foreign substances. As the ether took up some water, the residue consisted of an aqueous solution of the poison. After this was allowed to stand for some hours in vacuo over sulphuric acid, the poison separated in needle-shaped crystals. Ordinarily, the microscope was necessary to detect the crystalline shape. From sixteen kilogrammes of one cheese I obtained about 0·5 gramme of the poison, and in this case the individual crystals were plainly visible to the unaided eye." To this ptomaine Dr. Vaughan has given the name tyrotoxicon, or cheese poison.

On August 7, 1886, twenty persons at one of the hotels at Long Branch were taken ill soon after supper, and at another house nineteen other persons were affected with the same form of sickness, the symptoms being similar to those which appear where there is poisoning from tyrotoxicon. While an investigation into the causes of their sickness was going on, thirty persons at another hotel were affected with precisely the same symptoms. A thorough examination of the cooking utensils was made, because unclean copper vessels have caused irritant poisoning. Lobsters, crabs, blue-fish, and Spanish mackerel have, at times, and with certain persons, produced toxic symptoms, but no evidence of poisoning was found in any of these. It was finally ascertained that all who drank milk were taken ill, and those who had not partaken of it escaped, and it was decided that the milk had caused the trouble. It was found upon the further prosecution of the inquiry that one dealer supplied all the hotels where the sickness occurred, and a thorough investigation was then made of the cattle and the farms where they were fed, but everything, so far as the feeding and the condition of the animals was concerned, was found to be satisfactory, but it was also ascertained that the cows were milked at the unusual hours of noon and midnight.

The noon milking was placed in cans while it was still warm, and then carted eight miles during the warmest part of the day in a very hot month. Chemical treatment of a sample of the milk which had caused the sickness produced a mass of needle-shaped crystals. A portion of these crystals was mixed with milk and fed to a cat, when in course of half an hour the animal was seized with retching and vomiting, and was soon in a condition of collapse, from which, however, it recovered in a few hours. Drs. Newton and Wallace, who had charge of this investigation, in summing up the results of their investigations, said: "We are justified in assuming, after weighing well all the facts ascertained in the investigation, that the sickness at Long Branch was caused by poisonous milk, and that the toxic material was tyrotoxicon."

Another remarkable case of milk poisoning, which was traced directly to tyrotoxicon, was that of a farmer and his family living at Milan, Michigan. The head of the house, a man of about fifty years, was first affected with severe vomiting and other symptoms similar to those previously described. A few days after this the son, who was eighteen years of age, strong and vigorous, was taken down with the same symptoms, and then the mother and a daughter sixteen years of age were similarly affected, and these comprised the entire household. The mother and the son were taken on Thursday, and they both died on the following Monday. The daughter became sick on Friday and died the following Thursday.

Dr. Vaughan personally visited the afflicted ones, and he and Dr. Novy investigated the cause of the poisoning. The family was neat and tidy in their habits, but the house in which they lived was old and very much decayed. They had been troubled now and then with nausea and vomiting, followed by prostration, but these symptoms had not been sufficiently severe to cause them to summon a physician. Before this family had moved to the farm, the house had been known among the neighbors as an unhealthy one, and there had been much sickness and a number of deaths among its former tenants. The house was frame, consisting of two rooms on the ground floor, with attic above. The frame rested upon four large logs lying directly on the ground, and these were thoroughly rotten. There was no cellar. The floor was of unjointed boards, and every time the floor was swept, the dirt sifted through upon the ground; and when it was scoured or mopped, the water and filth ran through the crevices, and thus the conditions most favorable to putrefaction were brought into existence and maintained. A corner of one of the rooms had been partitioned off as a buttery, and here the food was kept.

The original floor had rotted away, and a second layer of boards had been put down without removing the old ones. Between these two floors was found a mass of decomposing matter, which gave forth a peculiar nauseating odor, sufficient to cause nausea and vomiting in one of the persons engaged in the examination. The family lived very simply, and had eaten no canned foods for months. During the week in which the sickness occurred they had eaten bacon, and this was examined and found in perfect condition, and the drinking water was also found to be pure. The greater part of the milk produced on the farm was correctly treated to remove the animal heat. The milk which the family used, however, was kept in the buttery previously described, and the family were in the habit of drinking it between meals. The father stated that he frequently noticed that the taste of the milk was not pleasant. Dr. Vaughan ordered some pure milk to be placed in this buttery over night and then examined it. In this milk he found tyrotoxicon, not only by the employment of chemical tests, but by poisoning a kitten with it.

The similarity shown in these cases scarcely needs to be pointed out, while the necessity of a more thorough understanding of the chemistry of putrefaction and of the liability which exists of poisons being generated in articles of food by decomposing matter, or by other unfavorable conditions, must be equally apparent.

Dynamic Power of the Sea.

From experiments at Bell Rock and Skerryvole lighthouse, on the coast of Scotland, it is found that while the force of the breakers on the side of the German Ocean may be taken at about a ton and a half to every square foot of exposed surface, the Atlantic side throws breakers with double that force, or three tons to the square foot; thus a surface of only two square yards sustains a blow from a heavy Atlantic breaker equal to fifty-four tons. In March of this year a heavy gale blew for three days and nights at Skerryvole, washing out blocks of limestone and granite of three and five tons weight as easily as if they had been empty egg shells. One block of limestone, estimated to be of fifteen tons weight, was moved over one hundred and fifty feet from a place in the surf where it had been firmly grounded since 1697, it having first been rolled in sight by the awful gale of the "windy Christmas" of that year. This is quite a high sea record for 1890, showing that the gale of March 3d was the worst known on the Scottish coast for 193 years.