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ANOTHER TELEPHONE DECISION.

The latest phase of the telephone litigation was developed at Pittsburg, Pa., July 8, in the U. S. Court, before Judge McKinnon, in the suit of the Bell Telephone Co. against the Western Telephone Co., for infringement and injunction. The court permitted the cousel for the Bell Co. to occupy almost an entire day with their argument, but refused to hear any reply on behalf of the defense, although they were prepared to prove that their invention was substantially the same as that used by Reis, many years prior to Bell's alleged invention. At first the court was inclined to hear of this matter, as the issue hinges entirely upon the question whether or not the Reis transmitter will transmit speech regardless of the kind of receiver used; but finally it refused to hear evidence, allowing that to go over to the final hearing. The court, however, held that the questions at issue had been decided recently by Judges Gray and Wallace, and that it would not, in the matter of a preliminary injunction, venture to decide contrary to the opinions of those eminent jurists.

The practical effect of this decision is that the use of the Reis telephone is an infringement of the Bell patent—a position which we have expected the lower courts would sooner or later take, since in no other way can the gigantic Bell monopoly be upheld. The moment justice is done, and the use of Reis' invention allowed, the patent of Bell will be reduced to its proper rank—that of a subordinate improvement. None of the Bell telephone litigations have reached decision by the Supreme Court. If the latter tribunal deals with the Bell patent in the same manner that it has with other wide reaching monopolies, the claims of the Bell people will, in due time, be greatly modified.

HOUSE KNOWLEDGE FOR BOYS.

The Governor of Massachusetts, in an address before the Worcester Technical School, June 25, said some words that are worthy of noting. He said: "I thank my mother that she taught me both to sew and to knit. Although my domestic life has always been felicitous, I have, at times, found this knowledge very convenient. A man who knows how to do these things, at all times honorable and sometimes absolutely necessary to preserve one's integrity, is ten times more patient when calamity befalls than one who has not these accomplishments."

A commendation of "girls' work" from such an authority emboldens the writer to add a word in favor of teaching boys how to do work that may be a relief to a nervous, sick, worried, and overworked mother or wife, and be of important and instant use in emergencies. A hungry man who cannot prepare his food, a dirty man who cannot clean his clothes, a dilapidated man who is compelled to use a shingle nail for a sewed-on button, is a helpless and pitiable object. There are occasions in almost every man's life when to know how to cook, to sew, to "keep the house," to wash, starch, and iron, would be valuable knowledge. Such knowledge is no more unmasculine and effeminate than that of the professional baker.

"During the great civil war, the forethought of my mother in teaching me the mysteries of household work was a 'sweet boon,' as the late Artemus Ward would say. The scant products of foraging when on the march could be turned to appetizing food by means of the knowledge acquired in boyhood, and a handy use of needle and thread was a valuable accomplishment."

Circumstances of peculiar privation compelled the writer, as head of a helpless family, to undertake the entire work. The instruction of boyhood enabled him to cook, wash, starch, iron, wait on the sick, and do the necessary menial labor of the house in a measurably cleanly and quiet manner. This knowledge is in no way derogatory to the assumptive superiority of the male portion of humanity; a boy who knows how to sweep, to "tidy up," to make a bed, to wash dishes, to set a table, to cook, to sew, to knit, to mend, to wait on the sick, to do chamber work, is none the less a boy; and he may be a more considerate husband, and will certainly be a more independent bachelor, than without this practical knowledge. Let the boys be taught housework; it is better than playing "seven-up" in a saloon.

THE NORMAL CONCERT PITCH.

At a large meeting of musicians held in London on June 21, a resolution was passed in favor of the adoption of a normal pitch of 518 double vibrations for the treble.

For a number of years it was noticed that the concert pitch not only was becoming higher, but that it was far from uniform in the different European capitals. This was naturally a source of great inconvenience and annoyance to both singers and composers, and a movement was started in France fully twenty-five years ago to secure a tuning fork of uniform pitch, which should be a standard for the entire musical world. The standard tuning fork deposited at that time in the Conservatory of Music at Paris gave 437·5 double vibrations, corresponding to *A* or *la* in the treble stave. Consequently *C* or *do* of the treble would result from 522 double vibrations. In England, the Society of Arts recommended that this note should be represented by 528 double vibrations, a number having the advantage of being divisible down to 33, which is a quality of some importance, since each descending octave has but half the vibrations of its superior stave.

The new standard of 518 double vibrations for the treble *C* or *do*, if the cablegram has reported it correctly, permits but one division, giving 259 double vibrations for the middle *C* of the scale. The succeeding lower octaves must therefore all be represented by fractional vibrations.

SINGLE LIPPED DRILLS.

There is known to some machinists a peculiar drill known as the "cannon" drill, the "half-round" drill, and the "half lip" drill, according to the prevailing nomenclature of locality. But all these drills depend for their centering and line on some guide outside themselves; they must be guided by center and slide like a boring tool that works in an already formed and possibly irregular hole.

Another drill is really a cutting tool composed of a guiding center, which is the drill proper, and two wings of rotating cutting edges. This is known as the "pin" drill, the "teat" drill, and the "flange" drill; in fact, it is an untwisted auger adapted to metals instead of wood. If pressure alone induced the auger to penetrate the wood, without the aid of the threaded screw point, and the wood chips did not clog, the pin drill would be a good wood auger. The auger, by means of its threaded point, is pulled into the wood, but the drill must be forced to its work. With this difference the auger and the drill are very similar.

The writer has in possession and use an "expansible bit" which will bore a hole from five-eighths of an inch diameter—its normal size—to one of two inches diameter—its extreme limit. The expansion is made by means of a sliding blade that may be secured at any point desired. This is a single blade (not two on either side the center), and it is surprising how fast this single cutter works, cutting a clean hole, the bit itself being merely a central shaft around which the one wing of a cutter swings. The tool is suggestive, and it was thought that if a self-progressing tool like an auger could keep its center with one blade, why could not a forced tool like a drill also keep its place with one cutting blade—in short, why is it necessary to make drills with double lips? It is quite evident that where two lips are to be ground exactly alike to form a center, there must be very exact work to preserve the changing center to conform with the double circumference—or radii. If the center was fixed, a single cutting wing could be easily adapted to size.

A favorable chance gave opportunity to test the possibility of a single lipped drill. In passing through a shop it was noticed that a workman broke one of the blades of a "lip" drill or "teat" drill. He was about to have it reforged, when he was allowed to grind away the fragments remaining from the broken portion, and use the drill with a single lip or wing. It worked admirably; cut as rapidly as when there were two lips, and as a proof of its superiority over the two lipped drill the terminal burr came out clean, instead of having an inner circumferential ridge. It is noticed that the burr or the last clean cut of the "teat" drill is a disk, the last of the drill's work. This disk is rarely a smooth one, but if examined it will be found to have two circumferences, one inside the other, that show that the two cutting edges do not act uniformly; in short, that it is difficult to grind a drill to center. Perhaps a single lip drill would be an improvement on our double lip drills in many cases. It certainly would be when there could be used a projecting and guiding center such as is necessary to "teat" drills.

The "Novelties" Exhibition of the Franklin Institute.

The pronounced success achieved by the Electrical Exhibition held under the auspices of the Franklin Institute, Philadelphia, last year has probably been a principal inducement moving that society to hold this year what is styled a "novelties" exhibition, in the well situated and capacious buildings and grounds that were utilized for last year's display. The exhibition will be open from September 15 to October 31, and exhibitors will be charged $2 for ten square feet of space, with 10 cents more for each additional square foot. Applications must be made before September 13, and those already received give promise that the exhibition will be one of unusual interest. All applications for space should be made on blanks that give full particulars, and will be furnished on addressing the Committee on Exhibitions, Franklin Institute, Philadelphia.

Nickel Crucibles.

Crucibles of nickel have lately been adopted in some chemical laboratories, in the place of the silver ones generally used for melting caustic alkalies. They have the advantage, not only of being cheaper, but of being capable of resisting a higher temperature than the latter, and the result is said to be favorable.

Electrical Studies at Cornell University.

The course in electrical engineering in Cornell University has now been established for two years, and is already well patronized. It requires four years of study for its completion, the object, writes Prof. W. A. Anthony in the *Electrical World*, being to turn out, not electricians or electrical engineers merely, but educated men. To enter it students must have a knowledge of the common English branches and a part of algebra and geometry. In the university they pursue the mathematics through calculus, study the French or the German language, give some time to the study of English, devote several terms to the theory and practice of machine drawing, pursue for final terms the study of mechanics as applied to engineering, besides the work in general physics and electricity, which occupies a considerable portion of the time for three years.

As to equipment, the physical department of the university, where the study of electricity is pursued, is supplied with very complete arrangements for the experimental study of electrical science and its applications. The best instruments for electrical measurements are at hand, and students have practice in measuring resistances of conductors, of batteries, and of instruments. They learn to test the accuracy of the instruments they employ. They measure electromotive forces by the quadrant and absolute electrometer as well as by various other means. There are four dynamo machines under charge of the department, besides several lecture room models and electromotors. Students make complete measurements and tests of these, and make constant use of them for various experiments. For instance, one student has been experimenting since last winter upon the effect of the various kinds of covering upon the rise of temperature of wires heated by electric currents; another has been comparing the different photometric methods as applied to the measurement of the illuminating power of arc lamps; another has been comparing the deposits of copper in voltameters having different sizes of plates, in neutral and acid solutions, in solutions of different degrees of concentration. Currents of various strengths from 1 to 18 amperes were employed. Silver voltameters were also compared with copper.

There is just now being completed a "magnetic observatory" for furnishing facilities for magnetic experiments and electrical experiments that depend upon the uniformity of the magnetic field around the instrument.

Iron has been rigidly excluded from the construction of the building. Here will be mounted the instruments for determining the elements of the earth's magnetic field, but the principal instrument is an enormous tangent galvanometer on the Helmholtz plan, capable of measuring currents from one one-hundredth ampere to 200 amperes. The conductors for heavy currents are three-quarter inch copper rods. The deflections of the needle are read on a graduated circle 50 inches in diameter, and a suspended coil 1 meter in diameter, of 100 turns of wire, furnishes the means of determining the horizontal intensity of the earth's field at the exact place of the instrument at any moment, by observations requiring but a few minutes.

This observatory is placed so far from any of the other buildings as to be free from any magnetic disturbance from moving masses of iron. It is connected with the laboratory by several wires, among which is a pair of 0000 copper, for conveying the heavy currents. In connection with this equipment, and as accessory to the large tangent galvanometer, is a set of German silver resistances, consisting of 36.000 feet of No. 16 wire in sixty sections of 600 feet each, connected to switches that permit of combinations in series, or multiple arc, or "multiple series," in all desirable ways. They give a variety of resistances from three-fifths ohm to 1,800 ohms.

The large tangent galvanometer has been constructed at the university, and it is proposed to construct next year a standard potential instrument to permit of the accurate measurement of all potentials.

All these instruments will be used by students as they have occasion. During this year several small dynamos and motors have been tested here, the students taking part in the work, and it is proposed in the future to continue this work of testing upon larger machines as opportunity offers.

Professor Thurston Goes to Cornell.

At their recent meeting, the trustees of Cornell University decide to tender to Professor Thurston, of the Stevens Institute of Technology, the position of presiding officer and "director" of Sibley College; which, as our readers are well aware, is the School of Mechanical Engineering of the University. The liberality of the Hon. Hiram Sibley, of Rochester, has recently provided this college with larger buildings, extended workshops, and increased facilities for the carrying out of the plans of the founder of the University and of the trustees. The collections have been enlarged, and it is proposed to considerably extend the scope of the school. The course will be broadened, the faculty enlarged, and the shop work and mechanical laboratory work, as well as courses of instruction involving research, greatly extended. The trustees propose to make this department as prominent and as complete, in every respect, as its position in a university avowedly intended to be an institution of practical as well as theoretical, scientific, and literary character should justify them in making it. The new director, and the faculty who aid him, enter upon their work with the strongest possible pledges of hearty support, not only from the trustees, but from all real friends of the university who have been consulted.

It is not known who is to succeed Professor Thurston at Hoboken, but it is anticipated that it will be a distinguished member of the engineering profession, as well known by his long professional services as by his ability and by his success as a writer on mechanical and engineering topics.

Refrigerators.

When the hot season begins the annual inquiry comes, "What is the best refrigerator?" The requirements are easy to state. It must be so constructed as to perfectly preserve any article of food that is put in it, in such a manner that it not only will not decompose, but that the most sensitive substance that may be put in cannot be contaminated by the odor, be it good or bad, of any other article, and all this without wasting the ice.

It may be said, then, there must be a circulation of pure, cold, dry air.

The outer air must be guarded against, both in the provision chambers and ice chamber, and the waste pipe conveying the drippings from the ice should be so constructed that no foul air is admitted from the sewer or waste pipe with which it is connected.

Refrigerators requiring chopped ice, thereby obtaining a greater degree of cold from the greater ice surface exposed, are wasteful.

The degree of cold required is not as low as is generally imagined, and if kept too cold some sensitive substances may be injured. A temperature averaging 40° Fah. is, according to the New York *Analyst*, the best.

And ventilation, according to the same authority, is not required. The action of the warmer air passing around the ice and displacing the colder air creates, by the current thus established, sufficient ventilation.

A good refrigerator must be so constructed as not to contain any material easily corroded, stained, or absorbent, and that every portion of it can be easily cleaned; for cleanliness is as important, if not more so, to the preservation as temperature.

It should be so constructed that the gases from one portion of the provision chamber cannot pass into any other part excepting the ice chamber, else the food may spoil, even though the temperature is maintained.

The temperature must be maintained at an even point.

Experimental Ballooning.

Important experiments in aerial navigation are now being made by Mr. A. F. Gower, well known in connection with the Gower-Bell telephone. The operations being carried on are, it is understood, within the cognizance of the Government, and are more particularly directed toward the adaptation of balloons to war purposes. Several ascents have already been made, and in carrying out his arrangements Mr. Gower appears to have recognized the advantages offered by the position of the town of Hythe, which he has made the center of his operations. On the 31st of May, the wind being favorable, one of the automatic pilot balloons invented by Mr. Gower, with appliances for giving out its own gas and ballast, one compensating for the loss of the other, was filled with 2,300 feet of gas, and ascended at about 11 o'clock. In the car a written statement was, of course, placed, explaining the ownership of the machine and its object, with the result that it was next heard of at Dieppe, having made a rapid passage of about seventy-two miles in a straight direction and descended at 2:30 in the afternoon. On June 1, another pilot balloon, with a capacity of 4,300 feet, was started, and immediately followed by Mr. Gower in his own balloon (containing 23,000 feet of gas). The object of Mr. Gower in ascending was to watch the action of the pilot; but the smaller machine made such rapid progress that it got out of his observation, and came down in the vicinity of Paris. Meanwhile Mr. Gower, who ascended about noon, took the French coast at Boulogne at 2:15, and then taking a northerly curve traveled overland to Calais, where he made a smooth descent at 4 P.M. A still more important undertaking, was, however, entered upon on June 3, when Mr. Gower, Captain Lane, and Mr. Dale, the aeronaut, ascended in a balloon of 40,000 feet capacity. A good start was made, and the aerial voyagers sailed away in a northerly direction. After a journey of rather more than an hour, they were compelled to descend, owing to the wind taking a slight turn toward the North Sea, and with much difficulty landed on the Isle of Sheppey, having traveled twenty-three miles.—*Nature*.

Salt as a Destroyer of the Teeth.

At a recent meeting of the New York Odontological Society, Dr. E. Parmly Brown said:

I will venture the assertion that the excessive use of common salt is one of the main factors in the destruction of human teeth to-day. I am now engaged in collecting some statistics on this point, from which I hope in time to demonstrate, what seems to me to be the fact, that common salt excessively used is a great solvent of the human teeth. If it will injure the human teeth through the chemistry of our systems in some way or other that I will not try to explain to-night, why might it not also have the effect of preventing a good development of the teeth when taken into the system in excess? I have lately procured some statistics from the Sandwich Islands, from a gentleman who has been there, covering a period of overfortyyears, that are very suggestive and interesting. Within that period the teeth of the Sandwich Islanders have decayed rapidly, and since they have begun to decay it has been noticed that the natives are in the habit of biting off great chunks of salt and eating it with their food. According to all accounts, the teeth of the Sandwich Islanders were formerly the most free from decay of any people on the face of the earth, if I remember rightly. You will find that people who eat a great deal of salt and a great deal of sugar are often entirely toothless. I know several instances of candy storekeepers where three generations are entirely toothless. People who eat an excessive amount of salt are tempted to eat large quantities of candy, pickles, and vinegar. There seems to be a craving for those substances after the excessive use of salt.

Compulsory Drawing.

As amatter of fact, in the practical crafts by which the bulk of the people gain a living, a knowledge of simple drawing is of more substantial importance than the ability to write; and as a lad who can write better than his school fellows stands a better chance than they of getting a berth in a counting house, so another who can draw even a little will make a better carpenter than those who cannot draw at all. Rather late in the day we have found this out. The discovery was the mainspring of the system of national art training; the knowledge of it is the impelling force of the great movement for technical instruction which is now in full swing. So long as the industrial prosperity of England depended merely upon the spread of railways, the multiplication of steamships, the stream of splendid mechanical inventions, and the increased quantity and cheapness of production which resulted therefrom, the influence of elementary art teaching upon manufacturers and upon national taste could be ignored, and to the great loss of this country it was ignored. But that state of things has almost wholly passed away. Our Continental competitors nowadays buy our machinery, or themselves make as good; and the pinch of competition is felt at this time not merely in the cost but also in the taste of production. The great nations of Europe had a sharper eye to the future than we. For thirty years have they devoted themselves to this question of elementary art teaching; and in nearly all the elementary schools of the Continent drawing is not merely taught, but is, and for long has been, compulsory. And the results are so striking, so beneficial throughout the range of industry and manufacture, that our own Royal Commission appointed to inquire into the facts some years ago, when the truth could no longer be gainsaid, has just recommended that drawing should be "incorporated with writing as a single elementary subject," compulsory in all primary schools, and that it should be continued throughout the standards.—*Magazine of Art*.

A Shoal Water Alarm.

A curious invention especially designed for navigating the Nile, but which is applicable to other rivers, has been brought out by Messrs. Yarrow, of London. The object of the invention is to notify the pilot of the existence of sand banks or rocks lying directly in his pathway. The invention consists of two poles projecting about fifty feet ahead from the post and starboard sides, at the ends of which are suspended two vertical iron rods. The bottom extremities of these come about one foot below the level of the boat itself. Attached to each of these two vertical iron rods is a wire rope which passes inboard, and is connected with the whistle on the boiler; and the gear is so arranged that immediately this indicator touches a rock or sand bank, it instantly causes the steam whistle to blow. This plan in the first instance draws the pilot's attention to the fact, and also points out to him on which side of the steamer the sand bank or rock exists, so that it gives him warning in which direction to steer.

Henry H. Gorringe.

Lieutenant-Commander Gorringe, of the U. S. Navy, who brought the Egyptian obelisk to New York in 1880, died July 6, as the result of spinal injuries received by jumping from a moving train some time ago.