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Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Air locomotives, compressed', 'North River front, improvement', 'Patent decisions', etc., with corresponding page numbers.

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 1066.

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Table listing contents for the week ending June 6, 1896, including sections like 'I. CHEMISTRY', 'II. METALLURGY', 'III. MINING ENGINEERING', etc., with page numbers.

THE ELEVATED ROADS AND THE RAPID TRANSIT PROBLEM.

The judgment of the Appellate Justices upon the late proposal of the Rapid Transit Commission should be read by every citizen who is interested in the subject of increased transit facilities. It judges the question from a broad standpoint, and shows a conservative regard for the permanent interests of the city. The court points out that the scheme, as presented for its judgment, was very incomplete, and that the data upon which the estimates were based was insufficient to give them any reliable value. It is pointed out that the cost of most of the great engineering works has exceeded the first estimate, and always by a large amount, and it is argued that there are problems involved in the execution of the proposed work which render the question of its final cost extremely problematical.

With the verdict of this court against it, the underground tunnel may be considered as out of the question, at least for many years to come. In any case it was a scheme which would have been attended with serious drawbacks; and were it now completed and in operation, it would have to contend with the natural repugnance of the people to descending a flight of stairs and burying themselves in an artificially lighted and more or less imperfectly ventilated tunnel for a quarter or half an hour as the case might be. It is quite a question as to whether the light and air of surface travel would not be considered to more than outweigh the superior speed of the tunnel route. It is a noteworthy fact that although a belt system of underground lines is in operation in the city of London, there is a large proportion of travelers who prefer the surface transportation in cabs and omnibuses in spite of their slow speed of from five to six miles an hour.

The construction of the tunnel being out of the question, attention will naturally be directed to the elevated roads; for in the extension and improvement of this system is to be found an alternative scheme which would provide the city with greatly improved facilities at a comparatively early date. We have good reason to believe that these roads would have been extended and improved before this if the city had shown any disposition to grant the necessary permission. The company have more than once professed themselves to be ready to make the much needed alterations and additions, and about the time that the question of building the Broadway tunnel was submitted to the Appellate Justices, the officers of the Manhattan Elevated Roads again manifested a commendable desire to meet the convenience of the public by extending their system and quickening their service. Certain plans and promises were made to the mayor of the city, all of which would seem to indicate that the company was desirous to make a reasonable provision for the needs of the 200,000,000 passengers who annually serve to swell the dividends of this very successful monopoly. It was not suggested that the proposed extension was to be made in any way dependent upon the rejection of the Broadway tunnel scheme; and a proposed outlay which was considered expedient in the face of a powerful competitive scheme must be doubly expedient now that this scheme has fallen through.

If the officers of the elevated roads are sincere in their expressed desire to extend their system, the next and immediate step should be to place their proposal before the Rapid Transit Commission—a commission that was created for the express purpose of receiving such suggestions. If there is any doubt as to the legal status of the commission, there are other means by which the proposals of the company can be made known to the citizens and passed upon by them.

The matter is an urgent one, and there can be no possible excuse for a lengthy delay upon the part of the company. On the other hand, any proposals that may be offered should be judged with the sole object in view of the city's best interests. If the elevated roads have been enormously profitable, they have also been enormously useful; and if their recent overtures through the mayor have been made, as we believe, in good faith, they should be at once accepted and the company given every opportunity to carry out the extension.

If, however, the elevated roads should make no further move looking to extension of their system, the city should use the strong arm of the Legislature in its behalf. The case is too serious to admit of delay. The volume of travel is steadily increasing and already in some quarters it fairly swamps the accommodation provided for it. Many of the terminal stations are nightly filled with a struggling mob, in which the commonest laws of chivalry seem for the nonce to be forgotten, and strong men elbow frail women in the wild rush to secure the much coveted seat—and this in the representative city of what should be, and in most regards is, the most progressive country and people in the world!

A FOSSIL bird, represented by a piece of a bone from a bed of clay on Vancouver Island, is described by Cope, who thinks that it may have been "the largest bird of flight thus far known."

PROPOSED EQUIPMENT OF THE NEW YORK SURFACE ROADS WITH COMPRESSED AIR MOTORS.

The Metropolitan Traction Company, which controls altogether about 182 miles of street railway in this city, and carries daily upward of 650,000 passengers, is contemplating an important change in the motive power of a large portion of its lines. About 32 miles of the system are at present operated as cable and underground trolley lines, and the plant is of the latest pattern and thoroughly up to date; but the greater part—fully 100 miles of the lines—is still worked by the slow and objectionable horse car. Several months ago the company determined to abolish the horse car and introduce in its place some form of mechanical traction, and in the interval their agents have been making an exhaustive examination of the many systems of street car traction which are being operated in Europe and America.

It has been determined to make a thorough trial of a compressed air motor which has been designed by Joseph H. Hoadley, of the engineering firm of Hoadley Brothers, who is now associated with the American Wheelock Engine Company, of Worcester, Mass. We are informed by the Metropolitan Company that at a private trial recently had at the Worcester works before the engineers and officials the Hoadley motor showed a remarkable efficiency, as compared with any compressed air motor which they had previously subjected to trial. At present ten of the company's cars are being equipped with the new motor, and if they prove as successful in service as the experimental car which was recently tested, it is likely that all the existing horse car roads will be similarly equipped.

The air will be carried in two cylindrical steel tanks placed between the trucks and beneath the floor of the car, and they will be charged at an initial pressure of 2,000 pounds to the square inch. The power house at 147th Street and Lenox Avenue will contain a 500 horse power Greene-Wheelock engine and a Minerva air compressor, the reservoir capacity of the plant being 5,000 cubic feet. The compressed air motor is being adopted in preference to trolley or cable traction, not merely from motives of economy, but also with a view to securing a service which shall be free from the interruptions to which the cable and trolley systems are liable.

The operation of these cars will be watched with close attention, not merely by the company which is making the experiment, but also by the engineering world at large. Engineers in the United States have been so fully occupied with the development of electric traction—and it has had a growth and a success which is phenomenal—that comparatively little attention has been paid to other methods of traction which utilize the oil, gas, and compressed air motor. As compared with the cost of the electric and cable systems, the compressed air and gas motors which are being increasingly used in European cities are said to be showing remarkably economical results. Chief Engineer Pearson, of the Metropolitan Company, is now in Europe for the purpose of personally inspecting the working of some of the more important plants that are operated on the above systems.

On another page will be found a description and illustrations of a compressed air locomotive, which has proved very successful in the mines of the Susquehanna Coal Company, Glen Lyon, Pa. The chief engineer of the company, Mr. J. H. Bowden, states that the cost of operating this plant is between 1 and 1½ cents per ton per mile, and that, with the introduction of a better type of coal car, he expects to make a still more economical showing.

The St. Louis Disaster.

For the second time within the present generation the city of St. Louis has been visited by that scourge of the Mississippi Valley, the tornado. It was on the evening of March 8, 1872, that the ever memorable cyclone carried death and destruction through this ill-fated city; and to-day the citizens are again occupied in the sad task of burying the dead and caring for the wounded that have been smitten by this worst form of nature's savagery.

The full cyclonic force of the storm of Wednesday evening was not felt at the outset, but appears to have been preceded by a violent wind storm, which swept over the whole city at the rate of eighty miles an hour. This was succeeded by a heavy deluge of rain, in the midst of which the cyclone developed in the southwestern suburbs and cut a wide swath of destruction through the city. Crossing the Mississippi in the neighborhood of the Eads Bridge, the upper works of which were badly wrecked, it laid low a large part of East St. Louis, and demolished a vast amount of shipping and also a long stretch of warehouse property that was standing on the river front.

The destruction was wrought with that speed and completeness which marks the passage of a tornado, and in a few minutes some 400 to 500 are estimated to have been killed outright and over 1,500 wounded, while the damage to property will amount to many millions of dollars. The details of this sad calamity are too well known to call for any repetition. Beyond

the fact that the whole of Wednesday had been oppressively hot and the air heavy and stifling, there were no premonitory signs of the impending disaster. There is food for thought in the fact that, with all our advancement in science and our boasted intimacy with the laws of nature, there are phenomena such as this, which are known to us only by their death-dealing fury, whose approach we cannot even predict and in whose presence we are utterly helpless.

Recent Patent and Trade Mark Decisions.

Dadirrian v. Yacubian (U. S. C. C. Ill., Showalter C. J.) 72 Fed. Rep. 1010.

A Foreign Common Noun as a Trade Mark.—The word "Matzoon" has been in use in Armenia for centuries as the name of an article of food made of fermented milk. A person manufacturing such article in the United States cannot monopolize the Armenian name of the article as his trade mark. The fact that it is a word unknown in the United States is immaterial so long as it is the generally recognized name of the article whereby it is known.

Thomson-Houston Company v. Electric Railway Electric Company (U. S. C. C. Conn., Townsend J.) 72 Fed. Rep. 1016.

Contributory Infringement.—Contributory infringement is the intentional aiding of one person by another in the unlawful making or selling or using of a patented invention. In this case the patent was for a trolley system and the defendants sold trolley stands for the purpose of being used in such trolley system and as a part thereof, and hence the defendants were held to be guilty of contributory infringement of a patent and were enjoined from such infringement.

Cook & Bernheimer Company v. Ross (U. S. C. C. N. Y., Lacombe J.) 73 Fed. Rep. 203.

Unfair Competition.—The plaintiff bottled whisky in bottles of a peculiar shape originally devised by him, and by extensive advertising such bottles came to be relied upon by purchasers as a means of identifying the whisky bottled by him. Afterward the defendant, dealing in the same whisky, began to use a bottle of precisely similar shape and appearance as that of the plaintiff, although the labels used were different. It was held that the use of such bottles by the defendant was unfair competition and should be restrained.

Bonsack Machine Company v. Underwood (U. S. C. C. N. C., Seymour J.) 73 Fed. Rep. 206.

Cigarette Machines.—The Hook patent, No. 184,207, for a cigarette making machine is a primary patent and is infringed by the device shown in the Underwood patent, No. 470,269.

Infringement by Experimental Machines.—The making of an experimental machine like a patented machine is not an infringement, but if it is to be used for selling the patent under which it is made, it ceases to be merely an experimental machine and a suit will lie for infringement.

License to Make Infringing Machine.—A manufacturer contracted with a corporation to make no cigarette machines excepting under the corporation's patent. However, he afterward submitted to its secretary the question of making the machine for another inventor and was told to go ahead and that the company would look into the matter of infringement when the machine was put on the market. It was held that this did not prevent the company from suing the inventor for infringement.

Matthew & Willard Manufacturing Company v. Trenton Lamp Company (U. S. C. C. N. J., Greene J.) 73 Fed. Rep. 212.

Infringement Suit Against Officers of a Corporation.—In a suit against a corporation for infringement of a patent it is neither necessary nor proper to make the officers of the company, who are mere salaried employees not dependent upon the sale of the alleged infringing article and who have not personally been guilty of infringement, parties defendant to the suit.

Who are Entitled to Design Patents.—The law authorizes the issuance of a design patent to any person who "by his own industry, genius, effort and expense has invented" the design. In this, the word "expense" is not limited to mere disbursement of money, and hence does not prevent the granting of a patent to one who invents a design while in the employment of another, especially where it does not appear that "expense" was necessary in producing the design.

Lamps.—The design patents to Miller, Nos. 22,422, 23,672, 23,673, and to Miller & Schmitz, No. 23,671, have been held valid.

Palmer Pneumatic Tire Company v. Newton Rubber Works (U. S. C. C. W. Va., Goff C. J.) 73 Fed. Rep. 219.

Preliminary Injunctions.—It is held in this case that the patent alone will not create a sufficiently strong presumption of its own validity to justify the granting of a preliminary injunction against its infringement. There must be either a prior adjudication sustaining the patent or a continuous acquiescence for a considerable period of time or it must have withstood an interference contest in the Patent Office.

Proof of Public Acquiescence in the Validity of a Patent.—Where public acquiescence in the validity of a patent is not alleged in the bill of complaint, it is insufficient to allege universal acquiescence by mere statements in affidavits, and when such affidavits are controverted by a number of witnesses giving names, dates, and showing that for nearly two years before several manufacturers had been making and selling goods substantially similar to those covered by the patent, public acquiescence is not proved and a preliminary injunction will not be granted.

Parker v. Appert (Ct. of Appeals D. C.) 75 O.G. 1201.

Amending Preliminary Statement.—It is always a suspicious circumstance in the case of interference that after the dates of one of the parties have been disclosed that the other party should then seek by amendment of his preliminary statement to show a date of invention prior to that of his original statement and prior to that of his opponent.

Dates of Sketches.—Where a party to an interference states that he made the sketches upon which he relies for the establishment of his earlier date but mislaid them and forgot where they were until after the disclosure of the dates of the other party, the matter is suspicious and the amendment to his preliminary statement should not have been allowed.

The Old World's Old Folks.

A German statistician has studied the census returns of Europe to learn a few things about the centenarians of the Old World. He has found, for instance, that high civilization does not favor the greatest length of life. The German empire, with 55,000,000 population, has but 78 subjects who are more than 100 years old. France, with fewer than 40,000,000, has 213 persons who have passed their hundredth birthdays. England has 146; Ireland, 578; Scotland, 46; Denmark, 2; Belgium, 5; Sweden, 10; and Norway, with 2,000,000 inhabitants, 23. Switzerland does not boast a single centenarian, but Spain, with about 18,000,000 population, has 401.

The most amazing figures found by the German statistician, says the *New York Sun*, came from that troublesome and turbulent region known as the Balkan Peninsula. Serbia has 575 persons who are more than 100 years old; Roumania, 1,084; and Bulgaria, 3,883. In other words, Bulgaria has a centenarian to every thousand inhabitants, and thus holds the international record for old inhabitants. In 1892 alone there died in Bulgaria 350 persons of more than 100 years. In the Balkan Peninsula, moreover, a person is not regarded as on the verge of the grave the moment he becomes a centenarian. For instance, in Serbia, there were in 1890 some 290 persons between 106 and 115 years, 123 between 115 and 125, and 18 between 126 and 135. Three were between 135 and 140.

Who is the oldest person in the world? The German statistician does not credit the recent story about a Russian 160 years old. Russia has no census, he says, and except in cases of special official investigation the figures of ages in Russia must be mistrusted. The oldest man in the world is then, in his opinion, Bruno Cotrim, a negro born in Africa and now resident in Rio Janeiro. Cotrim is 150 years old. Next to him comes probably a retired Moscow cabman, named Kustrim, who is in his 140th year. The statistician says the oldest woman in the world is 130 years old, but neglects to give her name or address, possibly out of courtesy, or perhaps in view of the extraordinary figures which came to his hand from the Balkans, he thought a subject only 130 years old was hardly worthy of particular mention.

The Boiling Point of Hydrogen.

If liquid air produced by the Linde process, according to the *Journal of Gas Lighting*, is to be a common article of commerce in the immediate future, liquid hydrogen is still sufficiently novel to attract the attention of the man of pure science. Professor Olszewski has recently determined the boiling point and the critical temperature of hydrogen; and the result shows that it is possible, by taking proper precautions, to do experimental work in the domain of physics at a point very near the absolute zero of temperature. The process is described in detail in *Wiedemann's Annalen*. The method of expansion, which had already been successfully employed to ascertain the critical pressure, was again utilized. The critical temperature is that at which liquid hydrogen, when slowly released from pressure, first boils up; and the boiling point is the temperature reached when the pressure is reduced to that of one atmosphere. The chief difficulty in these experiments is the thermometric one; and Professor Olszewski successfully overcame this by the employment of a thin platinum wire immersed in the liquid hydrogen, which by its varying resistance indicated the fall of the temperature. It is interesting to note, in connection with what has been stated with regard to the effect of cold upon the strength of materials, that Professor Olszewski used cast iron cylinders brought down to a temperature of 210° C. (not far from absolute zero) by means of liquid oxygen, at which the cylinders still held oxygen compressed to 18

atmospheres. The critical temperature of the hydrogen was, however, still lower, and was not reached until -234.5° C. had been registered. The boiling point was -243.5° C., or -406.3° Fah. (probably the greatest cold ever attained by artificial means).—*Progressive Age*.

The Huzulen.

In the Carpathian Mountains of Galicia dwells a primitive Salvic people called the Huzulen, which is nominally Roman Catholic and of whose curious customs Nature gives an account. Everywhere one comes across wooden crosses erected over buried brandy bottles. In 1894 a "brandy prophet" appeared; he was a simple peasant who waged a successful warfare against brandy drinking. The zeal of the people constrained the clergy to bury the spirit with ceremonies; and now the use of brandy has ceased, and at present only those drink brandy who are worth nothing. A gypsy, who had sent his wife away, bought the daughter of a Huzulen for fifty florins; he was reproved by the magistrate, but that had no effect. In a year he was tired of her, and then he hired the wife of another Huzulen for sixty florins; again the law was powerless, and at the end of the year the husband came for his wife. There are two remedies for back-ache—one is for the priest to walk on the patient's back in church and the other is to let a bear walk on it. Weasels, snakes, frogs, puppies, and kittens may not be killed, and there are numerous charms against the first two. For three days before the Huzulen moves into a new house he throws a black hen on it, so that snakes may not nest there. Black cattle are lucky. The mentioning of certain words for simmering and boiling is prohibited when applied to milk, lest harm should come to the cows. The grave diggers and coffin makers wash their hands over a grave to signify that they are not to blame for the sorrow, and the relatives ask the latter not to be angry with the dead for the trouble he has caused them, and not to ask for payment from him in the next world.

Role of Fats in the Animal Body.

The teachings of the most recent researches on this disputed question are summarized, says the *Literary Digest*, in a brief notice in *Der Stein der Weisen*.

"In the processes that go on in the body three groups of carbon compounds undergo a combustion in the true sense of the word—albumens, carbohydrates, and fats. Regarding the different functions of these materials, only this much is certain: that albumen is indispensable to the building up of new cells and the repair of waste material, and that carbon compounds, free from nitrogen, serve as fuel for the production of heat and mechanical work. These compounds consist of carbohydrates and fats and very probably of albumens also. It can also scarcely be doubted that the animal body can avail itself not only of fat but also of carbohydrates as fuel; but it is also to be assumed that in the normal physiological conditions fat and the carbohydrates play different roles. It should be noted that Nature herself has given to the infant in milk—without doubt an absolutely appropriate means of nourishment—not only albumen, but fat and carbohydrates. In most kinds of animals, especially in man, the proportion of sugar in milk is greater than that of fat, while on the other hand Dr. Gurdy of St. Andrew's has found in whale's milk the enormous amount of forty per cent of fat.

"The general opinion is this, that the strength-producing fuel in muscle is one of the compounds belonging to the carbohydrate group, glycogen or some similar compound, by whose combustion, together with the production of work, some heat is also inevitably produced. In ordinary circumstances this suffices to raise the bodily temperature to its normal height. But if this cannot be reached thus, other substances must be used as fuel. Heat produced by muscular work in the animal body is best obtained from the carbohydrates of the food, but besides this the indispensable production of heat is best attained through fats. This corresponds with the instinctive choice of foods made by men, who in the tropics eat little fat, while the dweller in polar regions devours large quantities of it to feed his bodily combustion.

"Moderate use of alcohol causes a deposit of fat, because, while alcohol is not turned into a fuel in the muscle and nerve cells, it serves as a pure fuel in the organism and replaces the combustion of fat. The reason that the use of alcohol is so dangerous in the polar regions is that alcohol favors the throwing off of heat in great degree, so that the effect is as if the stove in a room should be heated red hot and then all the doors and windows should be thrown open."

ROENTGEN photography is being successfully applied to biological studies. The ordinary star fish was photographed at the Durham College of Science and the contents of the caecum were found to be small shells both whole and broken; the stomach was filled with a whole common mussel. This interesting radiograph is published in *Nature*.