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LESSONS OF A GREAT DISASTER.

The North German Lloyd steamship Elbe, bound from Bremen for New York, was sunk in a collision with a small steamer fifty miles off Lowestoft, England, between 5 and 6 on the morning of January 30.

But twenty survivors escaped in one of the boats. All the other passengers and crew, numbering about 334 souls, were lost. The weather was clear, but cold, and a strong wind, almost a gale, was blowing.

Chief Engineer Neussell, who was saved, says the stem of the steamer which rammed the Elbe struck her about 150 feet forward of the rudder, or just abaft the engine room. The engines were not damaged by the collision, but the water soon poured in, and although the steam pumps were put to work, in about three minutes it proved to be useless. The fires were soon extinguished and the engines and pumps stopped working.

Mr. Keller, the London manager of the North German Lloyd Steamship Company, says:

"The Elbe was struck right on a bulkhead partition, so that both the watertight compartments which it divided were instantly filled."

There was no longitudinal bulkhead.

The shock and crash of the collision aroused everybody. The steerage was in a panic in a moment, and men, women and children, half dressed, or in their night clothes, came crowding up the companionways to the deck.

As the other steamer backed off and drew her stem out of the great cut made in the side of the Elbe, the latter careened over to port and began to settle by the stern. Three boats on the port side were lowered, but all except one were lost. By this time the list of the ship to port was so great that the starboard boats could not be lowered; and soon after the ship went down by the stern, and the whole crowd of people on board were engulfed in the waves. The single boat with twenty-two persons was picked up by a fishing smack. The colliding vessel was a small steamer from Rotterdam named the Crathie. Her stem was badly crushed, but she succeeded in reaching port in safety.

Among the lessons derivable from this disaster, we may note the inadequacy of the present means of saving life. The Elbe was provided with ten life-boats, besides life-rafts and collapsible boats. In consequence of the careening to port, the five starboard life-boats could not be launched. The life-rafts and other boats appear to have been of no account. Is it not possible for ingenious minds to study out new forms of life-saving devices that shall be available under the conditions in which the Elbe was placed? Cannot some practical system be devised for launching boats from the upper side of a careened vessel?

The weakest spot in nearly all steamers appears to be at or near amidships. A blow near this point has almost always proved fatal. Knowing this weakness, cannot some ingenious mind discover a remedy? Cannot an unsinkable ship be invented? We think it can. We have given in back numbers of the SCIENTIFIC AMERICAN engravings of ships that were cut in two, and yet each part floated. In one of the parts were the engines, boilers and propeller; and this section was still able to navigate, and also tow the other section. This was done at the West when the experiment was made of sending steamers through the lakes to the East. The vessels when intact being too long for the canals, were cut in two, as stated, and after passing the canals, the sections were again united.

The Elbe was built in 1881 by the Fairfield Shipbuilding Company, of Glasgow, better known as the Elder Company. She was the first express steamer built for the North German Lloyd Steamship Company.

She had ten standing life-boats, six collapsing, or folding, life-boats, three life-rafts, and was divided into nine water-tight compartments.

Her dimensions were: Gross tonnage, 4,510 tons; length over all, 418 feet; width of beam, 44 feet; depth, 35 feet. She had two funnels and four masts, which were schooner rigged. Her speed was 16½ knots an hour, and her horse power 5,600.

THE HEAVENS IN FEBRUARY.

An excellent opportunity to see the shy planet Mercury is offered this month. Since the astronomers watched it crossing the sun's face last November, Mercury has passed around the farther side of the sun and is now preparing to swing once more into line between the solar orb and the earth, but this time it will not be seen against the sun. On February 9 the little planet will attain its greatest elongation east of the sun and will be seen shining in the sunset glow low in the west. It should be looked for, as soon after sundown as possible, two or three days before and after the 9th. On that particular day it will be near the fourth magnitude star Lambda in the constellation Aquarius. But what will especially serve to identify it is the presence of Venus. Mercury and Venus will be in conjunction early on the morning of the 10th, and close enough together on the evening of the 9th to make the sight a pretty one. Mercury will be recognizable as the more northerly of the two, the distance separating them being about three degrees.

It will be interesting to remember when looking at Mercury on this occasion that the planet is, at the time, close to its perihelion point or nearest approach to the sun.

It will receive (shall we say enjoy?) a degree of heat ten times as intense as that which the sun pours upon the earth, and yet toward the end of last December the solar heat on Mercury was less than half as great as it will be on February 9. This arises from the fact that the orbit of Mercury is very eccentric, so that its distance from the sun, which is only 36,000,000 miles on the average, varies to the extent of nearly 15,000,000 miles. Luckily for us, the sun doesn't sport that way with the earth.

Every lover of the stars will rejoice at the return of Venus to the western sky. During the month she will gradually draw away from the sun and brighten a little, but she is still far in the distant part of her orbit and the real glory of her re-entry as the queen of the evening is a spectacle reserved for the spring. At the end of February, however, she will already have become a conspicuous object, brightening the barren region that lies on the borders of Cetus and Pisces.

Mars remains in Aries during the first half of the month. In the latter half his eastward motion will carry him over into Taurus and he will swing slowly past the Pleiades on their southern side. His splendor has departed, he is moving farther away, and the sun is getting lower on that southern pole of his, whose snows (if snows they are) sparkled so brilliantly and vanished so swiftly at the touch of summer last year.

But while Mars fades, Jupiter continues a feast for the eyes of all those happy people who know the joys of the telescope. His marvelous panorama of cloud belts and changing spots, the delicate blue of his poles, and the gorgeous decoration of white and ruddy vapors that encircles his vast equator, are sights of another world that no thoughtful person should miss seeing. Jupiter is in the eastern part of Taurus some four degrees northeast of the star Zeta, and almost directly north of Orion; but he needs no star to point him out, and no constellation to emphasize his presence. He crosses the meridian about 9 P. M. at the beginning of the month and about 7 P. M. at the end.

I give, as heretofore, two or three dates on which the shadows of some of Jupiter's satellites can be seen on his disk, eastern standard time:

February 10, at 7:41 P. M., satellite I will pass upon the disk; its shadow will follow at 8:45, and the latter will be half way across about 9:55.

February 22, at 9:19 P. M., satellite III will pass upon the disk; its shadow will follow at 2:08 o'clock the next morning, and the latter will be half way across about 3:38 A. M. In the mean time, at 2:21 A. M., satellite II will disappear behind Jupiter.

February 24, at 8:55 P. M., satellite II will pass upon the disk; its shadow will follow at 11:18, and the latter will be half way across at 12:40 A. M. At 11:21 the same night, satellite I will pass upon the disk; its shadow will follow at 12:35 A. M. and will be half way across about 1:45 A. M.

Saturn is in Libra, some 15° or 16° directly east of the bright star Spica. It cannot be seen before midnight. The same is true of Uranus, which remains near the fourth magnitude star Iota in Libra. Neptune is in Taurus, about 6° northeast of Aldebaran and about 2° in a northerly direction from the fifth magnitude star i.

The opening of the month finds the moon in Aries, in which constellation it reaches first quarter on the 2d, at a quarter past seven o'clock in the evening. The moon fulls in Leo, near the star Regulus, on the 9th, a little after midday, and attains last quarter in Libra at 8 A. M. on the 15th. It is in perigee on the morning of the 9th and in apogee early in the afternoon of the 22d. The coincidence of the perigee with the full moon phase is closer this month than it was in January. This tends to the production of high tides.

The new moon of February will occur just before noon on the 24th.

As the moon runs through the circle of the Zodiac she will in turn pay her respects to the various planets encountered on her way. At midnight on the 4th she will meet Neptune; at 10 P. M. on the 5th she will pass Jupiter, and at 10:36 P. M. on the 14th Saturn will bask in her rays. It becomes the turn of Uranus to meet the swift-footed goddess on the evening of the 15th. Renewing her course in the west, in the last week of the month the moon will pass Mercury, returning sunward on the 24th, and will overtake Venus on the 26th.

GARRETT P. SERVISS.

Antidote for Cyanide Poisoning.

Cobalt nitrate is found by Dr. Johann Antal, a chemist of Hungary, to be an antidote to prussic acid and cyanide poisoning. First he tried the cobalt on animals, and then, presumably at different times, on forty living persons who had been accidentally poisoned by prussic acid, and in all cases the results are reported to have been satisfactory.

Acetylene as an Illuminant.

The hydrocarbon acetylene C_2H_2 is well fitted for acting as an illuminating agent on account of the high percentage of carbon—92 per cent—which it contains, and because of the fact that being an endothermic compound, the heat evolved in its combustion is greater than that corresponding with the number of heat units generated by the oxidation of its constituents. Save in the laboratory, it has not hitherto been prepared in the unmixed state, and its utilization has not been contemplated, as the ordinary methods by which it can be obtained are comparatively costly. Its qualities as an illuminant are, however, sufficiently good to warrant the supposition that various applications may be found for it, should a cheap method of manufacture be devised. A considerable amount of rumor, couched in exaggerated language, has lately been current concerning the production of acetylene on a scale of sufficient magnitude to bring its adoption as an illuminant within the bounds of possibility. The bulk of the reports have been transatlantic in all senses, and too much regard should not be paid to them, but there is nevertheless a certain core of fact in these announcements which may be profitably sifted out.

The subject being eminently topical, Professor V. B. Lewes has taken advantage of it to deal in a popular manner with the various suggestions that have been made for turning acetylene to account, should it prove practicable to prepare it at a cost which would enable it to compete upon equal terms with other combustible illuminants. The dissertation alluded to was read on January 16 before the Society of Arts, and contains, inter alia, a useful recapitulation of the chief properties of acetylene and of its mode of preparation. It has long been known that certain metals, notably those of the alkaline earths, are capable of forming carbides, which when treated with water evolve acetylene, the hydroxide of the metal used being simultaneously formed. Moissan has shown that only a restricted group of substances can be regarded as fixed at the high temperatures which can be obtained by means of the electric furnace, silicides, borides, and carbides being prominent among these, and many such substances have been experimentally prepared by him. That calcium carbide can be obtained in a like manner is a necessary corollary; in addition to this it has been empirically found that the preparation of this substance can be effected with considerable ease. A mixture of powdered lime and anthracite exposed to the temperature of the electric furnace yields calcium carbide, the lime being reduced to calcium at the expense of a portion of the carbon, the remainder of the latter uniting with the calcium; the formula CaC_2 has been assigned to the calcium carbide prepared in this manner. The sp. gr. of calcium carbide is stated to be 2·262. this low figure being due to the fact that calcium is, next to the alkali metals, one of the lightest of the metallic elements. When calcium carbide is brought into contact with water, acetylene is evolved and lime formed, according to the equation $CaC_2+HO=C_2H_2+CaO$; when excess of water is present, the lime resulting from this decomposition is, of course, slaked. It is seriously proposed to manufacture calcium carbide for the purpose of preparing acetylene either for immediate and local consumption as an illuminant, or for distribution from a central station as the enriching agent in ordinary coal gas, or as the chief constituent of illuminating gas of special grade. A yield of 5 cubic feet of acetylene per pound of calcium carbide is claimed, the gas obtained being very nearly pure—98 per cent C_2H_2. The powerful and disgusting odor of acetylene would give warning of its escape from leaky fittings—a point of some moment, as it is undoubtedly possessed of toxic properties. The solubility of acetylene in water—about 1·1 volume for 1 volume of water—is somewhat against ease of handling and distribution, but the gas is a good deal less soluble in strong brine. It can be condensed to a liquid at a moderate pressure, and its transmission in this form would not be more difficult than that of most other gases which are now commercially obtainable.

There are two reasons why hope may be entertained that the utilization of acetylene as an illuminant may be eventually achieved. The first is that a flame of acetylene is greatly more luminous than one consuming the same volume of any other gas. Taking the consumption of ordinary London gas in a common flat flame burner to be 5 cubic feet per hour for a light of 16 candle power, a similar consumption of acetylene in a burner sufficiently suitable for a gas rich in carbon will give as much as 240 candle power. Weight for weight, the comparison is about half as favorable, for a cubic foot of acetylene weighs about twice as much as one of coal gas. The second point in favor of the realization of the proposed use of acetylene as an illuminant is that calcium carbide itself may be regarded as potential acetylene, seeing that the gas can be generated from it by contact with water. Portable cartridges of calcium carbide, properly protected from moisture, could therefore be used to charge reservoirs into which water could be introduced, and acetylene thereby generated and delivered for consumption by its own pressure. An estimate has been advanced as to the cost of producing acetylene, and may be provisionally transcribed. The cost of preparing calcium carbide in the electric furnace is stated to be £4 per ton, corresponding with an estimated price of £3 10s. for that quantity of acetylene which a ton of calcium carbide will yield, due credit being given for the value of the lime obtained as a by-product. The volume of acetylene given by one ton of carbide is 11,000 cubic feet, and the cost of the gas, therefore, works out at 6s. 4½d. per 1,000 cubic feet. The gas won in this manner has, as stated above, an illuminating value of 240 candle power, and compares favorably in price with oil gas of 96 candle power costing 3s. 4d. per 1,000 cubic feet. It must be noted that the difference, which is about 9d. per 1,000 cubic feet, is not large, and would suffer change of sign if the estimated cost of manufacturing calcium carbide were found to be unduly low. The prospect of acetylene displacing other enriching gases must rest upon a better foundation before it can be termed immediate.

The handling and transmission of acetylene are attended by a curious risk. The gas has the property of forming compounds with several metals, such compounds—acetylides—being eminently explosive. Copper and brass pipes would be liable to yield copper acetylide from this action of acetylene conveyed through them, and to become coated with a detonating film. No similar tendency has been observed with the commonest materials for gas pipes, namely, iron, lead and tin. The precise methods that may prove to be feasible for distributing acetylene as an illuminating gas can only be foreshadowed. One obvious means consists in mixing the gas with air in much the same way as that used for "air gas," made by saturating air with the vapor of a light liquid hydrocarbon, and using the mixture direct as an illuminating gas of high candle power, but not of such richness as to be liable to burn with a smoky flame. Some danger may attend this course, as gross carelessness in adjusting the proportions might result in the production of an explosive mixture. A second, and in some ways preferable arrangement, would be to enrich common coal gas with acetylene in place of gas from cannel or of enriched water gas. The addition of the acetylene could be effected either at the gas works or on the premises of the consumer, who would utilize a local reservoir of calcium carbide. In all these cases acetylene would of course compete with older methods of enrichment, and its cost of production is the only factor that need be seriously considered. Discussion thereupon is useless at present, further and more independent data than those quoted above being requisite for arriving at a valid estimate.

A better chance of putting acetylene to a practical use is afforded by the growing need in many places, and for numerous purposes, of a self-contained source of gas of high illuminating power. The bare fact that a portable solid substance can be caused to generate a gas of the required quality by mere contact with a sufficiency of water suggests numerous applications of this order. Lights of vehicles of all descriptions, including railway carriages, where compressed oil gas might be replaced by calcium carbide and water, signal lights and buoys in positions to which access is necessarily intermittent, and the domestic supply of isolated houses, give considerable scope for a material fulfilling the essential conditions of simplicity, certainty, and safety in use. For purposes of this kind, the question of cost is altogether subsidiary, and the rivals with which a new illuminant would have to compete are themselves handicapped by many disabilities. Should failure attend the more ambitious scheme to use acetylene as a general lighting and enriching agent, a fair measure of success may be secured in the less grandiose direction.—The Engineer.

New Forms of Ice Yachts.

Considerable time and money are being expended this winter in testing new designs for improving the speed and efficiency of ice yachts. The scientific principles involved in the work make it a very interesting line of investigation. The earliest form of ice yachts consisted of a box made of rough boards about 7 feet long and 4 feet wide, provided with three runners and a low-peaked sail. The runners were about a foot in length and were shod with rough iron bands, turned up in front. This form, however, was discarded forty years ago. The next improvement consisted in adding a set of runners about 3 feet in length, shod with smooth, sharp irons. The sail was next replaced for one which was more peaked, and in time a jib sail was added. Next came the use of four runners, arranged in pairs.

During the past ten years all the ice yachts have been of the three-runner type, and formerly where the frames were built to carry ten people they now accommodate but two. The wooden yachts are built on the cockpit plan, and consist simply of several straight parts known as keel, on which are attached the cockpit, runner plank, and spars. The runners of the modern yachts are very expensive. They are packed away carefully in boxes when not in use, to keep them clean and bright. They are made in a peculiar shape, the top being formed of oak and the shoe of cast steel, bolted securely to the wood. A set of runners weighs from 200 to 500 pounds, and costs from $50 to $200. Ice yachting has come to occupy in recent years a position of great prominence. On the Hudson and the Shrewsbury Rivers, where the winter regattas are usually held, many thousands of dollars are invested in ice yachts of a surprising variety of sizes and designs.

Mouth Hygiene.

The care of the patient's teeth is a matter too often neglected by the medical adviser, principally no doubt because of the important position the dentist now occupies in relation to every well-to-do family. The vast majority, however, of those seeking medical advice never go near a dentist unless for the purpose of having a root extracted. School children, the inmates of homes, asylums, prisons, and even hospitals are shamefully neglected in this particular. In most public institutions not only is the tooth-brush unknown, but it is almost an impossibility to secure proper cleaning of the teeth even in those taking mercury, for instance, where the danger of salivation is much increased by this neglect. Many institutions have gentlemen of the dental profession connected with their boards, but the teeth are much more apt to be overlooked than any other portion of the economy, and their every-day toilet slighted. It is, indeed, not an uncommon experience to find those who in health never omit the morning brush, go for days and weeks together without proper mouth cleaning when they are sick—the time above all others when the brush is most required. Of course, if the patient is too ill, an antiseptic mouth wash may replace it in a measure. A little volume of popular essays on the care of the teeth and mouth has just been published by Victor C. Bell, A.B., D.D.S., and we mention it here, not because of any new ideas or theories it embodies, nor because of its literary merit or beauty of illustration, for many things are more attractive than casts of irregular teeth and pictures of false sets. Such information as it contains, however, is most important for all to know, and if the advice given were followed, many a pain would be spared and many a tooth saved.

The proper care of the teeth of school children is receiving more attention in England than it formerly did, and no little credit is due to Dr. Cunningham, of Cambridge University, for his efforts in behalf of school children's teeth and his contributions on this subject to the Seventh International Congress of Hygiene and Demography, and his essay on oral hygiene, for which he was awarded the gold medal prize at the International Dental Congress held in Chicago during the World's Fair.

This gentleman says that parents and schoolmasters pay so much more attention to the quality of the child's food than they do to an efficient dental mechanism for its mastication, because of their ignorance of its importance and of the advantages, both economic and educational, to be derived from adequate attention to the teeth.

In speaking of tooth powders he says, "The principal action should be mechanical rather than medicinal. The power should be very finely grained and should contain no cuttle-fish powder, no powdered oyster shells, no pumice powder. It should consist of alkaline substances and contain no acid ingredients, nor such as are capable of changing to acid in the mouth. All fermentable substances such as carbo-hydrates are contra-indicated." He agrees with Miller, that precipitated chalk should form the basis of a powder, and also recommends a dash of neutral or slightly alkaline soap. He also considers a tooth soap preferable to tooth powder.

The physician needs not to be told how great is the necessity to the economy of sound teeth, nor need we enumerate the pathological conditions traceable to their decay; but all must admit and regret the shocking lack of general information upon this important subject, and the need for instruction, especially in the schools. We commend therefore the diffusion of knowledge concerning teeth, and if the woodcuts of artificial upper dentures, interdental splints, cleft palates, obturators, and drills contained in Dr. Bell's book will have the effect of frightening people into an early visit to a dentist, and if infants will gaze upon irregular dentition as depicted upon page 61, and never after suck their thumbs, much will have been gained for the cause of mouth beauty as well as mouth purity.—Medical Record.

Divided Lens Telescopes.

A Chicago man has lately brought forward the idea of making refracting telescopes of very large size—object lens, say six or more feet in diameter—by setting a number of small lenses in a frame, and grinding all down to a common focus.

This plan of making a divided lens is very old. It was illustrated in the SCIENTIFIC AMERICAN of August 16, 1873.