

miles additional—eleven miles in all. The soil is admirably suited to the work, while the route is almost a straight line. This road will doubtless enjoy the largest and most remunerative traffic of any city railway in the world, as it passes directly under a thoroughfare which is at once the business heart of the city and the central line of travel. Arrangements for the construction of this road are now in progress.

**SNAKE POISONS.**

Twenty thousand people, it is stated, yearly die, in Hindostan alone, from the effects of the bites of venomous serpents. It is a strange fact that this poison, so deadly and virulent in its effects, may be swallowed with impunity. Its action seems to be the complete paralyzation of the nervous centers through the medium of the blood, in which it spreads through the body with lightning rapidity. Applied to the mucous membrane it causes violent local inflammation; and absorption quickly taking place, the symptoms of general poisoning are soon apparent. The effects of the venom depend, first upon the nature of the snake, the quantity and quality of the poison, and the circumstances under which the bite is given; second, on the species, size and vigor of the living creature receiving the wound.

M. Fayer, professor in the Medical College of Calcutta, has recently published a work on the serpents of India, in which, referring to the action of the virus upon the blood, he says that, though he has been unable to detect any change in the appearance of the corpuscles, yet there is no question but that some alteration takes place. In inferior animals the bites of vipers destroy in the blood the coagulating faculty, while, on the other hand, by the venom of colubrines, coagulation after death is not interrupted. Again, when inoculated by the poison of the cobra, the blood immediately coagulates, but remains liquid if the bite be given by the daboia. Experiments made in this country with the rattlesnake show that the effects of its venom upon the human blood are quite apparent. Dr. Burnett, in a paper read some time ago before the Boston Natural History Society, gives an account of a microscopical examination, during which the smallest quantity of poison, taken from the fangs of a large rattlesnake, was presented to blood freshly drawn from the finger. A change was immediately perceived; the corpuscles ceased to run and pile together, and remained stagnant, without any special alteration of structure, and the whole appearance was as though the vitality of the blood had been suddenly destroyed, exactly as in death from lightning. This agrees, also, with another experiment, performed on a fowl, where the whole mass of the blood appeared quite liquid, having little coagulable power.

Analyses of cobra poison have lately been made by Mr. Henry Armstrong, of London. The matter, extracted from full grown serpents, was forwarded from India in small vials, and appeared to be a brownish, sirupy liquid; from which, when the vessels were uncorked, a quantity of gas escaped. Examinations were made, first, of the crude substance, second, of the precipitate caused by the addition of alcohol, and finally of the residue obtained by evaporating the filtered spirits, with the following results: The raw poison evaporated with sulphuric acid in *vacuo* deposited a friable mass which contained 43.55 per cent carbon and 13.43 per cent nitrogen. The white precipitate dried with sulphuric acid, under similar circumstances, appeared as a pale brown substance, easily pulverized, and leaving, after incineration, a light mineral residuum. It contained 45.3 per cent carbon and 14.7 per cent nitrogen, and also 2.5 per cent of sulphur was determined. The alcoholic solution, similarly evaporated, left a light brown friable mass, composed of 43.04 per cent carbon, 12.45 per cent nitrogen, and 7 per cent hydrogen. It was found impossible to crystallize the poisonous substance, neither water, alcohol, ether, bisulphide of carbon, or any other dissolvent employed leaving the slightest trace of crystals after evaporation. Nitric acid and alcohol determined a coagulum; heat produced the same effect. The salts of copper and potash caused the violet color characteristic of the presence of albuminoid matter.

The liquor, it appeared, resisted decomposition and maintained its activity even after being kept for considerable time, and the characteristics of the poison were noted to be equally powerful in all the three states above mentioned.

M. Fayer considers that to cobra poison may be ascribed a nature similar to that of vaccine virus, and believes that much may be discovered by extended experiment. He says that viper venom acts directly on the blood and secondarily on the nervous system, and adds that it may be that, by careful and reasonable employment, this powerful poison may be converted into a useful remedy, and that there is nothing to prove why, by extended experiment and study, a complete and prompt antidote may not be found.

From all accounts it appears that the rattlesnake (*Crotalus durissimus*) indigenous to this country is endowed with a poison even more virulent than that of the cobra or viper. There is reason for belief that its action is the same upon all living things, vegetables as well as animals. It is even fatal to the snake itself; and we find it stated that, on being irritated while confined in a cage, the animal has been known, in moving suddenly, to strike its own body, and to die from the wound as quickly as would any other creature. A remarkable physiological fact is here presented of a liquid, secreted directly from the blood, which proves deadly when introduced into the very source from which it was derived. Serpent poison acting as a powerful sedative, active stimulants are probably the best antidotes. Hence, in parts of the United States infested with venomous reptiles, it is the practice to administer large drafts of whisky, or to chew and swallow tobacco. The liquor stimulates the nervous system until the depressing effect of the poison is overcome by nat-

ural curative action. Tincture of iodine externally applied and administered by hypodermic injection into the cellular tissue near the wound is said to be of considerable efficacy, and in advanced cases chloride or iodide of potassium, largely diluted with water, is given in addition. Sucking the wound immediately after being struck often delays the spread of the poison. The negroes in the South favor an odd remedy, which consists in killing a chicken, splitting it in the back, and bending the warm flesh directly over the bite. They believe that the poison attacks the fowl in preference to transfusing itself through the human body. The Mexicans and Indians use a plant which they call the *golondrina*, which Dr. Torrey on examination pronounced a species of *eu-phorbium*. Botanically it is known as *e. prostrata*; and we find it described as a plant of frail, delicate appearance, somewhat like the gold thread, and having long, reddish stems that spread and interlace with each other. Its flowers, which appear from April to November, are very small and white, with dark purple throats. They are axillary, and have four petals and four sepals. All parts of the plant contain an abundance of milky juice in which the medicinal properties reside, and which is extracted by bruising the portions in a mortar. A considerable quantity of water is added and several ounces of the mixture administered to the injured person. The plant grows plentifully in dry gravelly places, by roadsides and in farm yards. The remedy, which acts as an emetic and cathartic, is said never to fail in a cure and to be attended with no danger in its administration.

**TO EUROPE IN A BALLOON.**

To accomplish this has long been the favorite project of the well known aeronaut Mr. John Wise, and for the past twenty years he has kept the matter before the public. During this period, he has made a large number of balloon ascensions, and gathered, as he believes, indubitable evidence of the existence in the aerial regions, at a height of from one to two miles above the earth, of a constant easterly wind current, and has alleged that if proper efforts were made it would be practicable, by maintaining a balloon within this current, to pass easily and speedily over from this continent to Europe. In 1859 Mr. Wise undertook a preliminary land voyage, and succeeded in moving in an easterly direction for a distance of some twelve hundred miles—to wit, from St. Louis, Mo., to Jefferson county in this State. But the results of that excursion appear to have dampened the interest of financial people, and the daring balloonist has, until quite recently, been unable to find anybody who, for the sake of science or any other consideration, was willing to risk the expense of a few thousand dollars for another trial.

We are glad, however, to be able to chronicle the fact that the Messrs. Goodsell, the enterprising publishers of the *Graphic* daily illustrated newspaper in this city, have pledged themselves to supply all the funds necessary for a new flight to Europe; and in a few weeks from the present time, as soon as the balloon can be manufactured, Mr. Wise will be again in the air.

Our readers are no doubt familiar with the form of contracts for building houses, ships, railways and various kinds of machinery; but probably they have never read the details of a contract for the building of a balloon and a voyage therewith to Europe. We will therefore give the text of the bargain between Messrs. Goodsell, the financial parties to the contract, and Messrs. Wise and Donaldson, the aeronautic directors of the expedition:

**CONTRACT FOR THE CONSTRUCTION OF THE GRAPHIC COMPANY'S BALLOON, AND ITS NAVIGATION FROM NEW YORK TO EUROPE.**

This memorandum of agreement, made at the city of New York, the 27th day of June, 1873, by and between The Graphic Company, proprietors and publishers of the *Daily Graphic*, party of the first part, and John Wise, of Philadelphia, party of the second part, and Washington H. Donaldson, of Reading, Pa., party of the third part, witnesseth:

That the said The Graphic Company will build a balloon of not less than 130 feet in height and 100 feet in diameter, and will fully equip and provide the same with valves, balance line, ropes, car and gallery, life boat or raft, and all other appliances necessary to insure strength and safety in so far as may be practicable. It agrees that the construction of the same shall be commenced at once and pushed to completion as rapidly as possible, and before the 20th day of August next if practicable; and the said The Graphic Company will furnish the use of said balloon to said John Wise and said Washington H. Donaldson for the purpose of the making of an aerial voyage therein by the parties of the second and third parts from the city of New York to some point on the eastern side of the Atlantic Ocean upon the conditions following:

First. That the said John Wise and the said W. H. Donaldson shall personally superintend and direct the construction of the balloon according to the utmost of their skill and judgment, and that in all matters connected with the construction of such balloon they shall be subject to the general direction of The Graphic Company.

Second. That the said John Wise and the said W. H. Donaldson shall not make nor participate in any other balloon enterprise, exhibition, or ascension while this agreement is in existence.

Third. That on the completion of the said balloon the said John Wise and the said W. H. Donaldson shall, on a day and from a starting point to be selected by The Graphic Company, make a public ascension in such balloon, accompanied by such other persons as may be designated by The Graphic Company; and making such ascension, that they shall, directly and without any delay or evasion, seek the elevation of the eastern air current, there to remain until land shall have been made on the eastern side of the Atlantic Ocean.

Fourth. That the said John Wise and said W. H. Donaldson shall then land said balloon as safely and expeditiously as possible, and immediately thereafter communicate the intelligence of their arrival, with full particulars of the voyage, by the most speedy means available, to the *Daily Graphic*.

(Signed) JAMES H. GOODSSELL, C. M. GOODSSELL, Managers of The Graphic Company. JOHN WISE, WASHINGTON H. DONALDSON.

The foregoing preliminaries having been duly settled, the work of construction was begun on the very next day, June 28th, and will be pushed forward rapidly to completion. The editor of the *Graphic* says: "Although it is impossible to fix definitely the day of departure, yet we are confident that everything will be in readiness before August 20 next. We have lent our aid to the undertaking in the interest of science and business, and the progress of mankind. The balloon will not be exhibited to the curious to make a sensation, but, as soon as it is finished, will take its flight. We have reason to believe that the public will not be disappointed or dissatisfied either with the method of the undertaking or the manner of its performance.

"It is needless for us to enlarge upon the benefits which will result from the success of this enterprise. They may be easily imagined, if they are not obvious at once. The discomforts, the risks, the cost, and the perils of the ordinary ocean voyage are familiar enough. The path across the ocean has been paved with human bones. Millions of treasure have gone down beyond recovery. To demonstrate the practicability of aerial navigation is to revolutionize the business and communication of the world. To demonstrate its impracticability, even, would be a positive gain; but once sail to Europe through the air in sixty hours, once acquire practical mastery of the methods of navigating the air and the difficulties of the route, and there is no telling what grand results may follow."

Of all newspaper dodges to attract interest and induce large sales, this "Balloon to Europe" affair beats all. The pictorial representations of the progress of manufacturing the great machine, its inflation, trial, and final departure, will be fruitful themes for the artist's pencil, and the voyage, if successful, will supply an extensive series of *Graphic* illustrations, of "Life in the Clouds," exceeding in interest everything of the kind before produced. The steam presses of our enterprising cotemporary will have to be several times duplicated and run night and day for many weeks in order to supply the public demand.

The balloon is now being made in the lofts of the Domestic Sewing Machine Company, corner Broadway and 14th street.

In a letter to the *Graphic*, Mr. Wise says:

"The balloon proper will be a spheroid of 100 feet transverse, and 110 perpendicular diameter. The supplemental balloon will be a spheroid of 36 feet diameter. These, with allowance for expansion of gas, will give us a lifting power of 15,900 pounds, and a net carrying power of 9,500 pounds, and of disposable ballast, 7,500 pounds. Our floats will not lose by exosmose of gas over 15 pounds per hour, and that will enable us to keep afloat 20 days. But allowing a liberal margin for the free escape of gas in the higher and rarefied regions of the atmosphere, we may still calculate safely for a ten days' buoyant power; and if deemed necessary, we can dispose of the boat and gallery, and thus restore a buoyant force of 1,200 pounds, which would serve us for several days more; so that, under the most adverse circumstances, we can hardly fail to reach the European shore.

"We shall carry a boat more for the purpose of providing for a contingency that may possibly arise, from any damage to the main balloon, but one that we have little cause to apprehend. The boat will be stored with water and provisions to serve for thirty days. Our kind friends are thus assured that we are not foolhardy, seeing that we shall provide against all and any contingencies that are likely to possibly arise.

"Our main reliance is on the great eastward drift of the trade wind. We do not pretend that, in this first experimental voyage, we shall be able to make a given point on land, but we have an eye to the Gulf Stream, the great warm river in the ocean, which forms above it, in the ocean of air, a corresponding aerial river that will float us to the coast of Ireland."

The editors of the *Graphic* announce that the balloon will have passenger room for eight or ten persons, and the choice few who wish to take part in the expedition may now call at the captain's office, 41 Park Place, and purchase their tickets.

We recommend those who are tired of life, who have made their wills, who have no one dependent upon them and whose friends would be glad to be rid of them, to prepare carpet bags and go. The chances of their return to earth in a condition suitable for further usefulness, we regard as extremely slim. When Mr. Wise made his great voyage from St. Louis, he had twelve hundred miles of land to pass over, and descended before reaching the sea. By starting from New York, this long stretch of overland travel will be saved, and in a very short time after cutting the rope he will be wafted out over the trackless deep, provided he seeks and gains the high easterly current aforesaid.

The balloon which he proposes will, we believe, be the largest ever made. That of M. Giffard, used in London in 1869 for elevating passengers at Ashburnham Park, by means of rope and reel, was 93 feet in diameter, and held 425,000 cubic feet of hydrogen gas. It was made of three thicknesses of linen, cemented with rubber and varnished with shellac. Cost \$10,000. It was capable of lifting 25 persons besides the cable by which the balloon was drawn down after every ascent, steam power being used. The cable weighed 4,350 lbs., and was 2,150 feet in length.

**THE GREAT BALLOON VOYAGE OF 1859.**

We will now give a history of the great voyage made by Mr. Wise, in 1859, from Missouri to New York, as published in our paper at that time:

[From the SCIENTIFIC AMERICAN of July 16, 1859.]

"The veteran aeronaut, Mr. John Wise, has long entertained the idea that a successful balloon voyage across the

(Conclusion on page 41.)