Improved Transportation of Fresh Fruit.

A recent shipment of fresh fruit from California to Philadelphia introduces a very promising improvement in the transportation of such perishable commodities. The car contained grapes, plums, peaches, and apricots packed in carbonized wheat bran; an inexpensive packing, which is claimed to preserve fresh fruit for long periods, making possible their transportation across the continent as "slow freight," at a saving of $600 a car load in freight charges.

Correspondence.

Flat Cast Iron Boiler Heads.

To the Editor of the Scientific American:

In your issue, dated July 2, is an article headed "Boiler Explosion Notes," referring to the explosion at Messrs. Gaffney & Co.'s works, Philadelphia, in which you indicate that "the jury rendered an erroneous verdict, and did not avail themselves of the means at their hands to verify practically the correctness of their conclusions."

The treachery of flat cast iron boiler heads has been practically proven and verified by the numerous explosions they have caused, and the trouble has been that in many cases the true cause of the explosion has not been traced to the flat boiler head, but other reasons given, such as low water, overpressure, etc. After having noticed many such cases in the year 1865, I published in Philadelphia papers and also in my Pocket Book the principal causes of steam boiler explosions, of which one was as follows:

"5th. It is a very bad practice to make boiler heads of cast iron, composed of a flat disk of from two to three inches thick, with a flange of from one to two inches thick, with cast rivet holes. The first shrinkage in the cooling of such a plate causes a great strain, which is increased by riveting the boiler to it. Any sudden change of temperature, therefore, either in starting or putting out the fire, might crack the plate and thus occasion an explosion. Such accident may be avoided by making the cast iron head concave and of even thickness."

The same has been published in my "Treatise on Steam Engineering." These books are well known by the Hartford Boiler Insurance Company, which, moreover, ought to have more experience than I have in the treachery of flat cast iron heads. You say: "The jury had the opportunity of submitting the remaining boilers to a thorough test, and of determining on the spot, in the most convincing manner, whether the inspectors whom they complain of had really been remiss in their duty, and whether the jury's notion that flat cast iron heads are unsafe was really correct."

Such an experiment would have been of no practical use, for the jury would probably have found that the shell of the boiler bursted without injuring the head. The exploded boiler was submitted to hydrostatic pressure by the boiler inspector, who found it strong enough for that purpose, and if he had put on sufficient pressure the shell would probably have bursted first. It is not the pressure alone in the boiler which causes the head to burst, but principally the strain in the iron caused by change of temperature.

It is true, as you say, that "flat cast iron boiler heads are used on hundreds of boilers in all parts of the country, and many years' trial has proved them to be safe and serviceable." A flat cast iron head may be much stronger than a concave wrought iron head, but the mischief is that we have no means of knowing when it is good or bad, for its internal condition cannot be seen from the outside; it may be full of air holes and overstrained by shrinkage, so as to make it burst before it is put into the boiler, of which there have been examples.

The most eminent engineer in Philadelphia defends and approves cast iron heads, and he has a theory to anneal them, as is done with carwheels, which would no doubt remove most of the shrinkage strain, but it would not remove the airholes, nor would it equalize the uneven temperature which the boiler head is subjected to. The strain on a car wheel is of an entirely different nature from that of a boiler head, and if his theory is adopted, there will be more "practical experience" in steam boiler explosions.

In one case, a boiler with flat cast iron heads exploded after the fire had been drawn out and the steam pressure reduced far below its normal working pressure, which explosion killed, if I remember right, six men.

With the above considerations, Mr. Editor, I am convinced that the verdict of the jury was a just one, and the wholesome effect it produced is realized by the fact that the Hartford Boiler Insurance Company has now ordered their boiler inspectors in Philadelphia not to insure boilers with flat cast iron heads over 30 inches in diameter. After the company gets more "practical experience" in boiler explosions with flat cast iron heads I hope they will reduce that diameter to 15 inches. In old times, flat cast iron boiler heads were made of charcoal iron, which is much stronger and less liable to strain by shrinkage than is anthracite iron Charcoal iron also flows more solid in castings and has less air holes than anthracite iron. You say in the article above referred to that "from all the information we can gather it seems pretty certain that the explosion was due to an overpressure of steam," etc.

I assure you, Mr. Editor, that the informations published in the papers about this explosion are in the main unreliable. The safety valves were in good order and did not blow off steam before the explosion, and it was testified in the coroner's inquest that the steam was far below its normal pressure shortly before the explosion. The boiler head evidently burst by shrinkage or expansion strain in the casting.

JOHN W. NYSTROM.

1010 Spruce street, Philadelphia.

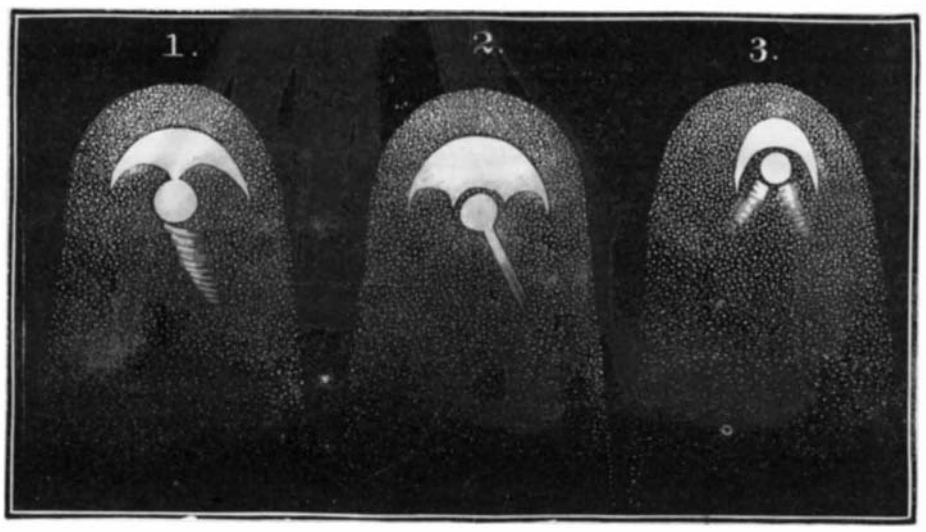
Telescopic Views of the Great Comet of 1881.

To the Editor of the Scientific American:

The accompanying sketches are telescopic views of the comet now adorning our northern heavens. Only the head of the comet is here represented, showing the appearance of the nucleus and coma, and the changes which were observed on the dates mentioned.

Fig. 1. shows the head of the comet as seen on the evening of the 24th ult. The nucleus was round, bright, and of an intense ruddy hue, to the naked eye appearing as bright as Mars. In front of this was a rather slender crescent, less bright, apparently connected to the nucleus, as shown in the sketch.

Fig. 2 shows its appearance on June 26. The nucleus was less bright than on the last observation, with a peculiar flame-like appendage issuing therefrom in a direction opposite from the sun. The crescent had taken the form shown in the engraving.



On July 1 the comet had taken the form shown in Fig. 3. The crescent form was much contracted, was not concentric with the coma as on former occasions, and two faint rays were seen to issue from the nucleus. These changes show great activity, and will doubtless continue, although not in so marked a manner, for same time to come.

WILLIAM R. BROOKS.

Red House Observatory, Phelps, N. Y., July 11, 1881.

Early Observations of Comet 2, 1881.

To the Editor of the Scientific American:

Who first, in this country, saw the great comet now gracing our northern heavens is a question of interest. From recent observations, in verification of a belief expressed at the time of the comet's announcement, it seems conclusive that very early *telescopic* observations were obtained of the northern end of the comet's tail at my observatory, namely, on the mornings of June 18 and 19 at 2 o'clock.

On the above dates I was sweeping for new comets—as has been my custom upon every favorable night for several years—when at about 2 o'clock I pointed my telescope close down to the horizon for a sweep through the northeastern sky, when, at a point between Capella and Beta Aurigæ, I encountered a misty beam of light. I at first supposed it to be a branch of the Milky Way, but although there were many telescopic stars in the field there was a continuity about the light which attracted my attention. It was brighter on the 19th than the morning previous, which I attributed at the time to a clearer atmosphere, not then suspecting its true character. I am now strongly convinced that it was the northern or upper end of the comet's tail, seen some days before the head had risen far enough to become visible in this country. Its position was about R. A. 5 hours 25 minutes, north declination 45°. The comet's position at announcement, on June 23, would agree very well with this place at the dates mentioned, namely, the 18th and 19th inst.

My verification of this opinion has been delayed by an unfavorable sky—a low bank of misty clouds completely hiding for many days the region of Auriga. But on the morning of July 4, also on the morning of the 7th, the opportunity for which I had been watching came. A clear sky in the vicinity of Capella permitted a careful search, when the beam of light previously seen had *entirely disappeared.*

I have waited for a third observation, but the moon at present interferes. Fortunately the *absence* of this beam of light from the place named can be verified by an examination at any future time; and its absence must, I think, convince every candid mind that a telescopic view was obtained by me of the comet's tail as early as the mornings of June 18 and 19.

Dense misty clouds, which soon gathered in the northeastern morning sky, prevented me from detecting its true nature at that time, and seeing more or less of the entire comet rise.

WILLIAM R. BROOKS.

Red House Observatory,
Phelps, N. Y., July 13, 1881.

The Florida Drainage Scheme.

Mention has already been made of the gigantic scheme for the drainage of the Florida Everglades undertaken by certain Philadelphia capitalists. According to a report by the engineer of the company, the country to be opened to cultivation covers over 17,000 square miles, lying about and to the south of Lake Okeechobee. The land reclaimed will embrace every class of Florida land, including "high and low hammock," "first, second, and third rate pine," and "swamp lands," and under the terms of the contract between the company and the State of Florida one-half of the 8,000,000 acres to be reclaimed by the lowering of the lake waters will revert to the company. Valuable deposits of hematite ore and marl are also reported.

Lake Okeechobee is described as the grand inland reservoir for the waters of middle Florida, having no natural or direct outlet. The principal feeder to it is the Kissimmee River, which pours in a constant supply of 207,360,000 cubic feet of water every twenty-four hours. The amount of evaporation from water surfaces exposed to sun and wind is set down in the books at the rate of from one-eighth to three-eighths of an inch per day, according to conditions. Lake Okeechobee having an area of 1,000 square miles, the evaporation from the surface of the lake aggregates at the lowest rate 290,400,000 cubic feet of water, which is more than one-third in excess of the supply from the main feeder. During the ordinary seasons, and particularly during periods of drought, the level of the water in the lake is lowered, the surrounding land becomes in a measure passable, and large herds of cattle obtain excellent pasturage in the savannas and swamp lands of the interior. Then when the rainy season comes, four months in the year, the waters of the lake gradually rise, overflow the immense tracts of sugar land, the soil of which is identical to that of Cuba, and back up the waters of the rivers emptying into the lake.

It is the purpose of the company just formed to permanently lower the surface of Lake Okeechobee, which, according to the United States survey of 1879, is twenty-five feet above mean low tide, by constructing a drainage canal twenty-one miles in length to the St. Lucie River at a waterfall of one foot a mile. This plan is similar to that recommended by Colonel Meigs to the National Government in 1879. In the proposed canal this waterfall will give a velocity of two and two-thirds miles per hour and a capacity of passing 733,708,800 cubic feet in twenty-four hours.

Three steam dredging machines of the Menge patent, constructed on the continuous ladder principle and resembling the buckets in a grain elevator, are now being put together at Jacksonville, the hulls being already in shape. Each dredge will be capable of making a clean cut of twenty-two feet in width. The dredges will be lashed in pairs, so that at one operation they will open a canal forty-four feet wide. To dig the canal from Lake Okeechobee to the St. Lucie River will require the excavation of 9,000,000 cubic yards, which, at a rate of two cents a yard (the Menge figure), will amount to $180,734, and at an outside figure of five cents a yard will amount to $451,336.

In addition to this canal it is the design to build another canal from Lake Okeechobee to the Caloosahatchie River, emptying into the Gulf; also to deepen and straighten the streams emptying into Lake Okeechobee, to dig lateral canals or ditches, and at various points to tap the ridge separating the saw-grass marshes from the Atlantic and the Gulf, thus draining the remotest sections of that great region.

MISCELLANEOUS INVENTIONS.

Mr. Edwin Thacher, of Pittsburg, Pa., has patented an improved bridge-truss. The object of this invention is to overcome the defects common to a greater or less extent in all forms of triangular or quadrangular truss now in use.

Mr. George Brucker, of New York City, has patented a nickel-plating fluid composed of a saturated solution of pure nickel in nitric acid, and of hyposulphite of soda and cream of tartar.

An improved slide for guard chains which can be adjusted very readily and can be used with chains of any desired thickness, has been patented by Mr. Lewis H. Sondheim, of New York city. It consists in a casing provided with a hinged or removable side and with a longitudinal partition dividing the casing into two compartments provided with springs for pressing the chain passing through the compartments against the opposite side of the casing, by which this casing is held on the chain in the desired position.