Correspondence.

Discovery of Two New Comets.

A NEW COMET BROOKS.

To the Editor of the SCIENTIFIC AMERICAN:

I have the honor to announce to the readers of the SCIENTIFIC AMERICAN my discovery, at two o'clock this morning, of a new comet in the southeastern sky. It is situated on the border of the constellation Hydra, and its position at discovery was right ascension 9 hours 51 minutes 50 seconds; declination south 17° 40', with a northerly motion. The comet is round, quite large, and moderately bright telescopic.

WILLIAM R. BROOKS.

Smith Observatory, Geneva, N. Y., November 22, 1895.

A dispatch from Geneva dated November 28 states that Prof. Brooks secured another observation of his new comet on that date after six days of cloudy weather. Its position is 9 hours 29 minutes 30 seconds, and declination south 47 minutes. The comet is moving northward into the constellation of Leo.

A telegram received at Harvard College Observatory, November 17, announces the discovery of a bright comet by Prof. Perrine, of the Lick Observatory, at San José, Cal.

The position of the object is as follows: November 17, 0·06 Greenwich mean time, right ascension 13 hours 44 minutes; declination north 1° 40'.

The comet has a short tail and a stellar nucleus of about the seventh magnitude as seen in the morning twilight.

The Perrine comet was also observed on November 28 by Prof. Brooks; its position being 14 hours 14 minntes, declination south 5° 15'. It is moving southward and growing brighter.

Fireproof Buildings.

To the Editor of the SCIENTIFIC AMERICAN:

I was forcibly impressed with your article on the "Defects of Fireproof Buildings," published in the SCIENTIFIC AMERICAN under date of November 23, and especially was I interested in the details given in the construction of the Manhattan Savings Institution building, now in ruins.

This latest among the horrors (the work of man's best friend when controlled, but worst enemy when uncontrolled) is but another evidence of the short sight of our most progressive men. They rear their lofty fireproof (only in name) palaces regardless of expense and think every contingency against disaster is provided for, when lo! they wake to the realization that some vulnerable and exposed feature has been entirely overlooked after the fire has consumed their boasted fireproof structure. It does seem that some system ought to be found that would be a positive and never failing proof against an attack of fire from the outside, and such a scheme being effectual would prevent ninety per cent of the destruction by all conflagrations

Now there is a simple, logical, and undeniable fact, which is no less than this: Water will not burn and it cannot be heated when exposed to the atmosphere to more than 212°. Suppose the windows on a brick building were covered with double galvanized iron shutters, open at the top, with outside sheet one-half inch shorter or lower than the inside, and suppose they were filled with water when danger threatened, and kept filled even during the fiercest fire that could be thrown against them. How could the fire get inside that building? You could put your hand on the inside of such a shutter at any time during a fire that consumed the next building. To get the water in such shutters and keep up the supply is an easy matter. A tank on the roof or a connection with any water main or steamer through a system of pipes laid in the walls and either over every shutter when shut or through properly constructed hinges, would meet the case. Where millions are spent in the erection of what are otherwise mainly fireproof buildings, it seems like folly to neglect such simple precaution as would be a positive barrier to fire entering by windows on the outside.

To illustrate the manner in which practical men view the ideas of other men, I relate this instance: Some twenty years or more ago the writer was impressed with the facts as above stated, and called upon the head of the house in your city which furnishes most of the ironwork for buildings and stated his plan for a positive fireproof shutter. The old gentleman listened with attention and turned to his desk again, dismissing the subject entirely with the remark, "It is no good, they would freeze up in the winter." He did not wait to hear me say that I did not propose to let water in them until there was danger of fire.

If I ever build a brick building in the city, it shall have such shutters on the windows.

D. H. WYCKOFF.

Asbury Park, N. J., November 25, 1895.

AMONG the deep coal mines in Europe is one at Lambert, Belgium. Depth, 3,490 feet.

A Warning to Fat People.

A Berlin professor has just discovered that for fat persons to employ any means whatever to reduce their flesh is likely to injure their health and shorten their lives. The Literary Digest quotes the abstract of the professor's article, with comments thereupon.

"Fat men, do not try to make yourselves thin. It is thus that Professor Eulenbourg, of Berlin, adjures you in one of the last numbers of the German Medical Weekly. It is not that he would advise you to persist in your obesity, but he has discovered that all the means that you may employ to be rid of it would have the effect of ruining your health, and even shortening your life. Against all these he would place you on guard. For example, he is indignant that permission should be given to German druggists to sell, without an order, to the first comer, tablets and potions which might perhaps cure obesity, but which injure the organism and produce grave troubles of the nerves and the blood, for all of them contain some poison, and it would be much better to be fat and healthy than a lean valetudinarian. Among other examples of the disastrous effects of the cures of obesity, Dr. Eulenbourg cites the case of a well known dramatic artist, who, not content with the opulence of form which Nature had given him, became so thin that he died in consequence. But it is not the treatment alone that is dangerous. Scarcely has the man the opportunity to enjoy his diminishing obesity, before disquieting symptoms begin their appearance, his humor alters, he becomes nervous, impressionable, and from day to day he has no more the feeling of being in his natural state. . . .

"It seems to be clearly proved that we cannot make ourselves thin with impunity. Nature creates the fat and the lean, and it is the part of wisdom for one and the other to resign themselves to their condition. But just here humanity seems to fail, and it is to be feared that the most serious discoveries, as well as the most dangerous advertisements, will fail to prevent people who are too fat from making themselves thin, no matter how. Why did not Professor Eulenbourg, instead of discovering the dangerous chemical properties of the remedies for obesity, try to discover that obesity was graceful, and more beautiful than the opposite state? Upon this condition alone would his advice be heeded, And after all, who can prove the æsthetic superiority of the thin over the fat? That's but a matter of fashion, the result of a new taste, that may change from one year to another. Is it not time to honor the ancient ideal of fat beauty? Would it not prevent the disastrous effects of all the remedies for obesity?"

Electric Railway Losses.

Professor Hermann S. Hering, of Johns Hopkins University, contributes to the Electrical World of November 9 a timely and valuable paper on the above subject.

The figures which he quotes are the results of an elaborate series of tests, which were carried out on a strictly scientific basis. They are certainly very startling; and those which deal with the question of losses resulting from the ignorance or carelessness of the motorman show once again how important a factor in the economics of transportation is the "human element."

The paper treats of four factors that determine the economical working of electric roads: The roadbed, the motorman, stopping and starting, and weight, or the ratio of dead to live load.

1. The Roadway.—As distinguished from steam roads, the electric road is too often surveyed and built by unskilled engineers, with the result that the best possible location that the topography of the route affords is seldom found. Railroad surveying is a special branch of civil engineering, and it takes years of experience to enable the locating engineer to acquire the faculty of producing the best possible line for operation upon a given route.

Grades should be as even as possible, not "choppy;" curves should be compound, or what is better known as "transition" curves, in which the track commences and ends in a curve of easy sweep, sharpening toward the center. Change of grade should always be marked by vertical curves.

The number of turnouts should be reduced as far as possible. After the revision of a piece of badly located line careful tests showed an increase of speed of 12½ per cent, and a decrease of the average current of 12 per cent on the up grade trip and 7 per cent on the round trip.

2. The Motorman.—"By far the largest part of the electrical energy used by the cars is expended in accelerating and lifting them;" that is to say, in starting and in hill climbing. If a car be driven to the top of a hill, it represents, by the time it reaches the summit, an amount of energy which an intelligent motorman will carefully husband on the down grade, using only as much current as will start it and utilizing the "drifting" capacity of the car when it reaches the level for as great a distance as possible.

"Motormen frequently use current on a down grade when it is totally unnecessary and then jam down their brakes when reaching the foot of the grade, which results in a total loss of this energy."

The tests show that 74 per cent of the total energy expended per car mile in city work is used up in lifting and accelerating, and only 26 per cent for horizontal traction!

It is obvious at a glance that, if only some means of storing this energy could be devised, a vast saving in cost of operation would be at once effected. Every time a stop is made on the down grade a portion of this energy is converted into useless heat at the brake shoes and so lost. If the brake effect could be secured by causing the car axle to charge suitable accumulators on the car, this energy could be thus transformed and used for propulsion on the level or up grade.

On a basis of cost of one cent per kilowatt hour, if only 50 per cent of this energy of starting and hill climbing could be stored, it would mean a yearly saving of $15,700 on a 100 car road, the cars making fifteen 10 mile trips per day. This sum, capitalized at 5 per cent, would amount to $314.000.

"The brakes should be used as little possible, and the cars allowed to drift as much as possible."

A test to ascertain what saving could be effected by intelligent handling of the controller was made by placing one of the electrician's assistants on a car that had just been brought in by a motorman, and letting him run it on the same schedule time, but with special attention to economy. The lead and the stops made were similar in each case.

The special motorman showed an economy of 15 per cent on the up grade and of 26 per cent on the down grade, over the other. Taking one-half this difference, or 10 per cent, as a basis, it is seen that the total saving in one year of city work on a 10 mile, 15 trip, 100 car electric road would be no less than $7,000, representing a capitalization of $140,000. Evidently it would pay the electric railway companies to give their motormen some special training.

3. Stopping and Starting.—One hundred tests gave the energy used in starting a car as 85 watt hours. On this basis it is seen that one extra unnecessary stop per trip on a 100 car road, making 15 trips per day, is $467 per year. From this estimate it is evident that a great economy would be realized if regular stopping "stations" were arranged and the promiscuous stopping abolished.

4. Weight of Car.—It was found that a reduction in the weight of the car of 1,000 pounds means a saving of 10 watt hours per car mile. This on a 10 mile, 100 car road, as above, would amount to $584 per year. We are told that the paying load on city roads averages only "10 to 15 per cent for the day."

We would point out, in closing our notice of this valuable article, that the economy in operation above mentioned will, in every case but the last, conduce to the comfort of the traveling public. A well-located line, with "easement" or "transition" curves, will abolish the violent lateral lurching at street corners and elsewhere, and gradual acceleration in starting, with a minimum of braking, will relieve the passengers of most of the longitudinal or "fore and aft" jolting which characterizes the present methods of the motorman.

Solidified Milk—B. F. McIntyre's Process, East Orange, N. J.

The object of the process is to prepare condensed milk in a semi-solid or powdered form, employing a low temperature so as to avoid changing the albuminoids, and discoloration, and melting of the fat globules; also to sterilize and preserve the product in a non-oxidizing gas.

Large quantities of milk are first separated in a centrifugal separator, and the milk concentrated by freezing out the water, the whole being agitated and stirred so that the ice forms in loose crystals, after which the concentrated milk is separated by centrifugal force; steam may be momentarily projected against the ice until free from adhering milk. The process is repeated until the product contains from 80 to 95 per cent of solids. It is then sterilized by passing over the surface of a freezing cylinder cooled to —10° to—20° F., glycerin being employed to transmit the cold. The frozen milk is further concentrated in vacuum pans heated to 100° F.; the vacuum is then broken by admitting carbonic acid instead of air, to prevent oxidation. The warm semi-solid product is run into moulds.

The composition of the milk can be altered by addition of a sterilized sugar solution to the milk when in the vacuum pans. After concentration to a semi-solid state, cream (sterilized by cold) is added, so as to give a product containing 10 to 25 per cent of milk fat.

The blocks of concentrated milk are cut into chips, placed on trays, and dried in carbonic acid heated at 100° F.; the material is then cooled to 32° F. and ground in mills worked at 32° F. The powder is preserved in hermetically sealed jars containing carbonic acid.

Partially concentrated milk may be drawn off from the vacuum pans and filled into jars in presence of carbonic acid; it then resembles ordinary condensed milk.