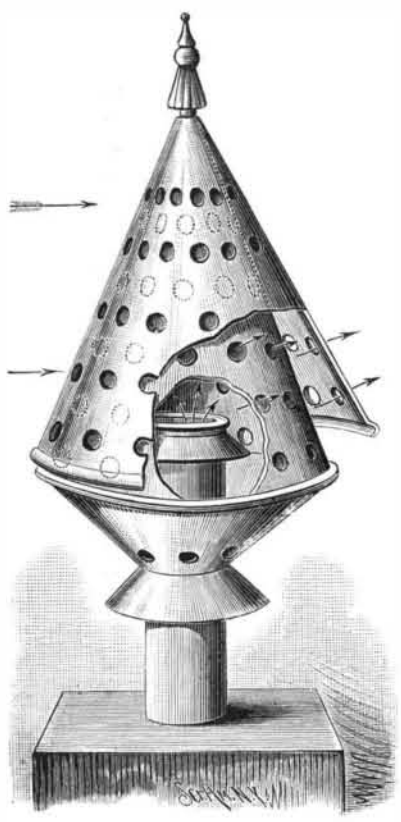
Method and Apparatus for Destroying Fire Damp.

When fire damp or carbureted hydrogen has accumulated in large quantities in a mine it has been the custom heretofore to vacate the mine and fire the gas. This process is ordinarily attended with great danger, and it has been found that the gas, when lighted, will, in most cases where the gas is heavy, first burn slowly, and as the flame increases in volume the gas will become highly heated from contact therewith, and, being driven into a confined space, will be caused to explode with great violence, and will destroy the timbering of the mine and choke up its passages with *débris*, which will render them inoperative and oftentimes result in the loss of life. Robert Blacklidge, of Enfield, Conn., seeks to overcome this danger by the employment of a great number of separate flash torches or rockets, that are to be distributed over the mine in various places, wherever the gas may be accumulated, and that may be lighted at such points simultaneously or in quick succession, so that the gas will be lighted at a new point before the flame from the first point lighted shall have reached the second point. By this means the gas may be ignited at the farthest point from the pit's mouth first, and carry the gas flame, after damp, and smoke forward toward the mouth of the pit or the nearest draught outlet, where the greater part of the poisonous gases of combustion and the gases remaining unconsumed will escape with the draught harmlessly. The method and apparatus for accomplishing this was patented September 21, 1880.

NEW CHIMNEY CAP AND VENTILATOR.

We give an engraving of a novel and simple chimney cap recently patented by Mr. William D. Bartlett, of Amesbury,



BARTLETT'S CHIMNEY CAP AND VENTILATOR.

Mass. It is designed to meet all the conditions necessary to the perfect working of a chimney or ventilator, and works equally well in a high wind or perfect calm. In this respect it is claimed that this device has great advantages over others intended for the same purpose, and in its construction it is certainly as simple as could be desired.

The chimney cap consists of a perforated cone closed at the bottom and forming a housing around the escape flue, which cap is fitted with a perforated conical hood that is slightly larger than the fixed cap, and is hung loosely at its apex, so that it may swing freely. The holes in the hood do not register with those in the fixed cap, so that as the hood is pressed by the wind against the cap the openings are closed on the windward side, while there is free exit at the opposite side.

The cones are broken away in the engraving to show the internal construction.

This device is adapted equally well to chimneys and to ventilating shafts or flues.

The Comet in Pegasus.

The comet discovered by Lewis Swift in the constellation of Pegasus is as large as any nebula north of the equator, except the nebula in the triangles and the great nebula in Andromeda. It can be seen in moonlight, but is not a bright object. It may be the comet of 1812, but this is a mere surmise. The condensation and nucleus are eccentric, evidently indicating the presence of a tail greatly foreshortened. The comet is so nearly in opposition that the tail is about on a line joining the earth and sun. Its slow motion indicates that it is either approaching the earth or receding in almost a direct line. If approaching it may become an object of great interest. Its apparent size indicates that it is either quite near the earth or else enormously large.

Paper Making Industries in China.

The Commissioner of Customs at Wuhu (China), in a report recently issued, states that paper is very extensively manufactured in the numerous little villages situated in the valleys among the hills, about eight miles to the southeast of the city of King-hien. It is made from the bark called T'an-shu-p'i, the paper-mulberry tree bark, and wheat straw, which, after having been well washed and boiled with a certain proportion of lime, is again washed, and then exposed to dry for a whole year on the sides of the hills, in spots where the grass and brushwood have been previously cleared away for this purpose. After the year's exposure, it is washed once more, and then pounded on a stone with a large wooden hammer; it is supposed to require 1,400 blows from this hammer to reduce it to the necessary consistency; after which it is removed to another building, and left to soak until it becomes quite a pulp, in a large earthenware vessel, containing a liquid glue, made from boiling the branch of a tree called the Yangkowt'êng, a species of hooked vine. This pulp is then put into a cistern of water, and well stirred up with a stout stick. A finely made bamboo frame, or sort of long oblong sieve, is taken by two men, one at either end, and dipped twice into this liquid, which is made to run equally over the whole surface, somewhat after the manner in which the photographer allows the developing solution to run over his plate. By this means, a thin and tolerably even layer is left, which soon partially dries and forms the sheet of paper, and which is removed by simply reversing the frame. As soon as a sufficient number of sheets has been made, they are taken to the drying room. This room contains a large brick oven, coated on the outside with lime, and built up to within a few feet of the roof. Upon the top of this oven the paper is placed, in parcels of about a foot in thickness, until perfectly dry; after which sheet by sheet is damped once more, and while still moist, is by means of a soft brush made to adhere to the sides of the oven for a short time, to undergo its final process of drying. It is then taken away to the packing room, and made up into bales, weighing from 80 to 120 catties each, the catty being equivalent to 1⅓ lb. avoirdupois. The largest sized paper is about one "chang" (11¾ feet) long, and is worth one dollar a sheet. This particular size of paper is made entirely from the "T'an-shu-p'i," but the smaller sizes are composed of a mixture of the above-mentioned bark, or the bark of the paper-mulberry tree, and wheat straw. This paper is known by the name "Suan-chih," and is considered a good quality paper in the Chinese markets.

The Grotto Under Mount Rossi, Sicily.

The eruption of Mount Etna in 1669, says *La Nature*, was the most formidable of historic times. The side of the mountain opened for a length of about four miles, and there issued from it a torrent of lava four miles broad, which, after destroying several villages and half of the city of Catane, flowed into the sea and formed a promontory two miles long by half a mile wide and sixty feet high. At the same time the scoria and sand thrown out by the craters formed a mountain with a double crest, that was at first called Monti della Rovina, and later Monti Rossi, on account of the reddish color that the scoria on the two crests assumed through the oxidation of the iron contained in it. The higher of the two crests is about 800 feet above Etna, and about 3,000 feet above the sea. In the interior of the cone of Mount Rossi there are two immense extinct craters, exhibiting the characteristic funnel-shape, and the sides of which are formed of scoria in a decomposing state. Up to 1823 no one had had the curiosity to descend to the bottom of these craters; but at this period the intelligent observer, Mario Gemellaro, undertook their exploration. He saw with some surprise a horizontal aperture at the bottom of one of the cavities, and entering it with a torch, he found, after traversing a suite of corridors resembling the galleries of a mine, a large well, into which he caused himself to be lowered by means of ropes. At some feet from the bottom of this well he found a vast rectangular room, at the further end of which there was a passage which grew smaller and smaller, and at last became impassable. This remarkable grotto, which was named Grotto della Palombe, is situated exactly in the center of Monti Rossi. It has now been opened to travelers, the descent being facilitated by a stairway, and the cavern being illuminated by magnesium light instead of the former resinous torches.

Concussions as the Cause of the Oil Fires.

To the Editor of the Scientific American:

Having noticed in your columns the troubles of the oil regions, I thought I would make a few experiments with a view to learn the true reason of the tanks being fired. I find that under certain conditions a mixture of oil vapor and water vapor can be fired by concussion. I would suggest as a remedy a floating cover to each tank. The amount of oil lost by evaporation would pay the cost of such cover, and it would always act as an extinguisher. Heavy thunder is the probable cause of the fires. D. F. STAFFORD.

Skipanon, Clatsop Co., Oregon, October, 1880.

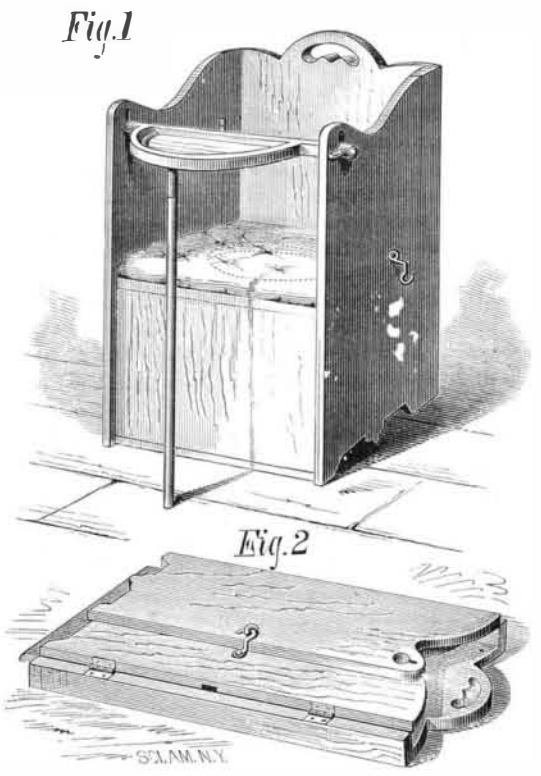
TWINKLING OF THE STARS.—This is generally conceded to be due to moisture in the upper air. M. Montigny, in a paper published in *Les Mondes*, holds that very pronounced twinkling of the stars indicates either commotion in the upper regions of the atmosphere or a sudden fall of temperature there, thus denoting the conditions of an early appearance of bad weather.

Rare Elephants.

There are now on exhibition in this city two peculiar elephants brought from the mountains of the Malay peninsula, about 800 miles from Singapore. They are remarkable for their small size, being respectively 28 and 36 inches tall; and for being covered with a thick coat of bristly hair or wool. They are supposed to be from five to seven years old. In size they resemble the extinct elephants of Malta, and in covering, those of Siberia. Their woolly coat is attributed to the circumstance that they live high upon the mountains where the climate is cold. The species appears to be all but unknown to naturalists, this pair being the first that have survived the passage through the heated low country to the coast and the subsequent journey by sea. The sailors on the steamer which brought them—the Oxfordshire, Captain C. P. Jones—named them Prince and Sidney. They are described as playful and harmless, and they keep their little trunks stretched out to strangers to be petted. They love to be scratched on the under side of the trunk close to the mouth, and they hold their trunks curled back over their heads as long as any one scratches them. Like elephants of larger growth, they keep up a swaying motion, either sidewise or forward and backward. When a visitor lets one of the little fellows take his hand he delicately curls his proboscis around it and carries it gently to his mouth. Then he trumpets his satisfaction.

IMPROVED NURSERY CHAIR.

The engraving shows a light and convenient nursery chair recently patented by Mr. J. C. Klett, 260 West 37th street, New York city. When in use it appears as in Fig. 1, but it is readily folded into the compact form shown in Fig. 2.



KLETT'S NURSERY CHAIR.

The chair is composed of a back, two hinged sides, and a hinged seat, all of which are provided with hooks or catches for retaining them in position while the chair is open for use. The chair is also provided with a pivoted shelf which serves as a stay for the sides and is readily separated from the other parts for packing. This chair is very convenient for regular every day use in the nursery, and is a necessity for persons traveling with children. It folds so compactly and is so light that it may be readily carried in the trunk.

Further information may be obtained by addressing the inventor as above.

Lowell Mills Burned.

Two important Lowell mills, the Chase and the Faulkner, were destroyed by fire October 6. The former was of brick, 225 feet long by 60 wide and 68 feet high, five stories on the front elevation and six in the rear, with a one story L, used as a boiler house. The mill contained 12 sets of cards, 6,600 spindles, 60 broad looms, 40 of them newly equipped last year. It was built in 1863, and gave employment to 300 hands.

The Faulkner mill was of brick, 91 by 54 feet, five stories high, and a three story L, 25 by 54 feet. It had 8 sets of cards, 2,720 spindles, and 44 looms, employing 100 hands. The annual production of the two mills was 750,000 yards of fancy cassimeres and cloakings, consuming 600,000 pounds of wool.

Preserving Rubber Instruments.

Various articles and instruments made of rubber are apt, with time, to become dry, to crack, grow brittle, and lose their elasticity. Dr. Pol recommends the following simple mixture: Water of ammonia, one part; water, two parts; in which the articles should be immersed for a length of time, varying from a few minutes to one-half or one hour, until they resume their former elasticity, smoothness, and softness.

Astronomical Notes.

OBSERVATORY OF VASSAR COLLEGE.

The computations in the following notes are by students of Vassar College. Although merely approximate, they are sufficiently accurate to enable the observer to recognize the planets. M. M.

POSITIONS OF PLANETS FOR NOVEMBER, 1880.

Mercury.

Mercury will probably be seen after sunset early in November. The planet will be 9° south of the sun in declination, and will set about an hour after the sun on the 1st. The best time for seeing Mercury will be on the 3d or 4th. The crescent moon will pass east of Mercury on the morning of the 4th.

Mercury will approach the sun, and will scarcely be seen after the 15th.

Venus.

On November 1 Venus sets at 6h. 14m. P.M. On November 30 Venus sets at 6h. 46m. P.M.

It will be brilliant in the southwest all through November, setting farther and farther south until the 21st. The crescent moon will pass eastward of Venus on the 4th.

Mars.

Mars is not likely to be noticed in November.

On the 1st of the month it rises at 6h. 26m. A.M., and sets at 4h. 45m. P.M.

On the 30th Mars rises at 6h. 16m. A.M., nearly an hour before sunrise, and may perhaps be seen preceding the sun and about 2° north of the sun in declination.

Jupiter.

Although Jupiter has passed its best position, ordinary observers will scarcely perceive its diminished brilliancy.

On November 1 Jupiter rises at 3h. 47m. P.M., and souths before 10 P.M., at an altitude of 51° in this latitude.

The moon passes north and east of Jupiter on the 13th.

On the 30th Jupiter rises at 1h. 48m. P.M., and passes meridian before 8 P.M.

Making our observing hours between 8 and 10 P.M., we find from the "American Nautical Almanac" that the two satellites nearest to Jupiter (the 1st and 2d) may be seen to pass from the face of Jupiter nearly together on November 1, so that Jupiter will be seen at first with two moons only; on November 8 the same two may be seen to enter upon the planet's face again nearly together.

On November 9 the first satellite may be seen to come out from the shadow of Jupiter; on the 16th and 23d this satellite will go behind Jupiter.

On November 24, while the first is in transit, the second will disappear by going behind Jupiter, so that Jupiter may be seen with only two moons.

On November 10 the largest satellite will be seen to move slowly away from Jupiter, and the smallest moon will come out from the shadow. On the 17th the largest satellite may be seen to move toward Jupiter, while the smallest is again hidden in eclipse.

On November 28 the third will enter the shadow of Jupiter early in the evening and remain more than two hours, when it will come out and slowly regain its brightness.

Saturn.

Saturn follows Jupiter, coming to the meridian 50 minutes later, all through the month of November, and reaching an altitude about 4° higher than Jupiter.

On the 1st Saturn rises at 4h. 27m. P.M. On the 30th at 2h. 24m. P.M.

The moon passes east of Saturn on November 14.

Saturn appears small and pale beside the glowing color of Jupiter, but it even surpasses Jupiter in interest. Of its eight satellites, very few can be seen with ordinary telescopes. Titan, the largest, was west of the planet on October 7, and nearly at its greatest distance. As this moon goes around Saturn in a little less than 16 days, it will be seen again far west of the planet on October 23, and far east of Saturn on the last day of October. Its revolutions around can be counted in this way.

Japetus can probably be readily seen in its orbit path far from Saturn, and requiring about 80 days for a revolution.

A telescope which will show Rhea, the next smallest satellite, will afford a great source of interest, as Rhea goes around the primary in 4½ days, and its motion can be seen in one evening.

The ephemeris of these satellites, published by Mr. Menth in the "Astronomische Nachrichten," gives Rhea as in conjunction with the center of Saturn, and below the base of the planet, on November 12, a little after midnight, Washington time.

A good telescope of three inches aperture will enable an observer to see Rhea at that time.

Uranus.

Uranus rises on November 1 at 1h. 46m., and on the 30th at 11h. 52m. P.M.

Its diurnal path is almost wholly between midnight and noon.

Neptune.

Neptune is in excellent position early in the month, on the meridian near midnight, at an altitude of 62°. On November 30 Neptune crosses the meridian circle at 10 P.M.

The Electrical Spur.

As a supplement to the electrical bit, noticed by us some time ago, it may now be stated that Mr. G. Hüttmann, imperial equerry at Vienna, employs the electrical current in a very ingenious manner in order to facilitate the management of the horse, especially for ladies.

To the left side of the saddle a small box which contains a galvanic battery and an induction coil is fastened. From this apparatus two silk coated wires are conducted to a special girth-leather, which end into two blunt metallic brushes touching the flank of the horse at that place where usually the spur is applied. These wires are also connected with the riding whip, which has two ivory knobs. By a pressure of the finger upon one of these knobs the current is closed and conducted to the wire brushes, where it acts as a spur in a strong and sudden manner, while when the other knob is touched a weak and continued current is originated, acting like the pressure of the thigh of the rider.

The electricity may not only be used by ladies, but will also prove useful to the equestrian performer in the circus in order to manage several horses at the same time, and to the groom in order to prevent horses from crib-champing and other bad habits. In Paris electricity is also used for preventing carriage horses from running away, a battery being connected with the bit of the horse.

THE FAN-TAILED POODLE

The *Deutches Familienblatte*, of Berlin, gives the above, which it styles "A new American invention—dedicated to the Society for Preventing Cruelty to Animals."

Hot Ice.

In his experimental investigations of the boiling points of substances under low pressures, Mr. Thomas Carnelley has been able to maintain water in the solid state at temperatures far above the boiling point of water. The conditions under which it is possible thus to heat ice he describes as follows:

"1. In order to convert a gas into a liquid the temperature must be below a certain point (termed by Andrews the critical temperature of the substance), otherwise no amount of pressure is capable of liquefying the gas. 2. In order to convert a solid into a liquid the pressure must be above a certain point, which I propose to call the critical pressure, otherwise no amount of heat will melt the substance. If the second of the above conditions be true, it follows that if the necessary temperature be attained, the liquefaction of the substance depends solely on the superincumbent pressure, so that if by any means we can keep the pressure on the substance below its critical pressure no amount of heat will liquefy it, for in this case the solid substance passes directly into the state of gas, or, in other words, it sublimes without previous melting."

By maintaining a pressure below 4·6 millimeters of mercury—that is, the tension of aqueous vapor at the freezing point of water—Mr. Carnelley was able to keep water frozen in a vessel so hot that it would burn the hand. Other substances also exhibit these same phenomena, the most notable of which is mercuric chloride, for which latter the pressure need only be reduced to about 4·20 mm. On increasing the pressure the substance at once liquefies.

Shooting Oil Wells with Nitro-glycerine.

A few years ago nitro-glycerine was only used in the oil wells in the very small quantities of one or two quarts at a time. Within a short period it has become a very important agent in bringing petroleum to the surface. When exploded in the oil wells over the oil-bearing rock it opens wide seams, through which the oil flows with great force and freedom, thus saving much labor and expenditure of capital. There is now used in every well that is drilled from thirty to two hundred pounds, which is worth eighty cents a pound to the producer. It costs about thirty cents to manufacture, and nets fifty cents on every pound to the manufacturer. Thousands of pounds are consumed every month, and there is a growing demand for it.

A correspondent of the *Sun*, who had assisted at the reopening of one oil well by the explosion of 100 pounds of nitro-glycerine at its bottom, gives the following description of the operation: A cartridge case or shell of tin, 15 feet long, was lowered into the casing of the well by means of a wire rope, and then filled with water. The glycerine was then poured into the shell, and, being heavier than water, forced the latter to flow out. When all the glycerine had been poured in the shell was lowered 1,800 feet into the well, and there rested on what is called an "anchor," 25 feet from the bottom. It was now ready to be set off. There was about 700 feet of oil above the shell. Through the center of the shell ran a small tin tube, inside of which was a small iron rod in four pieces. On the end of each piece was placed a common percussion cap. At the top of this rod was a tin plate so arranged that anything dropped down through the casing would strike it, and the force of the falling article would set off the caps, which would in turn explode the nitro-glycerine. The charge was exploded by dropping a small piece of iron tubing into the well. At the moment of discharge "the earth trembled violently, then came a dull sound, and a second later there rose into the bright moonlight, 100 feet high, a solid stream of oil, which fell on everything near, and continued to fall for three minutes. This stream of oil was one foot in diameter when it began to flow, but it soon settled down to a stream of about 1½ inches, which is a natural flow."

AGRICULTURAL INVENTIONS.

A sulky plow, patented by Mr. Thomas T. Harrison, of Aubrey, Kansas, is an improvement on the sulky plows for which Letters Patent No. 218,734 were issued to the same inventor August 19, 1879. The improvement simplifies the construction and renders the plow more easily controlled.

A fruit gatherer, for gathering oranges and other fruit without bruising or injuring the fruit or trees, has been patented by Mr. Levi J. Knight, of Manatee, Fla.

Mr. Lewis Y. Lenhart, of Red Wing, Minn., has patented a seed planter, so constructed that it may be operated from the drive wheel or by hand power, as the character of the ground may require.

Messrs. William V. Morgan and Thomas W. Hackman, of Allerton, Iowa, have patented an improved sulky plow so constructed that the plows may be easily attached to and detached from the carriage, and may be readily adjusted and controlled.

Mr. John H. McPherson, of Xenia, Ohio, has patented a tooth for grain drills, so constructed that it can be readily detached for sharpening and for convenience in passing from place to place, and which will swing back should it strike an obstruction.

Thread from Wood.

The manufacture of thread from wood for crochet and sewing purposes has, it is said, recently been started at the Aby Cotton Mill, near the town of Norrkoping, in the middle of Sweden. The manufacture has arrived at such a state of perfection that it can produce, at a much lower price, thread of as fine quality as "Clark's," and has from this circumstance been called thread "*a la Clark.*" It is wound in balls by machinery, either by hand or steam, which, with the labeling, takes one minute twelve seconds, and the balls are packed up in cardboard boxes, generally ten in a box. Plenty of orders from all parts of Sweden have come in, but as the works are not yet in proper order there has hardly been time to complete them all. The production gives fair promise of success, and it is expected to be very important for home consumption.

The Public Domain.

The annual report of Commissioner Williamson, of the General Land Office, shows that there were surveyed during the fiscal year ending June 30, 1880, 15,699,253 acres of public lands and 652,151 acres of private land claims. This is an increase in the amount of public lands surveyed of 725,347 acres over that of the last year. This great increase is attributed to the operation of the act of March 3, 1879, which led to a great increase in the number of applications by private individuals for public surveys. Disposals of public lands during the year were made as follows:

	Acres.
Cash entries	850,740
Homestead entries	6,045,570
Timber culture entries	2,193,184
Agricultural college scrip	1,280
Locations with military bounty land warrants	88,522
Swamp lands patented to States	3,757,888
Lands certified for railroad purposes	1,157,375

The area of public lands surveyed in the different States and Territories during the last year is as follows:

	Acres.		Acres.
Arizona	308,521	Nebraska	709,179
California	3,792,630	Nevada	938,694
Colorado	2,775,601	New Mexico	1,624,156
Dakota	2,130,808	Oregon	1,052,221
Idaho	225,637	Utah	440,585
Louisiana	80,504	Washington Territory	847,595
Minnesota	296,253	Wyoming	184,449
Montana	302,413		

In addition to this, surveys were made of private land claims in three States and Territories, as follows: California, 58,708 acres; Arizona, 149,258 acres; New Mexico, 444,184 acres. The total area of public lands surveyed from the beginning of surveying operations up to the close of the last year is shown to be 752,557,195 acres, leaving an estimated area yet unsurveyed of 1,062,231,727 acres.

THE Chester Steel Castings Company have just completed another addition of 60x90 feet to their works at Chester. The superiority of their steel castings for many purposes is becoming better known by locomotive and steam engine builders and machinists generally, and their orders have increased largely. They claim that their castings finish up smoother, admit of a finer polish, and will resist a greater amount of wear and tear than iron forgings, and require less labor in finishing, as a casting can be made nearer finished size than a forging.

An Elevated Railway for Costa Rica.

The government of Costa Rica has entered into a contract with J. Mosen-Chiarin for the construction of an elevated railroad from San José, the capital, to Rio Sucio, there to connect with the railroad in course of construction from Limon. The work is to begin within six months from August 9, and to be ready for traffic within ten months from the same date.