

SEARCHLIGHT'S GLOW IS SEEN FOR 100 MILES

Invisible Beam Strikes "Invisible Clouds" and is Reflected Far Out to Sea—1,100,000 Candle Power.

(New York Times)

Spots of light, appearing against the southern sky on perfectly clear, starry nights and even moonlit nights during the last month, have interested many observers who have reported that they saw curious comets, meteors, auroras, and even signs and portents in the sky. Sometimes they have been twice at sea—sometimes a glare. At times they have changed shape while remaining stationary and at others have wandered about the heavens, constantly assuming new forms—disks, ovals, lines, rays, shreds and irregular patches of light. Some- times they have appeared twice at the same time in different shapes and in different parts of the sky. Some ob- servers have discredited their reputation for veracity by telling what they saw. Others have doubted their own eyes.

The explanation obtained by the New York Times yesterday was that experi- ments were being made on State Island with the most powerful searchlight in the world, its 1,100,000 candlepower light produced weird new effects over- head on clear nights, because the beam was invisible in the transparent lower air and the source of light on earth could not be traced. But even on clear nights, as shown for the first time by this instrument, there are "invisible clouds," or unseen layers of moisture, at great heights, and these reflect the rays of the great searchlights, produ- cing the effect of an illumination from some celestial source.

Light Seen 100 Miles Away.

The light has been seen by ships at sea at a distance of 100 miles from New York. It has lighted up wet patches in the sky at a distance of fifteen miles above the earth. The height can be measured by triangulation of the angle at which the light is simultaneously seen by two observers a few miles apart. Lighthousescrews up and down the coast have been directed by the federal government to watch for these light patches in order to discover whether such searchlights, illuminating the sky with a vertical or high-angle beam, may not be superior to lighthouses of the type now in existence.

The light is now in use at the Tompkinsville Lighthouse, where it was placed for experimental purposes by the Sperry Gyroscope Company, which owns it. Observers for this company are pre- paring a report for the United States Weather Bureau on the revelations made by the searchlight on the trans- parency of the air even when the transparency of the air seems perfect to the naked eye.



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The existence of these layers of moisture has long been known, but the power of illuminating them provides a new means for studying them, and may become a valuable aid in analyzing weather conditions.

An astronomer with the naked eye can make a rough guess as to the amount of moisture and ice particles in the air on a bright night by the comparative steadiness of the stars when there is no great variation in moisture trembling and twinkling when there are great changes in the structure of the air from layer to layer. On some clear and cloudless nights telescopes are rendered useless by changes in tempera- ture and moisture at different levels, which throw light rays completely out of their course and make a blurred image. Sometimes at great heights the search- light's rays are reflected by half-formed

clouds of irregular shape, in which the moisture is still so dense that the stars shine through. This produces a faintly glowing, ragged patch. Sometimes the underside of a cloud stops and reflects the whole beam. When this is seen overhead, a circular area is illuminated. From a great distance, so that the light is near the horizon, the observer can only see the edge of the light, which becomes visible to him as a bright line, sometimes straight and parallel to the horizon, sometimes sinuous or slanting, according to the shape or position of the cloud.

"There have been some curious effects," said M. L. Patterson, searchlight engineer of the Sperry Gyroscope Com- pany. "Sometimes there has been a double light. The lower light results when the beam first strikes a cloud or fog bank, and then reflects off the top of the cloud. Sometimes there is a hole in this. Part of the light goes through and hits another cloud or fog bank at a greater height. Some- times the lower cloud has no hole in it, but is so thin that it reflects a small part of the light, and lets the rest through. The remnant of the beam keeps on going and causes another light at a greater height."

"Another strange effect takes place in a low fog, and it is here the search- light has its greatest efficiency for light- house purposes. Often a fog when it is very dense at sea level extends only about thirty feet upward. A man on the deck of a ship or on the street may see very little, while a man on the crow's nest, or on top of a building may be in comparatively clear air and able to see considerable distances. This searchlight goes easily through the low fog bank, or through a comparatively thick one, and makes its usual light in the sky which may be seen by anyone who stands higher than the fog-bank.

"Many ships coming into New York harbor are now on the watch for it and report what they see. The greatest distance from New York that it has been observed so far is 100 miles, where it was seen from a ship. In a thick fog it will be quenched like any other light, but in any other kind of weather it will be constantly varying in distance that they are approaching the coast.

"One difficulty which would arise in re- sponding to the use in lighthouses would be the trouble a seaman might have in in- terpreting the light signals appearing so irregularly in the sky. The light being studied a while longer, however, un- doubtedly a simple formula will be ob- tained by which a seaman can read the varying signals."

The instrument is a Sperry search- light, of the type invented by Dr. Elmer Sperry, but it is much larger than any previously made. The 1,100,000 candle-power light is produced on the principle of an arc light. The lower, or positive carbon, is five-eighths of an inch in diameter. In inventing this, Dr. Sperry sought to imitate sunlight by including in the positive carbon the principal light-making elements in the sun, that is, increasing the efficiency of light and projects them in almost paral- lel lines through the glass of the searchlight dish, which collects all the rays of light and projects them in a half- inch above the source of light, or half- inch below, so that the rays are not perfectly parallel, however, and the beam consequently expands and gradually be- comes diffused in proportion to its dis- tance from the searchlight. The diam- eter of the beam is doubled every quar- ter of a mile, so that at the height of a few miles it will illuminate a consider- able spread of cloud surface.

The searchlight may aid astronomers in studying the layers of moisture which trouble them a good deal at present. The only practical method of testing a site for a large telescope now is to take a

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telescope three and try it out for a con- siderable length of time, until the aver- age seeing conditions have been deter- mined. The top of Pike's Peak, for in- stance, has been tested as a telescope site and found to be poor because of constantly varying air conditions. Many other locations, which seem ideal for telescopes, have been tested and reject- ed for the same reason.

Mr. Patterson said a series of experi- ments would be made by photography to test the greatest heights at which the light was reflected. Cameras separated by considerable distances will take simul- taneous photographs of light patches and determine their height by triangula- tion. This method has already been used on the aurora borealis, the light of which has been found to extend any- where from forty to fifty miles to sev- eral hundred miles above the earth. American army officers have watch-

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ed the experiments with considerable in- terest, because of the value of the search- light in connection both with flying and with anti-aircraft work. One of the chief purposes of the experiment at Tompkinsville has been to increase the practicability of night flights by air- plane, the searchlights acting as guides and showing the way to landing stations. The light patches seen at great heights are often sketchy and irregular, because the highest clouds are the cirrus which develop at heights sometimes as great as ten miles and move with an average velocity of seventy miles an hour. They are small, isolated feathery masses, formed by the mixture of air strata of different temperature which condense the moisture of the warmer layer. When the surrounding atmosphere is dry, the cirrus clouds are often quickly absorb- ed, so that, on the whole, they make ex- tremely variable targets for the search- light.

LOCAL NEWS

McMILLIAN'S NINETY-NINE YEARS Experience in handling fine papers means a lot to discriminating buyers. They invite inspection of their beautiful Gift Boxes. s. n. r. t. f.

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SUPPER AND SALE At Queen Square church, Thursday, Dec. 8th, sale of fancy work, home made and candy, begins at 4 o'clock. Sup- per 6 to 7.50.

Empress of France Concert Party, Fri- day night. Many old favorites in both troupes. 7.45. 20 cents reserved 25. 12-10

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VENETIAN GARDENS The new novelty "The Kan-yan-Katch-Em" dance, which will be held at the Venetian Gardens on Thursday evening, promises to furnish a lot of pleasure to those who patronize this pop- ular place of dancing. Don't miss the star piece of dancing. Don't miss what is to be fun. Be there and see what is to be caught.

MACHINE GUNNERS ATTENTION A shooting competition will begin at 8 o'clock Thursday evening, Dec. 8, in the Indoor Rifle Range at the Armories. Prizes will be given. All officers, N. C. O's and men are asked to attend.

Rubbers and overshoes with double wear heels and soles. Percy J. Steel, 611 Main street.

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FLOATING VILLAGE In the interior of French Indo-China there is a village whose location is a source of worry to captains of mail steamers. They are never certain where they will find it.

Its name is Shok-Fou, and its lo- cation is somewhere on the Mekong River. The village consists of forty or fifty little huts built on rafts and lashed together with rattan ropes. Here dwell about two hundred people, whose chief occupation is fishing.

The rear of the village is lashed to half-submerged trees, but the whole town changes its position from time to time, according to the vagaries of the river or the whims of its inhabitants. Steamboats passing up the river will find it at one spot, and on the return journey discover that it has moved elsewhere.

THE IRISH WORKHOUSE Montreal Gazette:—"The 'passing' of the workhouses in Ireland, is an item of interest from the dear little island. These extravagantly managed institu- tions have been replaced, we learn, by 'pauperism' which no stigma of 'county homes' will be attached. This re- form is being carried out under the aus- pices of Dan Breen. The interests of the former officials are also being safeguarded under the scheme. The workhouse in Ireland was the last word in social degradation. Their 'pass- ing' will be welcomed.

LECTURED ON KLONDYKE. Rev. H. A. Cody gave an interesting lecture on the Klondyke last evening in the auditorium of the Main street Epis- copal church before a very large audience. There were more than 600 people present

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and the evening was greatly enjoyed. Mr. Cody told of his five and a half years as a missionary preacher in the Klondyke, and threw upon the screen a large number of beautiful slides illus- trating the scenes of his missionary labors and his travels, and also pictures of the men who were associated with him. The audience was a most appreci- ative one throughout. Rev. Dr. Hutchin- son, in introducing Mr. Cody, spoke of him as one of the distinguished Canadian authors from whose pen had come many very interesting volumes. At the of the lecture a very hearty v thanks was given to Mr. Cody.

A young lad named Michas, was knocked down by a street car today evening and was taken to hospital, where the gash in his leg was dressed. He is reported to be lying quite comfortably. It is under- stood that he is from St. Patrick's Indus Home.



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