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PROF. JOHN TYNDALL.

On the evening of December 4, Prof. John Tyndall died. The son of an Irish policeman, a man whom he himself described as "socially low, but mentally and morally high," he had before him the task of working into four compartments or four apertures, and he his own way up in the world. He was born August 21, 1820, in Leighlin Bridge, near Carlow, Ireland. He left school at the age of nineteen, and joined the Irish Ordnance Survey. Here he may be said to have begun his scientific career. In 1841 an official asked him how he employed his leisure hours, and told him that with five hours a day at his disposal they "should be devoted to systematic study." He added, "Had I when at your age had a friend to advise me as I now advise you, instead of being in a subordinate position, I might have been at the head of the survey." Next morning it is said Tyndall was at his books at secures that in one division of the lantern slide frame, five o'clock, and for twelve years followed the advice and places it in the lantern; he then takes the second given him.

1844 wished to emigrate to America. But a position as One person stands at the lantern and one at the railroad engineer in England was obtained for him, screen. The operator at the lantern then operates the and he remained. In 1847 he took the position of adjusting screw until the position of the plate is such master of Queenwood College, Hants, Hampshire. He that the person at the screen decides that the two showed great talent for teaching and began to contri-images coincide. The third plate is similarly adjusted bute scientific papers to scientific periodicals. In May, in the lantern slide frame by a duplicate adjusting de-1847, his father died. In 1848, with Frankland, since vice. The whole is then removed from the lantern professor of chemistry in the Royal Institution, he and each plate is sealed in position, so that, for that went to Germany. There, under Bunsen, Knoblauch and Magnus, he studied science for two years, receiving his degree in 1850. In 1851, on his return to Lonscreen. The positions of the pictures in the lantern don, he met Faraday. He was at once taken up by frame correspond to the colored screens through the great master, and was associated with Faraday in his work at the Royal Institution of Great Britain. He was appointed to the chair of Natural Philosophy to place picture after picture in the lantern and run there in 1853, and after Faraday's death in 1867 succeeded him as superintendent.

subjects. His books, written for the popular taste, are excellent examples of scientific exposition. In 1872, the experiments in some cases—testifying to the interest in them on the part of the public. His receipts from the lectures—some \$13,000—he presented to Harvard who devote themselves to original research.

Switzerland, and there met his wife, also an enthusiast on mountain climbing, whom he married when he was 56 years old. She was the innocent cause of his death. He had been ill for some time, and was taking both chloral and sulphate of magnesia. By mistake his wife gave him a large dose of chloral, thinking it was the magnesia. As she realized what she had done, she told him. He cried, "You have killed your John." He jumped out of bed and called for a stomach pump. The physician was summoned, who gave an emetic which operated, but life could not be saved. although the doctors worked over him all day. The fatal dose was taken at 8:30 A. M., and death occurred ten hours later, 6:30 P. M.

SCREEN PHOTOGRAPHY IN COLORS.

As has been known for some time, the primary colors of the spectrum, red, blue, and green, when combined, produce white light. The utilization of these colors in reproducing photographs in the colors of nature has been proposed and demonstrated by Mr. Fred-Ives, of Philadelphia. His method has been lately improved upon by an optician of this city, Mr. R. D. Gray, and it was our privilege to witness his public demonstration of his improvements on the 8th instant.

He follows out the usual method of taking pictures for color reproduction, by first taking in the camera the lens, a picture in which all the light values of the Northumberland, and Huntingdon. blue and white rays are excluded, allowing only the stopped down to f/8 and gives an exposure of three bed in Rhode Island. minutes. He then takes another negative with the on the plate. Still retaining the camera in the original, of bituminous coal. position, the third negative is taken in the ordinary way with white light, or without any tinted screen behind the lens which represents all the value of the 4 blue and white rays that emanate from the object. at the close of the carboniferous period. After these negatives are once made, it is simply a matlantern slides or positives.

It should be mentioned that the lantern consists of three objectives and three condensers, in front of one sugar in the Sandwich Islands.—In proved manufacture of sugar in the sandwich Islands. of which is placed a blue glass, in another a red disturbed or present anthracite region. optical systems are illuminated by three separate jets geographically into the Northern, the Eastern Middle,

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of lime light, or instead of lime light the electric arc light may be used.

To project the three separate positive pictures in a lantern, he has a square light wood frame divided uses three of these apertures for holding the plates, and his method of aligning the respective plates with the lantern is somewhat ingenious and practical.

One of the most difficult problems connected with this system of projecting the color pictures upon the screen is to make them exactly coincide, and Mr. Ives had great trouble in doing this when he made a public exhibition, but Mr. Gray has perfected a very simple and ingenious device for bringing each picture into the proper alignment. He first takes one plate and plate and places that in the second division of the He became dissatisfied with his slow progress, and in frame, and then applies his adjusting attachment. particular lantern, this lantern slide frame is all ready for use and will always register accurately upon the which they were originally made.

As a result of this method it is a very simple matter them through the same as an ordinary lantern, and Mr. Gray claims that while others have only shown a He published many works and papers on scientific few slides made for color projection, he has been able to produce a larger number.

Having thus perfected the minute detail of adjusting when at the height of his fame, he made a lecturing the pictures and the apparatus for showing them, it tour of the United States. His lectures, given in this was very easy and simple to project them on the city, were received by large audiences, no experimental screen, and the marvelous beauty and delicacy of the lectures, probably, ever being greeted with such eclat. combined colors in showing the various grades of color The daily papers reported them with illustrations of | in the pictures was surprising and most pleasing, and gave one a more adequate idea of the beauty of the landscape than an ordinary monotone photograph. In pictures of autumn foliage the delicate reds and yel-University, Columbia College, and the University of lows would appear to great advantage, in photographs Pennsylvania, founding scholarships in aid of students of distant mountains the azure blue of the sky covered with scattered white clouds appeared with most nat_ A great Alpine climber, for many years he visited ural effect, contrasting finely with the snow-capped peak and the brown and green foliage below, and in portraiture the color of the skin, the clothes and accessories were most admirably reproduced. The red and green in a watermelon picture were capital.

In using the lime light, when colors are combined, before the insertion of the slides, the appearance of the screen is white, with a slight tinge of blue. It is supposed that if the electric arc light is used in place of the lime light a still better result may be obtained.

The success of Mr. Gray in demonstrating the practicability of projecting photographs in colors is certainly an advance in this line of work. We believe he has applied the same principle to the reproducing of colored photographs in printing inks.

THE PENNSYLVANIA ANTHRACITE COAL FIELDS.

The late report of the commission appointed by the State of Pennsylvania to investigate the subject of "Waste in Coal Mining" contains matter of general

The anthracite coal fields are found within an area of some 3,300 square miles, about 484 of which contain workable coal beds. This area would form a polygon by drawing a line from the northeastern limit in Wayne County westward to Bernice, then southwest to Dauphin, then northeasterly to Mauch Chunk, then to point of beginning, mostly in the counties of Wayne, on an orthochromatic plate, with a red screen between Wyoming, Luzerne, Schuylkill, Carbon, Dauphin,

Prof. J. P. Lesley, in charge of the Geological State color values of the reds in the subject photographed Survey, is of the opinion that originally the coal field to be reproduced. In making such a photograph, covered the whole State and parts of the neighboring which takes the longest time, he usually has the lens States, a remnant of which is found in the anthracite

The anthracite exists wholly in the area east of the camera in the same position, in which nothing but Allegheny Mountains, and on the west of that range the green of the object photographed has any effect nearly the whole area rests on an almost unbroken field

The anthracite condition was, no doubt, produced from the original bituminous by the great convulsion uplifting and folding the rock strata which took place

The disturbed or uplifted area is well defined, but ter of ordinary photography to reproduce from them how much of the coal was changed to anthracite we do not know; probably not all, as would seem to be shown by the Broad Top coal field in Huntingdon County, which is semi-bituminous, though in the midst of the

The coal field has been, for convenience, divided