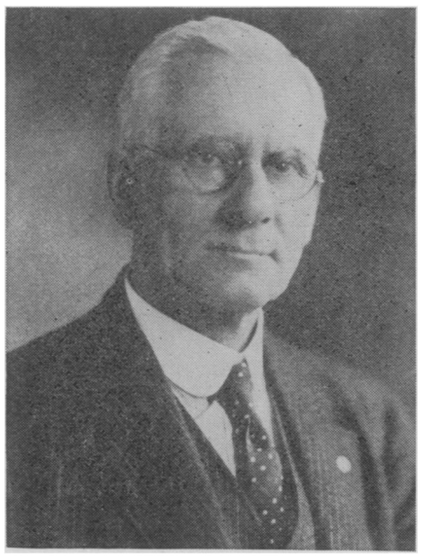

Prof. Charles F. Scott, of Yale, who received the Edison Medal of the American Institute of Electrical Engineers.

Tungsten and Mercury Cooperate to Make Synthetic Sunlight

Engineering

Lighting for Health

A NEW era of artificial lighting, in which the importance of illumination as an aid to health as well as to vision will be considered, has now dawned, Dr. M. Luckiesh, director of the General Electric Company's lighting research laboratory at Cleveland, told the American Institute of Electrical Engineers. The first great era came with the beginning of artificial lighting with the burning of crude materials, he explained, and the second with the use of electricity in arc and incandescent lamps.

"This dream of simulating sunlight," said Dr. Luckiesh, "and dispensing whatever health benefits there are in midsummer sunlight, while providing light for vision, has its beginning in the impressive logic of sunlight as a powerful environmental factor. It has been stimulated by some sound scientific facts which have been unearthed during the past 40 years. It has not been influenced by the recent craze for ultraviolet radiation proclaimed as a cure-all by charlatans or others who profit blandly or blindly in the twilight zone of knowledge.

"No attempt will be made to marshal all the major scientific facts which emphasize the value of sunlight. Admittedly, these are far outnumbered by vague data and unsupported claims. Sunlight does cure and prevent rickets; therefore, it is important to the health of children. In some places the death-rate is highest in or shortly after the season when the sunlight is at its minimum. There is some evidence that fewer colds are experienced by a group of persons systematically exposed to artificial sunlight than by a group not exposed. Sunlight is closely related to one or two vitamins—possibly to all. The effect of a single exposure to powerful ultra violet radiation for only a few minutes can be detected for two and sometimes three months after.

"These are examples of facts having sound or only partial foundations. But beneath all this is the powerful logic of sunlight as an environmental factor upon which all life depends directly or indirectly. It has been bathing this earth since the most primitive life began. Plants have developed under its heat and light. Eyes have evolved to see by its energy of certain wavelengths. Vitamin D at least is manufactured by it. Thousands of photochemical reactions selectively utilize its energy of various wavelengths. Viewing the completed picture of which the foregoing is only fragmentary, is it possible to believe that sunlight—so interwoven into life-processes—is not directly beneficial to human beings? Is it not easy to suspect that its benefits extend far beyond present knowledge and even far beyond the ability of our imagination to encompass at the present time?"

Dr. Luckiesh described a new sunlight lamp that has been developed in his laboratory that closely simulates sunlight, both in color and health-giving powers. It gives light in three ways. At the bottom of the bulb is a little pool of mercury. When the lamp is turned on, the tungsten filament glows, and the heat vaporizes the mercury, then a mercury arc is formed between two tungsten electrodes, so that about 68 per cent. of the light comes from the glowing electrodes, 25 per cent. from the arc and the remaining 7 per cent. from the filament. The lamp is simple to use, though it requires a transformer to step down the ordinary lighting current to the 11 volts on which it runs.

This lamp, declared Dr. Luckiesh, is 50 times as effective in producing tanning of the skin, known medically as erythema, as midday midsummer sunlight of equal intensity. The quartz tube mercury vapor arc, sometimes used for medical purposes, is 500 times as effective, he said, but has the disadvantage of requiring the user to wear goggles while using it, in order to prevent serious eye trouble. The new lamp, he said, requires no more caution than one would use with midsummer sunlight. Its bulb is of glass, which cuts out some of the shorter, and more harmful, ultraviolet rays, but passes those which have the most beneficial effect.

Scott's Honor

FOR his pioneering work in electric transmission, which has made possible the widespread use of electricity today, Prof. Charles F. Scott, of Yale, was honored by electrical engineers of the country when he was awarded the Edison Medal of the American Institute of Electrical Engineers.

Prof. Scott in his acceptance speech pointed out some of the amazing benefits recently derived from electrical research.

"For the first time in history our machine production creates an abundance which makes it possible to eliminate poverty," he said, and went on to call attention to the fact that electricity is not only directed by men but it is actually taking the places of men. Automatic telephone exchanges are now used instead of operators, and automatic power houses and substation devices are supplanting station operators.

The medal, founded in 1904 by

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friends and admirers of Thomas A. Edison, recognizes Prof. Scott as a leading electrical engineer of his generation. It recalls the fact that he was associated with engineers who built in Colorado the world's first long distance high voltage line. His name brings the Scott transformer, a connection he invented for changing two-phase power to three-phase, to the minds of engineers.

Prof. Scott, the nineteenth recipient of the medal, is a past president of the Amercian Institute of Electrical Engineers. He holds honorary degrees in arts from Yale, in sciences from the University of Pittsburgh and in engineering from Stevens Institute of Technology. He was born in Athens, Ohio.

Many prominent engineers and scientists have received the Edison Medal in the past, including George Westinghouse, inventor of the air brake; Robert A. Millikan, who isolated and measured the electron; Elihu Thomson, inventor of the watt-hour meter, the instrument which measures electrical energy; Michael I. Pupin, who first made long distance telephoning possible; and Alexander Graham Bell, inventor of the telephone.

R. E. Hellmund, chief electrical engineer of the Westinghouse Electric and Manufacturing Co., was awarded the Lamme gold medal of the American Institute of Electrical Engineers for 1930 for his "meritorious achievements in developing electrical machinery and apparatus." More than 300 United States and foreign patents cover Mr. Hellmund's inventions.

Air as Conductor

MORE knowledge about the mysterious high voltage phenomena of corona, a source of great losses in long distance transmission of electrical energy, was reported by Prof. Sigmund K. Waldorf, of Johns Hopkins University.

Prof. Waldorf was most successful in measuring with very sensitive instruments the power losses caused by corona and in recording its wave form. The results of his experiments form a valuable addition to the present paucity of literature on the subject.

Ordinary metals like copper and iron are conductors of electricity. But even air will carry electricity if there is enough voltage or pressure to force it from one conductor to another. As the voltage or potential between the conductors is increased the air begins to undergo changes. First, there is a dark discharge; current actually passes through the air but it cannot be seen. Then, with higher voltage, a glow is seen, and finally the discharge appears to be a number of sparks, called brush discharge.

Corona is manifest most on damp days when the conductivity of the air is great. Then it can be heard along high tension transmission lines as a loud humming, and the glow or brush discharge can sometimes be seen.

In his experiments Prof. Waldorf measured the corona loss from a wire conductor in the middle of a copper cylinder. He found that the loss from the wire across a 12 inch air radius to the cylinder per foot length is 25 watts, enough to light a small room.

Counting Health

A PORTABLE instrument which measures the intensity of the health giving ultraviolet rays by counting numbers on a meter was described by Dr. H. C. Rentschler, director of research for the Westinghouse Lamp Co.

The instrument makes use of a photoelectric cell with a uranium electrode which is sensitive to the ultraviolet rays that have the most healthful effect. The current flowing through it, which varies with the amount of light shining on it, charges a condenser. When the condenser, which holds electricity somewhat as a tank holds water, is filled, it overflows, or discharges, through a device known as a glow relay tube. This operates a relay, which in turn moves a counter up one number.

To use the instrument, the operator simply opens it up where the light is to be tested, and takes the number of counts in five minutes. In bright sunlight, said Dr. Rentschler, there will be a hundred counts in this period, while for half the intensity there will be fifty. If a longer record is desired, the counter can be connected to another device, which automatically counts the number of discharges in each five minute period over as long as thirty days.

Electrical Paradox

THE discovery of a material that will prevent the flow of electricity at low voltages and allow it to pass at high potentials, reported to the meeting by K. B. McEachron, General Electric engineer, gives the electrical industry a nearly ideal material for protecting its power lines from the great damage caused by lightning.

In normal times a lightning arrester of thyrite, the new material, will keep the current on the line. In storms, when lightning strikes, electricity will escape by way of the very arrester that so faithfully keeps normal power on the line.

Thyrite is a moulded compound including silicon carbide or carborundum. Figures on its relative cost compared with the cost of present types of lighting arresters have not been made public.

Each time the voltage across a piece of thyrite is doubled, the current increases 12.6 times. With practically all other substances current follows Ohm's law and is directly proportional to the voltage, so that doubling the voltage doubles the current.

Samples of the substance have a resistance of 50,000 ohms at 100 volts and less than half an ohm at 10,000 volts. They will carry lightning discharges as high as 30,000 amperes without any signs of distress.

The successful production of thyrite requires control of a large number of variables. The new material resembles black slate in color. It has mechanical properties similar to those of dry-process porcelain. In manufacturing, the material is moulded to the shape required and the contact surfaces are coated with metal by the Schoop metal-spraying process.

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K. B. McEachron and a cut-away lightning arrester containing thyrite, the dual-role substance which he made.