of the Bell Telephone Laboratories of New York explains, represents the radio and electrical engineers' answer to the unique and intricate problems which arise at the links between land telephone lines and their wireless trans-oceanic counterparts. Not the least of these problems is the fact that radio noise is much more severe than wired telephone noise. This makes radio transmitter power capacity large and expensive so that it is most economical to control the speech volumes to make them load fully the radio transmitter. When fully loaded a radio transmitter minimizes the effect of noise.

Best results on combined radio and wire telephone circuits could be achieved if first one speaker said all he had to say and then allowed the other to talk. Actually, in ordinary conversation there is a quick interchange of talk which is disastrous for good reception if both speakers want to talk at once. And that is where the "stammer" mechanism of the vodas comes in. It causes an almost imperceptible delay before the circuits will accept the voice of Mr. A, for example, after Mrs. A finishes telling him how little Johnny is. A one-sixth of a second lag is all the electrical vodas needs to handle the conversation in normal fashion.

Modern radio telephony requires a man in a control room to handle the two voices speaking, in a fashion somewhat like the operator in a radio control room in a broadcasting station. The control man's job includes adjusting the receiving relays to the particular amount of noise existing; adjusting the transmitting and speech volumes properly; selecting the proper hangover or delay time for the two voices and perhaps increasing the sensitivity of the transmitting side of the vodas for soft voices.

Science News Letter, September 18, 1937

ASTRONOMY

Sun Gives Less Light Than Supposed, Moon Gives More

Harvard Astronomers Find That Old Sol Is Weakling But Lunar Size and Reflecting Power Was Understated

ARE YOU still nursing a summer sunburn? Console yourself: it might be worse, if our sun were as husky as other stars in the same class. Actually, it's a comparative weakling. It gives off only about seven-tenths of the radiation it should, Harvard College Observatory scientists have just announced.

But on the other hand, if the full moon "does things" to you, science has an explanation for that, too: the moon has been found to be slightly brighter than has heretofore been believed.

Both these facts came out when Dr. William A. Calder at the Harvard College Observatory made pioneer determinations of the brightness of the two bodies with the now-famous electric eye or photocell.

Harvard astronomers said that the research gives the first indications they have had that the sun is below normal. An exact measurement of the sun's brightness is highly important to science because the sun is used as a standard for measuring and describing the energy emission and luminosity of more distant stellar bodies.

The new value obtained for the sun's magnitude by Dr. Calder is minus 26.32, four-tenths of a magnitude dimmer than the value derived by Dr. Henry Norris Russell of Princeton University in 1916 and used by astronomers all over the world since that time. Astronomically speaking, this is a large correction, indicating that the sun emits thirty per cent. less radiation than is normal for a star of its type. The sun is astronomically classified as a "G zero dwarf" star, signifying one predominantly yellow and of relatively low brilliance.

Dr. Calder urges, however, that his new value "be taken with caution" because of the important implications of his results.

The scientist's new value for the luminosity of the moon is also considered highly significant, and Harvard astronomers said his finding of a greater reflecting power than was suspected "has probably unsnarled one of the minor mysteries of this body."

Previous research had indicated that the moon's surface was made up of a very dark material with low reflecting power, technically known as an albedo of .07. Other investigators have held that the surface was composed of rocks of more normal reflecting power. Dr. Calder's work supports this latter view, giving the surface of the moon an albedo of .12, close to that of ordinary rocks.

For the moon's magnitude, Dr. Calder has determined the figure minus 12.66, slightly higher than the generally accepted value of minus 12.55. He has also found that the sun and moon are of virtually the same color, and that the moon is not more reddish as has been suggested.

The new values were obtained by

●RADIO

September 21, 4:15 p. m., E.S.T.

WAR ON WEEDS—Dr. Earl Bressman of the U. S. Department of Agriculture.

September 28, 5:15 p. m., E.S.T.

DISEASES OUTSIDE OUR DOOR—Dr. C. V. Akin, Chief Quarantine Officer for the Port of New York.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

comparing the sun's light with that given off by first magnitude stars, among the brightest in the heavens, but only about a hundred billionth the brightness of the sun as viewed from the earth. Both were compared with a standard lamp, the sun in the daytime and the stars at night, with the lamp 500 feet away. Stars used were Vega, in the constellation Lyra, Deneb in the Swan, and Capella in the Charioteer. Measurements of the light of the full moon were conducted in a very similar manner.

Science News Letter, September 18, 1937

MEDICINE

Match Inhaler Invented For Treatment of Colds

A FRICTION match for treating colds has been invented by Alfred Schmid of Berlin-Dahlem, reports the American chemical journal "Industrial and Engineering Chemistry." The device consists of a small glass rod coated with absorptive charcoal which contains a carefully measured amount of iodine. The tip of the match is covered with an incandescent mantle of easily ignited iron. When this covering is ignited, iodine vapor is created and can be inhaled directly. The inhaler can be carried in the pocket.

Science News Letter, September 18, 1937

Cherries, unlike many fruits, stop developing in color and flavor as soon as they are picked.

ASTRONOMY

Giant Variable Stars Vary Entirely By Laws of Chance

Statistical Analysis of Cycles of 400 Long-Period Variables Explains Why Blinks Were Unpredictable

SCIENCE'S many futile attempts to predict the changes in brightness of the heavens' blinking giants, the long-period variable stars, have been ended by the explanation of two Harvard astronomers that only the law of chance governs their irregular flarings and fadings.

Under this circumstance, say Leon Campbell and Dr. Theodore E. Sterne of the Harvard Observatory staff, no mathematician can possibly anticipate the irregular changes of brilliance. Their research has also eliminated the belief of some astronomers that there have been important and widespread evolutionary changes of increase of diminution of cycle among these long-period variables.

The findings are the result of a two-year statistical analysis of the cycles of nearly 400 long-period variable stars, some of them with observation records running back more than a century. These stars are a class of gigantic red suns which flare and fade in brilliance in periods ranging from several weeks to several months. When at their brightest they may be as much as ten thousand times more brilliant than when they are dimmest.

Early studies of these stars told astronomers that their cycles are not exactly periodic and that the irregularities are too large to be accounted for as observational errors, but astronomers have never been able to devise any formula that would enable them to predict the cyclical alterations. Some mathematical expressions have been obtained to cover a given series of data but these have almost invariably been away off in later observations.

In explanation, Mr. Campbell and Dr. Sterne say that "most of the irregularities of period can be attributed to a natural spread among the cycles of a star. Some cycles are longer than the average, some shorter. It appears to be usually a matter of chance, in a long-period variable, whether a particular cycle is long or short.

"In view of the improbability that over two different intervals of time there will be exactly the same proportions of long and short cycles, unpredictable deviations from uniform time-keeping should be expected."

As for evolutionary changes among these stars, the two scientists admit they have probably occurred since the universe was formed several billion years ago, but they find "no good evidence" of such a change during the past century. If there is any general evolutionary change, they say, it is too slow to be detected over so short a period as a hundred years.

The "mathematical chance" solution fitted nearly all of the stars observed, the only exceptions being a small group of stars which have shown increases or decreases "of too systematic a nature to be explicable by the natural spread among cycles." These included the stars R Hydrae, R Aquilae, U Bootis, R. Cancri and S Serpentis.

Science News Letter, September 18, 1937

Some kinds of palms make suitable house plants, says a Cornell botanist, but he warns that they cannot stand sudden changes of temperature.

Soviet scientists are trying to find out the meaning of 50 great structures of rough piled stones, about 3,000 years old, in Azerbaidjan.