

quartz. When an oscillating electric current is applied to two metal plates, between which is a quartz crystal of the proper size, the crystal starts vibrating. A single crystal, cut a certain size and shape, always vibrates at the same rate, when excited by an electric current oscillating at this rate.

If a current oscillating at a different frequency is applied to the plates, the crystal fails to vibrate. Such a crystal may be used to control an oscillating current, and as such finds practical application in radio. Many broadcasting stations are "crystal controlled," which means that such a crystal keeps them from deviating from the frequency, or wavelength, assigned by Uncle Sam.

As Dr. Marrison has set up the experimental apparatus in New York, three crystals are used, each vibrating a hundred thousand times a second. Each is enclosed in a padded case to keep the temperature constant, and covered with a bell jar to prevent changes in air pressure of humidity. Each crystal is connected with an oscillating circuit from vacuum tubes, which keeps them running.

Any crystal can be connected with the clock through the medium of an electrical circuit called a "submultiple generator." Thus from the crystal there comes a current oscillating exactly 100,000 times a second, which is fed into the submultiple generator. Out of this comes a current of one one-thousandth of the frequency, that is, oscillating a thousand times a second. The current operates a 1,000-cycle motor that is geared to the hands of the clock face. Already, over short runs, Dr. Marrison has found that the clock rate keeps within a hundredth of a second a day, about the same as that of the Riefler.

Science News-Letter, August 23, 1930

"Ruins" of Nature

THE reported discovery of "ruins of a large stone city containing hundreds of buildings" about 100 miles from San Diego, has been investigated by Spencer L. Rogers, curator of anthropology of the San Diego Museum, who reported to Science Service that the stone "city" was built by nature, and not by prehistoric Indians.

The site with its irregular stone formations was once chosen by Indians as a convenient ready-made place for a habitation, Mr. Rogers found.

Archaeology

Science News-Letter, August 23, 1930

Train Dispatchers With Shifting Eyes

Medicine

DISCOVERY of a new occupational disease among railway train dispatchers in America was made by the Industrial Health Conservancy Laboratories of Cincinnati according to information made public by Dr. Carey P. McCord.

Of a group of 165 dispatchers from seventeen different railroads examined, two-thirds were afflicted with an involuntary to and fro shifting of the eyes which is the characteristic symptom of nystagmus, as the new disease is called.

Until the present time, America has been regarded as free of this occupational menace, which has taken a great toll of mine workers in England since its discovery there. Its exact cause is not definitely known, some authorities attributing the disease to deficient illumination and others to the eye strain resulting from constant motion of the eyes following objects in motion, as the eye of a miner follows the point of his pick or the sewing machine operator watches her needle.

Explaining the appearance of the optical ailment among the train dispatchers, the fatigue theory has been forwarded as more logical and continued use of a train sheet blamed for the eye strain.

Reports from the U. S. Public Health Service of Washington state that previous to this time practically no evidence of nystagmus has been discovered in this country. The Illinois commission examined 500 pick men in the mines of that state but did not find a single victim. From this it was assumed that superior hygienic working conditions in the United States rendered the American laborer immune from the disease that was cutting into the ranks of English workmen, often incapacitating them for work in the prime of life.

Naturally strong eyes appear to be no guarantee against the inroads of nystagmus. Dr. J. W. Tudor Thomas of the Cardiff Royal Infirmary found from a study of five hundred cases of nystagmus among miners, that as many workers originally blest with normal vision had been afflicted with the disease as had workmen with defective eyesight.

Neurotic tendencies, alcoholism, and anemia are thought to be factors increasing the hazard of nystagmus. That the workers in coal mines are the most frequent sufferers further suggests that the absence of colors may in some mysterious way react unfavorably on the eyes.

Science News-Letter, August 23, 1930

Beautiful New Waterfalls in Africa

Geography

A SERIES of gorgeous waterfalls never before seen by a European and practically unknown to natives have been discovered in South Africa by Farquhar B. Macrae of the Northern Rhodesian Civil Service and described by him in a report to the Royal Geographical Society.

One of the falls is 200 feet in height, or 33 feet higher than the Niagara Falls, and rivals in beauty the Famous Victoria Falls which are about twenty miles distant. This fall is, however, only one of a series following each other in rapid succession so that the total effect is that of a much greater drop totalling 334 feet. They are known to the natives as the Chiengkwasi Falls and are on the Chunga River which empties into the Zambezi. It is on the Zambezi River that the Victoria Falls are located. In describing the Chiengkwasi, Mr. Macrae says:

"The main Chiengkwasi fall is a fine sight. Numerous very green ferns grow in holes and cracks in

the stone and the water dashes down over the smooth face of the rock, spurting out into little plumes of spray wherever it meets an obstacle. In times of flood it must be an awe-inspiring sight during the few hours that such a short river would remain at its maximum height."

A few miles from the Chiengkwasi Mr. Macrae found another impressive series of five falls. The largest of these was a drop of 83 feet.

"Below this fall the scenery is most imposing," he continues, "towering basalt precipices rise on either side of the river, which is never much more than 100 feet broad and is generally considerably narrower. At one point the cliffs cannot well be less than 400 feet high and are probably higher. They rise in one sheer wall from the water's edge. The general impression of height is greater than that conveyed to an observer standing at the bottom of the Palm Grove at the Victoria Falls."

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