PHYSICS

"Sound Prism" Analyzes Musical Tones Instantly

COMPLEX overtones that distinguish various musical instruments and human voices are broken up into a "sound spectrum" by a new instrument demonstrated at the annual convention of the Institute of Radio Engineers in Philadelphia. This device performs the analysis of sound in about a tenth of a second, which with previous methods required hours of tedious work.

The various frequencies of the sound are projected visually, spread out on a screen, just as a prism spreads light rays into the rainbow-like spectrum of light. The new device, which has received the convenience-name of "sound prism," was developed by Prof. Knox McIlwain and O. H. Shuck of the University of Pennsylvania. It is expected to be of great assistance to radio engineers, in determining how far apart in wavelengths it is necessary to separate broadcasting stations to secure the natural transmission of sounds produced by various musical instruments.

The necessary wavelength separation of radio stations for the natural transmission of sounds was discussed at the meeting of the National Association of Broadcasters. This may become a problem of great importance, since if it is necessary to provide a wide wavelength separation of stations, the broadcast band will be too small to accommodate all those now in existence.

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EUGENICS

Stanford Makes Record For Co-ed Marriages

AN AMERICAN girl who yearns for a higher education plus a husband will have the best chance of getting the husband if she graduates from Stanford University.

This is the lesson to be read from statistics on marriage rates for five western colleges, presented to the Eugenics Research Association. The investigation was made by Mrs. Caroline H. Robinson of Swarthmore, Pa.

Western college girls, the general verdict runs, are more likely to marry, and to marry early, than graduates of Swarthmore, which college, Mrs. Robinson said, "has been thought to hold the palm in these matters in the East."

The University of California at Berkeley stood out as having a low marriage rate among its women graduates. Stating that from 1874 to 1907 one half of this university's alumnae remained unmarried, Mrs. Robinson compared it to Barnard which has a low marriage rate. Both, she pointed out, are metropolitan education centers.

The marriage rate for the men graduating from western colleges was far higher than for Harvard men.

Throughout the 5,489 cases studied, Mrs. Robinson found a tendency to marry earlier and earlier among the more recent college classes.

In a special study of the marital status of over 4,000 Stanford alumni, Dr. C. Gilbert Wrenn of Stanford University reported finding that "maritally, Stanford men form a very significant group with a marriage rate far higher than that at Harvard." In the years between 1903 and 1912, the rate rose to a peak of over 89 per cent. In the preceding decade, a depression time, and in the decade including and following the World War, the rate was 82 per cent. Just the opposite of the men, the Stanford women graduates had a higher marriage rate in depression eras than in prosperous years.

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MEDICINE

Malaria in Drug Addicts Treated By New Medicine

THIRTY-NINE morphine addicts admitted to Bellevue Hospital within the past six months had malaria.

A study of ten of these patients showed that the malaria was acquired as a result of sharing a home-made hypodermic outfit—"the works" as the addicts call it—with other addicts, some of whom apparently had malaria germs in their blood, Drs. Emanuel Appelbaum and Ben B. Gelfand of Bellevue Hospital reported to the American Medical Association.

The addicts injected the morphine directly into their veins, using a needle attached to a medicine dropper. The outfit was neither cleaned nor sterilized between shots, going from one man's vein to another and sometimes carrying malaria-infected blood with it.

Atabrine, a relatively new laboratory-made medicine, was used in treating six of these patients. The results were so promising that the physicians recommend giving it further trial in treating malaria patients.

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IN SCIEN

ENGINEERING

Dry Ice May Compete With Blow Torch in Metallurgy

SOLID carbon dioxide, popularly named "dry ice," may, at a temperature of 112 degrees below zero Fahrenheit, compete with heat in securing "shrink fits" for machine parts.

W. H. Swanger of the National Bureau of Standards who has been conducting experiments with solid carbon dioxide reports that machine shop practice may come to accept the new method of applying excessive cold instead of heat in shrinking metals.

When it is necessary to secure a metal band to a shaft, the usual practice is to heat the band. Expansion allows it to be slipped into place, and as it cools it contracts to a tight fit. However, by "refrigerating" the inside part, or shaft, it can be shrunk materially. The band is slipped on and when the shaft warms to room temperature it expands to normal size, and a tighter fit is secured.

Relatively a curiosity five years ago, the domestic production of frozen carbon dioxide has in recent years exceeded 40,000 tons.

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MEDICINE-PSYCHIATRY

Threats Against Life Cause Digestive Ills

THREATS to life and security do evil things to the digestion. Cases were reported by Dr. George E. Daniels of New York City to the American Psychiatric Association.

One young woman was admitted to the hospital suffering from nausea and abdominal pain. Her fear of being discharged from the hospital brought out the story that she dreaded, perhaps needlessly, the possible reappearance of her former worthless husband with whom she had been most unhappy. She was sure he would kill her or kidnap their child. When psychiatrists made her feel that she would be protected she recovered from her stomach disorder.

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CE FIELDS

ARCHAEOLOGY

Ancient Ruins May be Set Aside for Research

THE GOVERNMENT is considering a new kind of prehistoric national monument.

Certain ancient ruins would be set aside, not for the general public to visit, but for scientists to explore.

The suggestion of establishing such reservations for research was made by Frank Pinkley, Superintendent of Southwestern National Monuments. The proposal is now being discussed by Park Service officials with scientists at the Smithsonian Institution and other well known archaeologists.

An example of the type of reservation under consideration is an open ruin in the Verde Valley of Arizona, which is valueless from an agricultural and a grazing standpoint. The area contains enough research material to provide many seasons of scientific work. As it is near Montezuma Castle, a cliff-dweller ruin national monument open to the public, it could be supervised by the custodian of that monument, thus keeping administrative expense to a minimum.

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PSYCHIATRY

Size of Family Affects Behavior of Children

CHILDREN from large families do better in arithmetic classes; children from small families are better in reading.

More intelligent children, as measured by intelligence tests, are found in small families.

Children in small families are more apt to steal and commit sex offenses, while children in large families are more given to lying.

These facts, gleaned from a study of over twenty thousand children in Massachusetts public schools, were reported by Dr. Neil A. Dayton of Boston to the American Psychiatric Association at the closing session of its meeting in New York City. The children were all below the average mentally and had had to repeat each year's work in school before passing into the next grade. Dr. Dayton did not state whether or not the facts learned from studying these children would apply to children of normal intelligence.

Restriction of immigration will reduce the number of mentally deficient persons, in Massachusetts at least, Dr. Dayton concluded, because the large families, from which children with lower intelligence quotients come, are found among the immigrants.

As to personality, the children from the large families were rated as obedient, social, stubborn, suggestible and quarrelsome. Those from the small families were emotionally unstable, seclusive, selfish, egotistical and overaffectionate.

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PSYCHOLOGY

Heart Shown to be Real Center of the Emotions

ALTHOUGH long neglected by scientists, there is a real scientific basis for the popular expressions that refer to the heart as the seat of the emotions, such as: "soft-hearted," "dying of a broken heart," and "grief gnaws at the heart."

Experiments upholding this idea were reported by Dr. Theodore P. Wolfe of New York City to the American Psychiatric Association.

When pleasure is felt, he found, there is an increased blood flow to the limbs and body surface and a decreased blood flow to the digestive organs. With unpleasurable feelings the reverse is true. This may be called, he explained, the scientific basis for the expression, "my heart dropped into my stomach."

Merely the thought of moving an arm caused an increased blood flow to it, he found, although when someone else raised the patient's arm without his having thought about it, there was no increase of blood flow into it.

Another example of the close connection between the heart and the mind is found in dreams. Questioning some hundred heart disease patients at the Presbyterian hospital in New York City, Dr. Wolfe learned that most of them had dreams in which their lives were threatened. These dreams occurred only at the time of a flareup of the heart ailment.

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MEDICINE

"Brain-Stones," Rare Disease, Reported

AN UNUSUAL case of "stones in the brain" was reported before the meeting of the American Psychiatric Association by Dr. Jacob Kasanin of the Rhode Island State Hospital for Mental Disease. This condition is a disease of the blood vessels of the brain in which calcium, the mineral found in bones, is precipitated into the small arteries.

Physicians believe the disease tends to run in families and that it is associated with epilepsy and mental deficiency.

It should be easy to diagnose the condition by X-ray pictures, Dr. Kasanin said. Only about half-a-dozen such cases have been reported in America, and the first ones were thought from the patients' symptoms and behavior to be brain tumors. The underlying cause of the condition is not known, except that it is some degenerative condition of the brain.

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AGRICULTURE

Selenium Poisoning Prevented with Sulfur

THE possibility of combating selenium poisoning in animals through a sulfur treatment of the growing plant is suggested by Dr. Annie M. Hurd-Karrer, pathologist of the U. S. Department of Agriculture.

Selenium injury in wheat plants, according to Dr. Hurd-Karrer, is almost identical with the sulfur-deficiency disease. By growing wheat plants in soil treated with sodium selenate and later further treated with various sulfur compounds, as well as the element itself, it was found that the green-tipped white wheat leaves of selenium-injured plants could be entirely prevented.

Dr. Hurd-Karrer's thesis is that the selenium compound reacts with the sulfur, the latter elements becoming unavailable to the plant, resulting in a malnutritional disease, sulfur deficiency. When an excess of sulfur is added, so that the effects of the selenium are overcome, a normal plant is produced.

This inhibition of symptoms, says Dr. Hurd-Karrer, suggests that the entrance of selenium into plants and the consequent toxicity for animals may be conditioned by the sulfur available.

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