

## PSYCHOLOGY

# Turn on the Light Brightly; Then You Can Hear Better

## Tests Prove Eyes Are Real Help to Ears; Sensitivity of Fingertips to High Pitched Vibrations Found High

**D**O YOU sometimes feel that you cannot distinguish sounds very well when you are out on a very dark night?

You may be right. Your eyes are a real help to your ears in distinguishing the pitch of two notes or the intensity of different sounds, it appears from tests reported to the American Psychological Association meeting in Chicago by Dr. George W. Hartmann of Pennsylvania State College.

The tests were given at night in a room which was alternately dark and then flooded with brilliant illumination from a total of 510 watts in electric lights. In another series, each test in the dark was followed by one with a lighted 100-watt bulb dangling directly before the listener's eyes.

The listeners were consistently better able to distinguish both pitches and intensities when in the light.

### Hearing Through Fingers

The fingertips are sensitive to vibrations much higher than what has been considered the upper limit for them, Dr. Robert H. Gault, of Northwestern University, told scientists gathered for the meeting.

This sensitivity of the fingertips to the higher ranges of vibrations is important because of the possibility that the deaf may be able to supplement their lip reading with "finger hearing."

Previously the upper limit has been set at 2,700 double vibrations per second or less. In Dr. Gault's laboratory, subjects were able to detect rates as high as 8,192 per second. This, he believes, is due to the instrument used for transmitting the vibrations.

The ear is 100 times as sensitive as touch at 64 double vibrations per second, but at 4,096 per second the ear is 500,000 times as sensitive. Correct amplification might correct for these variations in sensitivity, Dr. Gault said.

If you have difficulty in hearing a conversation conducted in a noisy place, or if you cannot understand a speaker who seems to be talking loudly enough, your

difficulty is quite likely not with your ears at all.

Some persons have outstanding lack of ability to perceive speech, Dr. Thomas H. Howells, of the University of Colorado, told members of the American Psychological Association.

A novel test prepared by Dr. Howells revealed this defect. It was prepared by dictating common words and recording them, along with different conflicting sounds, in a sort of jumble of sound on phonograph records. The records were then played quite loudly.

Strangely enough, it was found that there is practically no relation between scores on speech perception under these circumstances and scores on tests of hearing ability.

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## MEDICINE

## Medicine Advanced By Crystal Pure Secretions

**P**URIFYING gland secretions until they will form crystals, an accomplishment of modern chemistry, is one of the greatest aids that the medical art has received in recent years. It enables the physician to gauge his dose exactly instead of estimating it, it makes possible the introduction of drugs directly into the blood stream for practically instantaneous effect, and in many cases it eventually leads to the synthetic production of the same or even better principles at lower cost.

Progress in medicine made possible by the identification and purification of the hormones or ductless gland secretions was outlined in an address in Chicago by Prof. Julius Stieglitz of the department of chemistry, the University of Chicago.

Prof. Stieglitz related one dramatic incident that came under his own observation: "A mother lay ready for childbirth in the Chicago Lying-In Hospital but with a heart too weak for the strain. Her heart had actually stopped beating and the eminent obstetrician

faced the necessity of sacrificing the mother to save the child by a Caesarian section, but he allowed one minute more for an injection of epinephrine. The heart responded, the mother revived, and with the support of epinephrine passed through her ordeal. Today both mother and child are alive and well."

Epinephrine, used in this case, was the first of the hormones to be isolated in crystalline form; this was the work of Prof. John J. Abel, veteran scientist of the Johns Hopkins University. One of the latest hormone isolations is the work of a very young chemist, Prof. Edward A. Doisy of St. Louis University. The gland extract which he has succeeded in purifying to crystalline form is theelin, the female sex hormone. It has been used by physicians not only for the correction of deranged sex-physiological conditions, but for the successful treatment of mental disorders and other secondary disturbances.

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## INVENTION

## New Device May Enable Blind to Read Printing

**A**N INVENTION which promises to allow the blind to read and which may thus become a boon to those without sight has been made by Georg Schutkowski, a Berlin engineer. It is based on what the inventor calls "optical congruency" and applies photoelectric cells, now used for the detection of differing intensities of light, to the detection of differing forms and figures.

From a letter, or figure, two corresponding pictures are produced by photography. Projected on top of each other, the two pictures are completely covering.

In the device of Schutkowski a negative film of a common printed alphabet is put into a revolving drum, which has windows at regular intervals. An optical lens combination projects the original black print alphabet onto the windows of the drum, in which the negative picture is located in reverse position. When the projected black print letter falls on the proper negative of the drum, complete darkness is produced behind the film for the fraction of a second. A photoelectric cell, which is placed behind the drum, consequently is in darkness for this time. Attached to the photoelectric cell is an arresting magnet, which for the fraction of the second stops the motion of the drum and connects the current of an electric phono-

graph to a loud-speaker. The phonograph record has at the given place the corresponding letter in speech. So the printed letter is reproduced as sound. The blind man thus hears the letter which is printed in the original print.

It is also possible to let him feel it instead of hearing. To this purpose the current moves the letters of a Braille alphabet which are fixed on levers.

The same principle could be of course also applied to translating letters into secret codes, or letters into figures, or letters of a language into the sound of another one. But the chief application projected is for the use of the blind to allow them to hear or feel ordinary print.

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PLANT PHYSIOLOGY

### Plants May Produce Some Oxygen For Own Needs

**O**XYGEN needed by the roots of plants may be to some extent supplied by the plants themselves, from the oxygen generated as a by-product in the manufacture of food in the leaves. Evidence on this point has been obtained in experiments by Prof. W. A. Cannon of Stanford University, who has made preliminary reports to the Carnegie Institution of Washington and to *Plant Physiology*.

Prof. Cannon set jars containing shoots of willow and other plants in darkness and in light, and compared the rates at which their roots used up oxygen. He found in the larger number of cases that the illuminated shoots needed less oxygen from the outside, and therefore reached the tentative conclusion that the extra supply of the needed element was being provided for internally.

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TECHNOLOGY

### Electric Process Makes More Efficient Sandpaper

**S**ANDPAPERS that are claimed to be 50 per cent. more efficient than the best previously manufactured brands are now made by a 75,000 volt electrical process.

This intense electrostatic field sprays the cutting particles of garnet, aluminum oxide and silicon carbide on to the glued paper more evenly.

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ECOLOGY—ANTHROPOLOGY

# Shifting Corn Belt May Have Influenced Culture Migrations

**T**HE GREAT American corn belt, that rich agricultural empire that now centers in eastern Iowa and western Illinois with its borders extending from Indiana to central Nebraska, seems to have been more or less of a migrant during past ages, swinging from west to east and back again in sensitive response to change in climate. Evidence that its center was once as far east as Ohio has been found in the records of prehistoric Indian cultures by Prof. Paul B. Sears of the University of Oklahoma.

Much evidence for changing climates in North America during the past ten thousand years or so has been produced by the study of pollen grains and other plant remains buried in peat bogs, and a good correlation between these changes and similar ones in Europe has been worked out. In these researches Prof. Sears has made himself a leader.

The succession of post-glacial climates has been cold-moist, cool-dry, moist, warm-dry, moist again. With each succeeding type of climate a characteristic type of vegetation has developed in any given part of the eastern United States. In the Ohio region it worked from forests of evergreens in early post-glacial times up to a rich mixed forest of hardwoods some five thousands years ago. Then came the period of warmth and comparative dryness. The forest became more open, invaded by open grasslands. This set up conditions most favorable for the cultivation

of corn and for the invasion of bison herds. This phase ended in the return of a moister climate and the re-growth of the heavy forest which white men found when the first explorers entered the Ohio valley.

The archaeological records examined by Prof. Sears indicate that with each type of natural vegetation there was probably associated a special type of Indian culture. At the crucial time when the Iowa-like prairies invaded Ohio and made corn-growing and bison-hunting possible, there was in possession of the land a predominantly hunting people, of the Algonkian Indian culture group. As their native forests retreated eastward they went with them, and their place was taken by a corn-raising Indian people from the West, a people we know now only from their mound-building culture, one high type of which we call the Hopewell. They held the land and built their monuments; but when the climate switched to forest-favoring humidity again they had perforce to return whence they came, where cornfields and buffalo-hunting were still possible. As they left, the forest-dwelling Algonkian re-possessed themselves of the land.

Histories of similar culture-migrations following the migrations of natural vegetation as influenced by climatic fluctuations have been traced by Prof. Sears for other parts of the country; he terms the study "the archaeology of environment."

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