

sketchy abstracts in one of the Western languages. This has resulted in a mutual walling-off between science within and outside of Russia, to the mutual disadvantage of both sides.

Russian scientists, Prof. Wood admits, could quite logically demand that outsiders learn their language; but as a practical thing it does not look at all probable that they will do so. Besides, if they did, he points out further, there is a growing

scientific literature in Japanese, Finnish, and other languages impossible for the average European or American to read.

Since Latin, once the "lingua franca" of scholars, has long since been abandoned, Prof. Wood expresses the hope that his colleagues in the Soviet realm will be willing to make more use of one of the three commonly accepted international languages of science.

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## PHYSIOLOGY

## Map of Ear's Membrane Shows Parts "Tuned" to Each Pitch

### Experiments With Guinea Pigs Demonstrate Selective Nature of Membrane; Low Notes Crowded at One End

**R**OSA PONSELLE'S notes do not sound the same to you as Lawrence Tibbett's. Of course not.

But just how do you tell them apart?

What is there in your hearing apparatus that tells you, now a soprano is singing, now a tenor?

Controversy on the old question of just how your ear or your brain sorts out sounds of different pitch and makes you distinguish between them was renewed at the meeting of the American Psychological Association. Agreement has been reached on some points, however.

The ear itself is the sorting mechanism, according to one viewpoint, presented by Dr. Elmer Culler of the University of Illinois and Dr. S. S. Stevens of Harvard. The membrane of the ear is so "tuned" that only one part of it will be set in vibration by a note of any particular frequency. In this it acts like a set of radio receivers, each tuned to pick up a different wavelength.

New evidence for this theory was shown to scientists at the meeting, in the form of actual maps prepared by these investigators, working independently, to show just where on the membrane different notes are picked up. At one end of the membrane, which is curled up in the ear like a snail in its shell, are the "receivers" for a wide range of the lower notes. All the notes of the human voice and those up to 2000 cycles are bunched in one half of the membrane, it was found.

The survey for Dr. Culler's map was made by applying each of 23 frequencies throughout the auditory range to one place after another on the membrane, until, by "listening in," the area of great-

est response was located. Dr. Stevens used guinea pigs which had injuries to different parts of the membrane. He carefully noted which tones the animals could not hear. In general, the two independently prepared maps agreed with each other and with theoretical maps of the human ear based on keenness of hearing for different pitches.

Of another school of thought are the Princeton scientists, Drs. Charles W. Bray and Ernest Glen Wever, and Dr. George P. Horton of the University of Washington. A very loud tone is not picked up by any single area of the membrane but sets the greater part of it in vibration, in the opinion of these investigators.

When animals hear a single very loud

pure tone until their ears are so tired that they are temporarily deafened, the deafness is not just for the tone which tired them but for all tones in general, indicating that the mechanism for picking up one note is not distinct from that for hearing other tones, Dr. Bray said.

Probably the difference in intensity of the tones studied accounts for why his results differ from those of the Illinois and Harvard scientists, he explained. For moderately loud tones, the place theory seems adequate and there is no dispute, he said.

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## CONSERVATION

## Hawaii Strives to Save Almost Extinct Wild Goose

**H**AWAII has a wild goose, called "nene" by the natives, which is among the rarest of birds. It is obviously closely related to the Canadian wild goose of North America but has been isolated for so long that it has developed into a breed that is distinct with its own peculiarities.

Nene at one time were abundant in Hawaii but as the country settled up they gradually approached extinction. Finally but a few remained in a domesticated state at two ranches high up in the mountains. It was then that the territorial fish and game authorities stepped in, secured a number of nene, and propagated them at their farm. Now there are some three score in the flock and careful provision has been made to prevent extermination of the species.

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THE RETURN OF NENE