instant later, the hook on the cable will snare the rope holding the container of outgoing mail. Service is thus possible in towns too small to afford excellent airports.

Another important aeronautical promise is also implicit in the All-American service, which is headed and financed by Richard C. du Pont, glider pilot. For, if these planes which carry no passengers can be made to pay for themselves, and if all first class mail ever does go via air, a day will come when passengers and mails will go in separate planes.

Two routes are to be operated, covering the 56 small cities. One will go from Philadelphia to Pittsburgh, with mail pick-up and delivery at 26 intermediate points. The other will run from Pittsburgh to Weston, W. Va., with 30 intermediate stops.

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PHYSICS

Audience Given a Deafness In Mass Demonstration

Sounds Barely Perceived Against Noise Background Become Clearly Audible When Distraction is Removed

SCIENTISTS at the meeting of the Acoustical Society of America were made deaf en masse for a time and learned how one type of deafness appears to the afflicted.

Dr. Harvey Fletcher, acoustical expert of the Bell Telephone Laboratories, put on the show which every person with normal hearing ought to hear to learn the problems of those who live in a world of ringing bells, sirens, waterfalls and murmurs of voices.

While many deaf people hear no sounds, others have a kind of nerve deafness which produces sensations of noise in their head.

Day and night bells may ring, sirens may grind out their shrilling noises, the roar of waterfalls may be heard or even —in some cases—actual voices seem to be murmuring in a distracting background of sound.

To his audience, Dr. Fletcher brought such sounds by loud speakers in the auditorium and then, superimposed on this background of extraneous noise, he added simple speech, music and other understandable sounds.

Like the deaf people, members of the audience experienced great difficulty in hearing under this condition. Then suddenly, by removing the background of noise, Dr. Fletcher showed that the articulate speech which they had been trying to hear was really roaring at them as one might shout at a deaf person.

The ringing sounds in the heads of deaf people have been known to cause some eventually to commit suicide. While there has been no certain knowledge, it has been suggested that in some cases the "voices" which famous characters of history have heard—like some of the saints and Martin Luther—may have been due to this type of deafness which produced head noises interpretable as ever-present voices. Luther's encounter with the Devil in which he hurled the inkpot at Satan may have had this physical interpretation.

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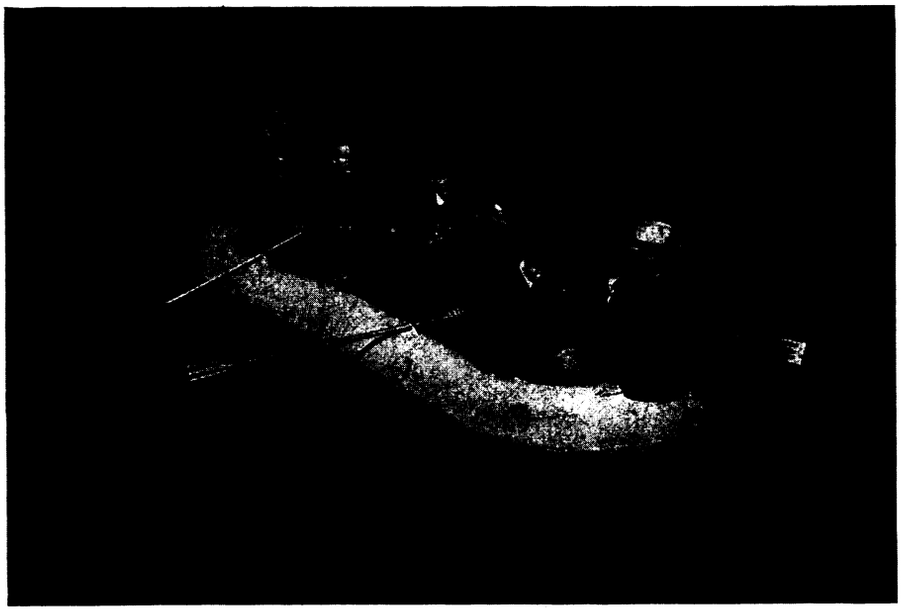
AERONAUTICS

Life Raft for Planes; Can Support 20 People

A NEW type of virtually unsinkable pneumatic life raft, designed to prevent repetition of forced landings by over-water planes as in the case of the British Cavalier several months ago with tragic consequences, is announced by U. S. Army Air Corps engineers at Wright Field. Larger than previous types, the new "rubber boat" will accommodate ten passengers and will provide sufficient buoyancy to support ten additional men clinging to lifelines attached to the boat.

A latex rubber bladder, canvas covered, supports the boat, the bottom of which is of heavy rubberized duck fabric, and contains three pneumatic inflatable seats. Valves and manifolds are provided on the latex bladder for inflation by carbon dioxide gas, and cylinders of this gas are attached. About five pounds of the gas are required for complete inflation.

The life raft is equipped with a pump and repair kit to patch leaks, so that the raft under ordinary circumstances will remain afloat almost indefinitely. Waterproof containers attached to the raft contain four army canteens of water, emergency rations, an emergency signal kit with six red flares, and a flare pistol. The raft may be rowed by four



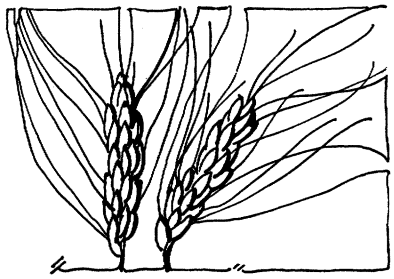
TEN MEN IN A BOAT

This official photograph of the U. S. Army Air Corps shows how their new collapsible rubber air raft carries ten men to safety. Earlier rafts of this sort could hold only two.

AGRICULTURAL ECONOMICS

NATURE RAMBLINGS

by Frank Thone



After Drought, What?

DROUGHT'S grip on the Great Plains seems to be slipping. Winter brought more snow, spring more rain; dust storms are only intermittent now instead of nearly incessant. A timid green creeps over the Dust Bowl. Farm families, who trekked in creaking jallopies to California, Oregon, anywhere to get away, are drifting back, and those who stayed are hoping to get off relief and "make a crop" for themselves again.

This return from exile gives land-use scientists a chance to grow some new gray hairs. If farm practices are renewed on the old basis, with the coming of a cycle of good rainfall, the Plains will be all set for another act of the same tragic drama when drought returns—as return it doubtless will, some day.

All of which makes timely a new WPA publication, *Farming Hazards in the Drought Area,* written by R. S. Kifer and H. L. Stewart of the Bureau of Agricultural Economics, U. S. Department of Agriculture.

Although they sedulously avoid dramatics and stick to unimpassioned facts and figures, the grief and misery that stalked the West during the nightmare of the mid-thirties crop out in spite of them, through the chill statistics of families on relief, debt loads, depletion of cattle through drought-forced sales, and so on.

Recommendations for rehabilitation necessarily vary from section to section, but in general the reformed land-use practices would include increasing the size of the farm units in the drier areas, taking wind-eroded soils out of plowed crops and putting them under permanent native grass sod, diversifying crops instead of putting almost exclusive emphasis on wheat, and above all developing a relatively small-scale, one-family livestock industry.

The report recognizes the necessity for financial assistance to farmers in accomplishing this program, as well as the fact that such loans will probably have to be government-backed. But no choice is seen between this and continued bankruptcy and misery for a whole major geographic section.

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Noise Reduction

NOISE reduction in business and industry is a splendid objective, but all too little attention has been given to the proper acoustical design of ear plugs which will enable the wearer to reduce markedly the bewildering irritating and potentially damaging "sea" of noise which surrounds industrial workers everywhere, said Prof. Vern O. Knudsen of the University of California at Los Angeles.

Most ear plugs on the market, Prof. Knudsen indicated, are designed more for swimmers than for hearers. In a systematic acoustical study of such devices Prof. Knudsen has been able to devise improved forms.

One "ear defender," as the device is known, consists of a tapered rubber plug containing an outer plug of heavy metal and an inner plug of soft rubber. The two plugs, which for high insulation against sound should have inertness as large as possible, are coupled by means of an air space and the rubber walls of the tapered tube.

A fifty-decibel reduction in sound intensity is achieved with these new devices; a reduction equivalent to the change in sound intensity on a busy street to that in a quiet garden.

Just as grays, whites and blacks in the background of a painting may enrich the colors of the picture's main theme, so too will the music of the future be played against a background of synthetic tones which will enhance the music's main theme, Dr. Knudsen predicted.

These background "unpitched sounds" can be generated in a type of apparatus already developed — the Voder — which by electrical circuits can simulate a wide variety of natural sounds and even sounds which have never been heard before.

It is possible, suggests Prof. Knudsen, to use filters that will select tonal bands from these sounds which will form a harmonic series. By the musicians of the future these sounds could be incorporated into music as background which will enrich the main theme melody.

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Buzz and Hiss Make Speech

A BUZZ and a hiss—that's all there is to human speech, even the smoothest sugary tones of a radio announcer.

Bell Laboratory scientists showed that a buzz and a hiss combine to give every infection in the whole gamut of human speech. The buzz-hiss sounds mix and mingle in the throat and mouth and turn into intelligible speech.

The first sound, called the "buzz," has three properties. It has a pitch determined by the fundamental frequency of vibration; an intensity determined by the total sound power issuing from the speaker's mouth; and it has a quality determined by the relative amounts of sound power carried in various frequency bands. The second sound, the hiss, has no pitch whatever and is only a noise.

Homer Dudley demonstrated a new device — yet unnamed — which takes a spoken sentence apart and then puts it together in any fashion the scientists may desire. A young man's husky tones turn to those of a quavering old man, or to the pleadings of a lovelorn girl, at the twist of a dial.

Basically the new speech analysis instrument is like the Voder—now being shown at the World's Fair—but it is controlled by the speaker's voice rather than by keys.

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Buildings Shaped by Sound

BUILDINGS shaped by sound, rather than geometry alone, should add a strange new beauty to the architecture of tomorrow, J. P. Maxfield and C. C. Potwin of Electrical Research Products, Inc., asserted.

The demands for good hearing characteristics in auditoriums and concert halls have been so great that acoustical factors are influencing the appearance of new structures, they said.

The old method was to design and build a structure and then apply corrective acoustical tricks if needed for better hearing. Modern architects plan from acoustics first and find that the acoustical requirements often produce pleasing new shapes and contours.

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