

A GIANT VOICE

A WONDERFUL NEW HORN

Motorists along an open road near Pittsburgh, Pa., U.S.A., recently were amazed by the thunderous music of a brass band playing a march, although an empty hillside lay between them and the nearest building, three-quarters of a mile away. Despite the absence of any visible source of music, they subsequently heard, sweeping forth with full volume and clarity, the swelling chords of the pipe organ, the crashing crescendos of a great male chorus, piping piccolos, booming bass drums, and velvety-voiced violas.

The occasion was a public demonstration, attended by newspaper men, music critics, and electrical engineers, of the latest form of loud-speaking device for which a patent has just been granted to Clinton R. Hanna and Dr. Joseph Slepian, the inventors, both members of the Westinghouse Electric Company's research staff.

New Acoustic Device.

This development, which establishes another milestone in the progress of acoustic science, is built fundamentally around a type of reproducing and radiating device called the exponential horn.

The underlying principle of the new process is proper coupling between the diaphragm and the surrounding atmosphere, which is the essential feature of improved mechanical phonographs and horn-type reproducers. The new arrangement has gone a step further than any preceding development, in making possible the reproduction, at full volume, of the deep bass of the organ and drum. The auditors at this particular demonstration were highly impressed with the merit of the exponential horn, and of the reproducing element used in conjunction with it. The reproducing element is of radically new type, especially adapted for this horn.

Full Volume of All Pitches.

It was explained by the inventors that although it is relatively easy to perfect a reproducer capable of covering the full range of pitches at small intensities, it is, however, a much more difficult problem to provide load capacity adequate for the assurance of full volume at all pitches. And it is significant that the lower pitches, which constitute the backbone of many musical compositions, are the most difficult to reproduce at great intensities.

One of the records used to test the loud-speaker was the "Lost Chord," as sung in the Sesqui-centennial Auditorium by 2500 voices, comprising the associated glee clubs of America. The bass of this gigantic chorus stood out with impressive intensity. Nor were shades of pitch or nuance of voice absent in the chords that swept across hill and dale adjacent to the pole. The fact that the low-frequency notes were not obtained at the sacrifice of the high-frequency notes was obvious in the closing strains of the "Lost Chord." The embellishments which this chorus arrangement gives to the first tenors were heard with utmost clarity riding serenely on substantial undercurrents of first and second bass and second tenor. The ensemble of pipe organ and voices in the Oakley Portugal arrangement of "Adeste Fideles," by the same chorus, was another number that adequately tested the reproducing capacity of the new loud-speaker.

A conversation addressed to the auditors was clearly understood, even at the great distance intervening, this being a most difficult test surmounted by the device.

Great Sound Effect.

The device produces the sound effect of a horn fourteen feet long, but actually is only forty-eight inches in each direction. Its name, the exponential horn, is based on the mathematical formulae used in calculating its peculiar internal curves. It is due to this that sound of all pitches, low as well as high, receive accurate rendition and correct volume.

Although the apparatus used in this demonstration radiates from ten to twenty times more volume than the ordinary loudspeaker, there is no distortion in the reproduced sound; this feature being one of outstanding importance to acoustic engineers. It is curious to note that despite the tremendous volume of sound, which can be sent rolling among the hills a mile away, the amount of electrical energy represented by all this sound is only about 24 watts, or less than that of a flashlight lamp.

The apparatus was not especially designed for lightness, yet there is no part of it which cannot be carried by hand, with the exception of the great wooden horn, and even that can be replaced by a lighter one at some sacrifice of volume in the lower pitches.

It was explained by the inventors that it is relatively easy to perfect a reproducer capable of covering the full range of pitches at small intensities. However, far more difficult is the problem of providing load capacity adequate for the assurance of full volume at all pitches. Namby-pamby bass, the sort often reproduced, that conveys the sound of a feverish moan, was conspicuous by its absence at the demonstration.

For Public Entertainment.

The adaptability of a loudspeaker of this type to various community enterprises of music or entertainment may readily be understood. As applied to a concert in a public park, where band concerts and other municipal programmes are staged, the horn would eliminate any necessity for crowding, or feverish jockeying for parking places near the stand. Judged by the demonstration recently, the concert auditor, should he decide to park nearly a mile away, would enjoy the concert as well as those near the stand. Other major applications of the device will be in large auditoriums and in connection with talking movies.

CLEANING UP THE STATES

TOO MANY STATIONS

BROADCAST CHANGES IN AMERICA

SOME SWEEPING CHANGES.

The newly-appointed body to control radio in the United States has already got to work. The Federal Radio Commission, which will be in supreme charge for twelve months—after that it will continue as an Appeal Court, leaving the administration and control work to the Department of Commerce—consists of five members. Their first move was to hold public hearings of suggestions, offered by various bodies and persons, as to the best method of unravelling the tangle of too many stations.

Too Many Stations.

During last year the number of broadcasting stations throughout the States increased alarmingly, and owing to an ascertained defect in the existing Federal radio laws, the authorities were unable to prevent a station operating or even taking a wave-length already assigned to another station. Hence the confusion in the air became a veritable bedlam. In New York and Chicago, as many as thirty stations were operating at the same time in each city. In an area of 100 miles from the centre of New York City, there were no fewer than 80 stations, in a similar area around Chicago, 68 stations played havoc with the listeners' sets.

Some Must Close Down.

Now the commission has decided that a great many of the 700 odd stations in the States must either close down, or divide time between themselves. In New York City and suburbs only 20 stations will be permitted to operate. It has been decided, and a very definite announcement has been made, that stations will be licensed and authorised to operate on a basis of usefulness. Public service or public convenience will be the determining factor in licensing a station and allotting a wave-length. As there are only 89 channels or suitable bands of frequencies available for the whole of the United States—after

setting aside six for Canada, it follows that many stations will use the same wave-length. This can be arranged for according to the distance between the cities in which the stations are located, and the power to be used. Thus interference will be eliminated as stations of comparatively low power, separated by, say, 100 miles, may use the same wave-length simultaneously.

Exclusive Wave-lengths.

That method, of course, will not provide for hundreds of stations as some national or important high-power stations must be allotted an exclusive wave-length. The second method of allowing for four or five hundred stations is to require these to split up the operating time between them.

No Wide Frequency Separation.

A very important matter, of course, is the frequency separation decided upon between the stations. In New York all stations in that area will have a separation of 50 kilocycles, and the other stations outside the 100 miles from New York will be fitted in between the 50 K.C. separations. Very stringent regulations have been made regarding the observance of its allotted frequency by a station. The deviation above or below the allotted frequency (presumably when not modulating) must not exceed half a kilocycle.

B.C.L.'S PARADISE

RADIO IN ENGLAND.

The radio market in England is in a healthy condition and promises a marked growth, according to W. A. Bartlett, managing director of Brandes, Ltd., London.

"The average American's conception of England being a land of crystal receivers and earphones is out of date," said Mr. Bartlett. "Approximately 90 per cent. of the receivers now use from one to six valves. The market for valve sets is expected to grow rapidly during the next few years for two reasons. The industrial situation, which has been serious, is improving, and the recent reallocation of wave-lengths made at the Geneva Conference has prevented chaos. A two-valve set will tune in 20 stations very nicely in most instances, and a six-tube set can get 280 stations. The desire for reception of distant stations a six-tube set can get 230 stations. The broadcast wave-band is the same as in America with the exception of Davenport, which is using the 1600 metre channel."

LEARN ESPERANTO

In accordance with the announcement made in last week's issue of our journal, we now present the second lesson of the Esperanto course to readers. In view of the oral instruction given by an experienced Esperantist from 2YA, readers are afforded a splendid opportunity to acquire a knowledge of the international language, lessons and items of which up to March last, have been and are being broadcast from 112 stations in 23 different countries.

During the instructional transmission from 2YA, students should have a copy of the printed lesson at hand. This will enable them to follow the broadcast lesson more readily.

Inquiries relative to Esperanto may be made to "The Esperanto Instructor," N.Z. Broadcasting Co. Ltd., Wellington, or care of "Radio Record." A stamped addressed envelope must accompany each inquiry, otherwise a reply cannot be guaranteed.

LESSON II.

(To be broadcast from 2YA on August 11 from 7.39 to 7.54 p.m.)

The Article.

The INDEFINITE article, a, an, is not expressed in Esperanto, being contained in the noun, as in Latin. AN-TENO, an aerial.

The DEFINITE article, the, is translated by la, which never changes. La krado, the grid.

The Noun.

ALL NOUNS (names of things, places or person) end in O. Borno, a terminal; stacio (pronounced stah-seo), a station; Londono, London; Johano, John.

To form the PLURAL of nouns, add J (pronounced Y). Fadenoj kaj telefonoj, wires and telephones.

There are only two cases: NOMINATIVE and ACCUSATIVE (objective)—the latter is formed from the nominative by adding N. Johano konstruas aparaton, John is building a set. La patro sendas mesag'ojn. The father sends messages.

The question may be asked: Why the accusative ending, in Esperanto? It is international, and occurs even in English, although irregularly, e.g. him, them, whom. The accusative removes ambiguity, and makes the language flexible. Its abolition would introduce difficulties, especially to those whose nations in whose languages the order of words is different to that of English. In Esperanto, a DIRECT OBJECT of all transitive verbs is indicated by means of the accusative termination, N, which is added to the

nominative case in both singular and plural.

Thomas frapis RobertoN. Thomas hit Robert. RobertoN frapis Tomaso. Robert hit Thomas. (Note that the N distinguishes the object of the sentence, irrespective of its position); Roberto frapis TomasoN, Robert hit Thomas; TomasoN frapis Roberto.

The days of the week are: Sunday, diman'co; Monday, lundo; Tuesday, mardo; Wednesday, merkredo; Thursday, ĵaŭdo; Friday, vendredo; Saturday, sabato.

The months of the year are: January, januaro; February, februaro; March, marto; April, aprilo; May, mayo; June, junio; July, julio; August, aŭgusto; September, septembro; October, oktobro; November, novembro; December, decembro.

N.B.—The use of capital letters is optional.

Christmas, Kristnaska Tago; Easter, Pasko; Whitsun, Pentekosto.

Vocabulary.

Patro, father; kaj, and; frato, brother; leono, lion; esti (verb) to be; besto, animal; rozo, rose; floro, flower; kolombo, pigeon; birdo, bird; aparteni, to belong; al, to; suno, sun; brili, to shine; tajloro, tailor.

patro kaj frato. Leono estas besto. Rozo estas floro kaj kolombo estas birdo. La rozo apartenas al Johano. La suno brilas. La patro estas tajloro.

[The third lesson will be published next issue.]

CARILLON COMING

Listeners who have read of the charms of carillons of the lowlands will be pleased to hear that in the distant future they will have the pleasure of hearing one of the largest first-class sets in the world from 2YA. The committee in charge of the Wellington War Memorial has let a contract to an important English firm for the supply and erection of a carillon, to consist of 49 bells. This will be installed in the campanile to be erected as soon as possible, and when completed will provide an appreciated item for broadcasting. So popular are the carillons of Belgium, and so famous do the performers become, that on the occasion of their ringing, crowds gather in the streets and stand in silence throughout the hour or more that is occupied in a full-dress performance.

According to a tally published last year there were 184 carillons in the world. Of these 63 were in Holland, which for the past four centuries has been the home of carillon music. Belgium next door had 44, France 25, Germany 10, England 7, the United States 15, Canada 4, and South Africa and Australia one each. Although 31 carillons were destroyed in the Great War, only two—those of the Cloth Hall at Ypres and of Louvain—were of the first order.

Carillons of the first order, such as Wellington is to possess, are much fewer in number than the figures given above. Those in Canada, Australia, and South Africa all come under this heading, according to Mr. W. G. Rice's "Carillon Music and Singing Towers of the Old World and the New." Only 12 in Holland are of the front rank, 11 in Belgium, 5 in France, 4 in England, 2 in Ireland, and 10 in the United States. People who wish to hear carillon music at its highest, according to Mr. Rice, should hear the carillon at Mechlin, in Belgium, when an evening recital is being given by that most famous of all carillonneurs, M. Josef Denyn. Every Monday evening, from 9 to 10 o'clock, M. Denyn gives Mechlin a concert during the months of June, August, and September. Mechlin's carillon, by the way, was made in 1674, and contains 45 bells.

They seem to have developed a very fine ear for bells in Holland, and in the old days, at any rate, the bell-founders had a big job in getting their bells past the critical ears of the experts. Some of the old criticisms of the seventeenth century are said to exhaust the vocabulary of deficiency. In one case, at The Hague, in 1686, the bells of the first octave were denounced as disagreeable in sound and in discord with each other; the next few bells were wrong, but would do; the C next above was false and dull; the C sharp was shrill and dead; the D and D sharp were dull; the E was sharp; and beyond this came a bell "no more musical than a druggist's mortar," and so on. The contract had been to provide The Hague with a carillon equal to Amsterdam's best. In spite of all the critic's vitriol, the bell-founder's work was accepted, and the bells are heard to-day at The Hague. The erection of carillons in Britain and America has been a very recent development. Britain has been famous for centuries for its church bells and chimes, but—until recently the carillon was neglected. The first seems to have been one of 35 bells at Cattistock, in Devon, made by a Dutch firm in 1862, then the same maker made one of 28 bells for Eaton Hall, the Duke of Westminster's mansion. Aberdeen, in 1890, had a carillon of 36 bells. Toronto got the first carillon on the American continent in 1922, and three months later the United States had the second.

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Ask Me Another The Newest Craze.

£10 in PRIZES.

ALL ABOUT IT

£10 in Cash Prizes.

1st £5

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4 prizes each 10/-

The "Ask Me Another"

fad is the craze of the hour in England and America, surpassing the Crossword Puzzle in popular favour. Interesting and highly educational, the questions given here have been made intentionally difficult, and will provide a good test for your general knowledge. They are designed solely from an educational viewpoint, and in no instance may they be regarded as anything in the nature of conundrums.

Even if you cannot answer all the questions do not withhold sending in your answers. Perhaps the winner will not be able to answer them all.

What You Have To Do.

1. Prove your skill and knowledge by answering these questions fully and exactly.
2. Send POSTAL NOTE for 1/- with each entry. THREE entries may be sent for 2/6 and add added for each subsequent entry.
3. The first prize of £5 will be paid to the competitor whose answers are nearest to those held in a sealed envelope by the Editor of the "Radio Record." The correct answers and the names of the prizewinners will be published in the "Radio Record" of August 19.
4. Write answers in numerical order on one side of the paper only.
5. The decision of the adjudicators must be taken as final. In the event of a tie or ties, prizes will be divided, but no competitor can win more than one prize or share in this competition. If more than FIVE competitors tie for the First Prize, the whole of the Prize Money, £20, will be divided among them, and no Second Prize will be awarded.
6. The closing date of the "Newest" Competition is August 13, and all answers must be in before that date.

PUZZLE No. 1.

1. What is the National emblem of Wales?

2. What bird lays its eggs in the nests of other birds?

3. What is the difference between a camel and a dromedary?

4. What is meant by "nulli in secunda," "ex officio," "locum tenens"?

5. What is the "Plimsol Mark" on the side of a ship?

6. Who are the authors of "The Brook," "Pilgrims Progress," "The Cloister on the Hearth"?

7. What characters in English literature "asked for more," said she wasn't born but "grow'd"?

8. When does Boxing Day fall?

9. What are the five races of the world?

10. What is meant by the "three mile limit"?

The Newest Competition,

P.O. Box 1315, Wellington.

Dear Sirs,—Herewith my entry for your "Ask Me Another" Competition, together with 1s. P.N. entry fee. I agree to abide by your rules of entry.

Name

Address