

SCIENTIST EVOLVES NEW ANTENNA GAUGE

Grover's Paper Gives Working Figures for General Capacity

WASHINGTON (AP)—Representing several years' study of electro-statics and said to be the last word on antenna systems, a scientific paper on methods for the calculation of antenna capacity has just been completed by Frederick W. Grover, consulting physicist of the Bureau of Standards.

Rendering calculation unnecessary in many practical problems, Mr. Grover's tables of the values of capacity for various types of antenna are considered by radio experts to be particularly valuable.

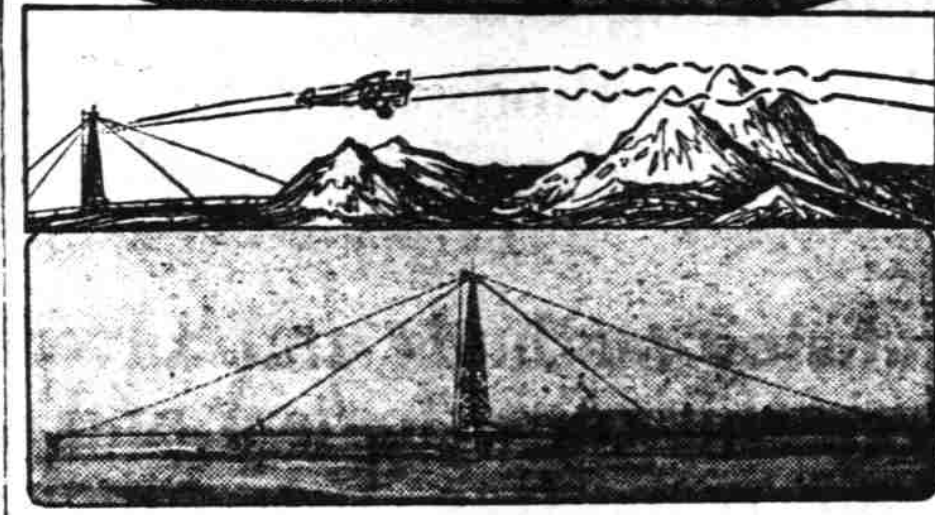
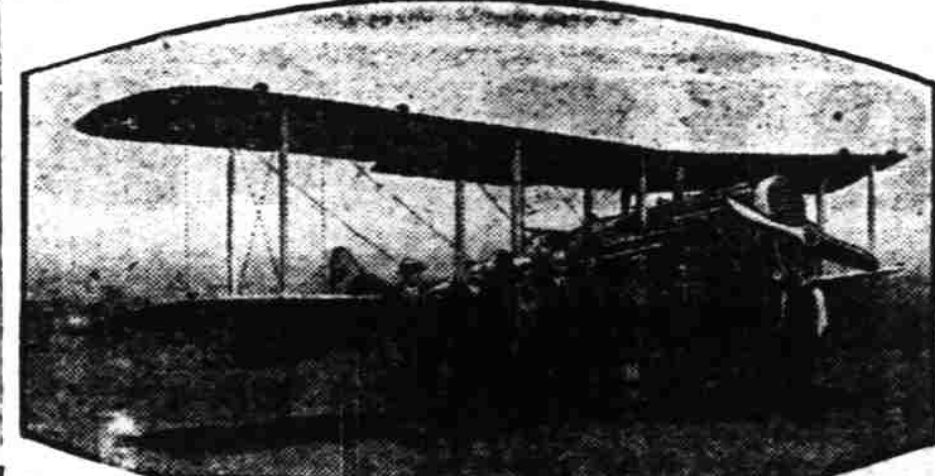
To calculate the capacity of an antenna, a certain electrical charge is assumed upon the antenna and the resulting potential is determined. One difficulty in carrying out this method is that, in general, the law of distribution of charges is not known. Mr. Grover declares, G. W. O. Howe, noted English physicist, made the assumption that sufficient accuracy is attained if first a uniform distribution of charge is supposed to exist and the potential calculated at various points of the antenna wire, the average of these potentials being taken as the final potential.

"Howe called attention to discrepancies between values obtained by his method and values for the same antenna by the inductance method," Mr. Grover said. "The present paper shows that the two methods agree if appropriate inductance formulas are employed.

"Formulas for the calculation of the capacity between two parallel wires of infinite length have been known for some time. The case of a single wire of infinite length, stretched parallel with the surface of the earth as a distance which is small compared with its length, may be treated by the same formulas, since by the theory of electric images, the effect of the induced charge on the earth may be taken into account by supposing the earth to be replaced by a wire of the same dimensions as the given wire and carrying a charge of opposite sign. The image wire is assumed to lie as far below as the actual wire is above the surface of the earth."

Mr. Grover's paper gives working formulas for figuring the capacity of practical forms of antennas including single horizontal wire, single vertical, parallel horizontal wires, cage, umbrella, fan or harp antenna. Formulas derived by him were published by the Bureau of Standards in 1917. Account was taken of the finite length of the wire in these but the lack of uniformity of charge distribution was only imperfectly taken into account, Mr. Grover says.

FIND MYSTERIOUS SHIFTING IN RADIO BEACON LIGHTS



Experiments conducted by the Bureau of Standards in directing airplane flights by radio beacon have shown a mysterious shifting of the course indicator during night flying. Above is the plane used in the tests, while below is the College Park, Md., beacon station and directional antenna.

WASHINGTON (AP)—While success is marking experiments of the Bureau of Standards in directing daylight airplane flights by the radio beacon, a mysterious shifting of the course indicator in the planes at night is baffling the bureau's radio experts.

A series of night flights between New York and Cleveland, directed by the bureau's radio beacon at Bellefonte, Pa., and the New York stations, revealed serious errors. Instead of being stationary, there was a continuous shifting of the course over a wide range. The indicator in the plane, which informs the pilot that he is in the equisignal zone or on the direct course, rapidly moved about in an indefinite manner.

The shifting was found to be much worse in mountainous than in flat country, the fading of the general level of the signal being especially severe when the planes were over the Alleghany mountains. The cause responsible for this phenomenon at night is believed to be the same as that which produces the fading of signals of broadcasting stations.

On a night flight from Harrisburg, Pa., to Washington, using signals from the radio beacon at College Park, Md., no shifting was detected. There are no marked mountain ranges in this territory. Observations of the Bellefonte beacon were made at night on the ground at Washington, a distance of 134 miles. While the shift phenomenon was noticed, it was less pronounced than that observed in the air.

The Bellefonte beacon was found to be very accurate in guiding daytime flights between New York and Cleveland and could be relied upon for a range of 150 miles. Excellent signals also were obtained in two flights of 135 miles each made from College Park to Bellefonte by the Bureau of Standards experimental plane and using the College Park beacon. The indicator was found to be of practical use in navigating in conditions of low visibility.

These flights demonstrated the need of installing more reliable means of modulating the radio-beacon current at the frequencies required for the indicator, Dr. J. H. Dellinger, chief of the radio division of the bureau, declares. Flights of the bureau plane have been discontinued until these alterations have been completed.

plaint. The commission said this was especially the case in those states with smaller populations where first class artists were difficult to obtain. No other form of entertainment provides or is expected to provide the variety demanded from broadcasting stations by many listeners, the commission declared.

An interesting recommendation made was that broadcasting companies take the greatest care to obtain announcers who will afford an example to listeners of how the English language should be pronounced and used. This was considered essential in view of the "far reaching influence of wireless on listeners, especially children."

They said that radio in the hands of the unskilled may have an injurious effect on those who are apt to imitate one who has been especially chosen as an announcer.

Most of the broadcasting stations in Australia are controlled by Amadagated Wireless Limited, a company which also owns most of the patents on radio apparatus in that country. The post-

ENGINEERS EVOLVE DISTRIBUTION PLAN

Many Technical Problems Found To Exist In New Programs

WASHINGTON (AP)—When the radio commissioners start re-allocating broadcasting stations on a basis of equitable distribution of power and wavelengths decreed by congress, they will have for their guidance a plan of redistribution being worked out by leading radio engineers.

While the legislators have been threshing out the issue of equitable apportionment of stations among the five zones, radio experts of the government and big commercial organizations have been working quietly on the technical problems involved in a new nationwide broadcasting setup. These engineers volunteered their services without pay.

Outstanding experts on the advisory committee include Dr. J. H. Dellinger, of the bureau of standards, Maj. William R. Blair, of the signal corps, Capt. S. C. Hooper, of the Navy, W. D. Terrell, head of the radio division of the department of commerce; L. E. Whittemore, of the radio research department of the Bell Telephone company, and R. S. McBride, of the American Engineering council.

They have confined their studies to the engineering problems involved in improving radio reception. These include the elimination of various kinds of interference, a more efficient use of the limited number of wavelengths, the question of transmitting power, location and synchronization of stations and the separation of channels.

Problems pertaining to the issuing of licenses, the supervision of broadcasters, quality of programs and public service rendered by stations, are not being considered by the engineers as they are questions of general policy which will be decided by the commission as outlined by congress.

TECHNICAL ADVISER SKILLED IN RADIOS

WASHINGTON (AP)—Acting as technical adviser to the Federal Radio Commission in the allocation of short waves, Captain Stanford C. Hooper of the Navy temporarily occupies the desk of the late Admiral W. H. G. Bullard.

CONDOLENCES SENT

WASHINGTON, Mar. 31—(AP)—President Coolidge sent today his condolences to Mrs. Frank B. Willis on the death of her husband, extolling the late senator as an "earnest and effective advocate of causes he considered just."

LISTEN IN

SUNDAY MORNING
8:00-11:00—KXII, Morning worship.
11:00-12:00—KOIN (219), Church service.
11:00-12:00—KJW (492), Church of Our Father service.
11:00-12:00—KWBS (200), Classical program.
11:00-12:00—KXII, First Methodist church service.
11:00-12:00—KTBR (229), First Presbyterian church service.
11:00-12:00—KWJ (230), Organ concert.

SUNDAY AFTERNOON
12:00-1:00—KOIN, Organ concert.
12:30-2:00—KXII, Special music.
12:45-1:15—KWJ, Quartet.
1:00-1:30—KOIN, Country program.
1:30-2:00—KWJ, Concert.
2:00-3:00—KOIN, Municipal concert.
2:00-3:00—KXII, PCN program.
3:00-4:00—KTBR, Studio orchestra.
3:00-4:00—KTBR, Salon orchestra.
3:00-4:00—KTBR, Concert program.

SUNDAY NIGHT
8:00-9:00—KOIN (219), Organ concert.
8:00-9:00—KXII (220), Concert trio.
8:00-9:00—KWJ (492), PCN Symphony hour.
9:00-10:00—KXII, Catholic Truth society.
9:00-10:00—KOIN, Orchestra and soloist.
9:00-10:00—KWJ, Pianists.
9:00-10:00—KTBR (229), First Presbyterian church service.
9:00-10:00—KXII, Mt. Tabor Presbyterian church service.
9:00-10:00—KXII, Studio features and entertainment.
9:00-10:00—KOIN, First Church of Christ, Scientist, service.
9:00-10:00—KWJ, "Fantasies."
9:00-10:00—KXII, PCN program.
9:00-10:00—KXII, International Bible Students' program.
9:00-10:00—KXII, Concert.
10:00-11:00—KWJ, Little Symphony orchestra.
10:00-11:00—KXII, Golden Strand group, orchestra and soloists; 8:45-9:30, concert; 9:30-10:00, "Great Moments of History"; 9:30-10:00, Symphony hour; 9:30-10:00, orchestra.
10:00-11:00—KXII, varied; 9:30-10:00, church service; 9:30-10:00, orchestra.
10:00-11:00—KXII, varied; 9:30-10:00, church service; 9:30-10:00, orchestra.
10:00-11:00—KXII, varied; 9:30-10:00, church service; 9:30-10:00, orchestra.

his fellow worker in a dramatic period of radio development. Captain Hooper was the right hand man of Admiral Bullard, the "father of Navy radio," during the world war. The admiral then was director of naval communications and Captain Hooper was head of the radio engineering division. When the United States entered the war, a period of tremendous expansion in radio was inaugurated. President Wilson authorized the Navy to take possession of all land stations and all merchant marine radio was turned over to Captain Hooper. These facilities were consolidated and provisions made for handling one-third of the cables were cut.

Captain Hooper was charged with the responsibility of purchasing and testing radio equipment for shore stations, ships and aircraft. From 1915 to 1918, the Navy made great strides in the development of aircraft radio. Prior to that time the use of radio on airplanes had been negligible, so that when the United States entered the war it was far in advance of other nations in aircraft radio apparatus.

The Navy created the incentive for the development of the radio compass, perfecting it for use on land and ship stations. The adoption by the Navy of the arc type of high power transmitter revolutionized the art at that time. The duplex system of sending and receiving messages at the same time was applied to naval station and the Navy pushed the development of vacuum tube transmitters. Captain Hooper was the first fleet radio officer, serving with the Atlantic fleet from 1913 to 1914. When the war broke out in 1914 he was assigned to duty abroad as an observer of British, French and German radio operations. Since the war, Captain Hooper has had an active part in fostering the development of high frequency transmission and in preparing data for the International Radio Telegraph Conference. He is a native of California, and before entering the Naval Academy was a telegraph operator for the Southern Pacific railroad.

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AUSTRALIAN FANS HAVE TROUBLE ALSO

Complaints of Listeners Found To Be Vexing Broadcasters

WASHINGTON (AP)—The Australian radio fan, like his brother listeners in America, is becoming more fastidious about the entertainment he receives from the "theater of the air."

Reports of the department of commerce on the radio situation in Australia show the complaints of listeners regarding programs are vexing broadcasters and government supervisory officials. The three chief complaints are that stations broadcast too much sports information, too much jazz music and too many talks.

A commission on government found, however, that in view of the quality of programs and the comparatively small sum paid by listeners for a year's entertainment, the public in most of the states have little cause for com-

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GERMANS STILL DELAYED

Storms Prevent Start On Long Awaited Atlantic Flight

BALDONNELL, March 31—(AP)—Adverse weather in Ireland and over the Atlantic ruined Baron von Huenefeld's hope to continue his flight from Berlin to Mitchel Field, L. I., this week. The Junkers plane Bremen was unleashed today from its air field moorings, and with a full load of fuel and oil was carefully rolled back into the hangar and the flyers are not optimistic about starting before Monday.

Baron Huenefeld yielded to the demands of the Irish and Foreign press for particulars of his venture to the extent of issuing an "official communique," evidently in reply to criticisms which have been made of his attitude both in Dublin, where protests were carried to the highest Free State government authorities, and in Berlin where it was reported, there has been criticism of his project.

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