



## Technical Men Meet at Frank L. Capps & Co.

Isabel Capps, Speaker

Frank L. Capps & Co., Inc., 244 W. 49th St., New York City, recently played host to a distinguished group of engineers in the first of what will probably become a series of meetings to consider the lacquer cutting stylus in relation to groove shape and to playback fit.

Miss Isabel Capps had arranged an interesting exhibit to demonstrate the incredibly small portion of the sapphire actually employed in cutting a record and the effect upon the groove of different treatment in the manufacture of the stylus.

### Sapphire Portion Made of Lucite

The first exhibit consisted of 25 to 1 scale models which were passed among the audience. These models really looked like the familiar lacquer stylus, since the sapphire portion was made of lucite inserted into an aluminum shank. The effect upon the audience was nothing short of sensational because they revealed with such a dramatic highlight the actual proportion of cutting area to the whole stylus. On each model the effective portion of stylus used in cutting 100 lines to the inch at a 60/40 ratio had been inked over. The included angles continued above this inked out area for inches while the shank itself was over a foot long. The usual assumption in examining a stylus under a 20X glass is that practically all of the angle thus magnified is involved in the cut. These models very effectively demonstrated how small the tip portion of the sapphire is that must be controlled in manufacture.

### Image Enlarged Many Times

Miss Capps went on then to show cross sections of grooves cut with styli of varied specification. These were shown in shadowgraphs which enlarged the image 500 times. With the aid of scale charts she demonstrated how very small the actual difference of 5 degrees makes in the resultant groove and that because of the microscopic amount of the sapphire actually used in cutting, the slightest deviation in shape immediately above the radius gives a false picture of the true included angle unless the cut is deep.

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Audio Device's Press Luncheon held last month at New York's Hotel Lexington. INSET—Dr. O. H. Caldwell, Editor, Electronics Industries and Mr. Wm. C. Speed, Audio President (luncheon's principal speaker) discuss recording's history.

## Audio Devices' President Sees Recording Boom; Education—Entertainment—Business to Benefit

Recently, speaking at a press luncheon in the Florentine Room of New York's Hotel Lexington, Mr. William C. Speed, President of Audio Devices, Inc., predicted a great expansion period for disc recording in the entertainment and educational fields.

### Multi-Cellular Speaker Introduced

Sound Reproduction Methods Revolutionized

The audio recording and reproducing system like a chain "is no stronger than it's weakest link." The fidelity of the sound at the output, can be limited by any one of the components in the system. Thus, if a major improvement is made in the cutter head or recording blank performance, this improvement can not be delivered to the ear unless every unit in the series recording or reproducing system is like-capable. Many of the handicaps limiting the fidelity of sound reproduction result from the six primarily mechanical devices in the re-

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Speaking of the educational possibilities of recording, Mr. Speed said, "Less than 1% of all primary and secondary educational institutions have recording equipment, yet trends point to recorded educational features in which the student participates as a prime factor in child and adult education. In addition, there is promise of immense increase in the use of recordings in our national school system. Thirty-two states are now laying plans for state-wide educational radio networks in which recording will play an important part.

"Dramatized education is still in its infancy. Through the use of sound and motion films, together with records and transcriptions somewhat along the lines followed in recorded speech instruction courses, we shall be able to accelerate greatly the education of our children and add vastly to their store of knowledge."

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Iowa State College radio students "on the air" in Workshop Studios of WOI—Ames, Iowa.

## Iowa State College Radio Trainees Record For Local Station—Gain Professional Experience

Student training in radio at Iowa State College, Ames, Iowa, is carried out through course work and workshop activities. The courses, set up in the English and Speech Department and the Department of Technical Journalism and Vocational Education, call for the use of numerous recordings.

The Radio Workshop, headed by Ed Wegener, Production Manager of WOI—Ames, has produced many outstanding transcribed shows.

### Kids Loved Them

During the winter and spring of the 1944-45 school year, it presented a new series of children's programs. Beginning with eighteen episodes of "Tom Sawyer" the series was followed by twenty-one episodes of "Alice in Wonderland." These two popular programs were presented three times a week but the response from Iowa children was so enthusiastic with eighteen episodes of "Tom Sawyer" series ended the program director of WOI, Dick Hull, requested that the next series "The Wizard of Oz" be presented five days a week for forty-seven episodes. In the presentation of these stories the Iowa State WOI Workshop used only tried and proven radio dramatic techniques. All means of holding an old audience and bringing in a new were used. For example, "The Wizard of Oz" brought in seven hundred requests (without a box top in the lot) for maps of the wonderful land of Oz.

### Two-Fold Purpose

As a result of these programs, WOI increased its public service to the people of Iowa and the Iowa State students  
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## Recording Boom Predicted

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In discussing the status of present-day recording methods, Mr. Speed, who presented historical high-lights of various stages of progress in recording history from 1890 to the present, demonstrated that disc recording has now reached a state of perfection undreamed of when Thomas A. Edison recorded his own voice in a recitation of "Mary Had a Little Lamb." "Because of the fact that the disc method now permits recording and reproduction of almost the complete tonal range audible to the human ear," Mr. Speed continued, "it now surpasses any other form of recording.

### Wire Lacks Fidelity of Disc

"The millions of phonographs now in America's homes," he added, "will never be made obsolete by wire or tape recording. Wire and tape recording lack the tonal fidelity and dynamic range necessary for accurate recording and reproduction of musical selections.

"Undoubtedly," Mr. Speed concluded, "each form of recording will find its own place in radio, educational, business and social fields."



By E. Franck, Research Engineer

## Improvement In Lacquer Cutting Styli

At a gathering of Recording Engineers on March 7th, reported on page 1 of this issue, Miss Isabelle Capps outlined the results of research she has been doing concerning lacquer cutting styli.

Her study of the actual shape of grooves cut by styli of different forms will result in a distinct technical improvement in lacquer recording throughout the industry.

### Better Top Corners

One of the types of groove distortion Miss Capps described, particularly interesting to us from a lacquer viewpoint, concerned the top corners. She found that the burnishing surface must be very small at a point corresponding to the top of the groove, if clean corners are desired, and has been able to get top corners that are almost perfectly clean through control of the burnishing surface. As far as actual groove shapes are concerned, this corner distortion probably accounts for **most** of the difference between wax and lacquer grooves.

### Lacquer Formulation Also A Factor

In our own lacquer development work, we have been conscious of this corner effect and have found that lacquers themselves can vary in the amount of distortion produced even when cut with the identical stylus. In general, the effect is greater with a softer lacquer than a hard one, although the controlling factors seem to be more than mere hardness. No doubt, there is a tendency toward instantaneous cold flow, which is greater or less, depending on the particular lacquer formulation. We have always believed that a lacquer which has cold flow and produces this type of deformation is apt to flow back slowly after the grooves are cut, thereby giving rise to an ageing distortion. We find it heartening that this particular trouble can be attacked and progress made from two different directions—stylus shape and lacquer formulation.

## Muti-Cellular Speaker Introduced

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ording and reproducing system, namely the recording disc, cutter head, stylus, pick-up, turntable, and loudspeaker. Engineering development are constantly overcoming these mechanical bottlenecks.

The Duplex loudspeaker recently brought out by Altec Lansing Corporation, 250 W. 57th St., New York City, removes the bottleneck from this particular mechanical device. Faithful conversion of electrical to acoustic power is obtained with the Duplex because it is a two-way loudspeaker incorporating a separate lightweight aluminum diaphragm for reproduction of the frequencies above 2000



Altec Lansing's Multi-Cellular Two-Way Speaker.

cycles and a separate 15" molded cone diaphragm for reproducing those below 2000 cycles. Also incorporated in this loudspeaker, is a multi-cellular horn which spreads the sound from the high frequency portion of the speaker

providing uniform quality distribution over a horizontal angle of 60 and a vertical angle of 40°.

### No Cone Type Limitations

The design of the Duplex Loudspeaker overcomes the several serious limitations which conventional single unit cone type loudspeakers have as follows:

- (a) Inefficient reproduction of high frequencies which require the use of small diaphragms of extremely small mass.
- (b) The speed of propagation of sound in ordinary paper cone does not permit efficient radiation of high frequencies.
- (c) Non-uniform radiation of energy due to the fact that the angle of distribution decreases as the frequency increases which limits the size of the diaphragm.
- (d) Distortion due to intermodulation of low and high frequencies always present in single diaphragm type of speakers.

### More Ampere Turns In Gap

The use of edgewise wound ribbon in the voice coils of both the low and high frequency diaphragms in the Duplex loudspeaker provides 27% more ampere turns in the gap, which almost alone accounts for 22% increase in acoustic efficiency. The compliance of the high fre-



In spite of the admitted flexibility of the wire recorder for "on the spot" recording, it is significant to note that Omaha's KFAB relies on their portable disc recorder for all such occasions. Pictured above, KFAB's Lincoln Supervisor, "Wink" Wight is seated in the station's Mobil Unit which houses a battery operated self-contained independent power plant. A real of make cable is so constructed with commutator that it enables cable to be reeled out or in while recording. The Mobil Unit is augmented with broadcast relay equipment mounted in two wheeled trailer which can be attached for direct broadcasts.

quency daphragm is provided by a tangential corrugation which allows three times the excursion for the same stress as is allowed by the ordinary annular corrugation. The new Alnico No. 5 permanent magnets used in both the low and high frequency units is also a very important factor in the increased efficiency of this speaker.

### Recording Industry Enthusiastic

The Duplex loudspeaker which represents Altec Lansing's offering in the non-theatrical field has been received with enthusiasm by the radio and recording industry. As mounted in several models of ported cabinets it is rated to give uniform reproduction thruout the entire F. M. range of 50 to 15,000 cycles. While this high frequency response is far above the best of present disc recordings, it is an engineering fact that a sound reproducing system should be capable of reproducing up to an octave higher than that which it is actually called upon to do.

In the recording field the Duplex loudspeaker is ideally adaptable for monitoring and for detecting high frequency distortion and intermodulation which may develop in the recording system. It is also offered for use in client's and audition rooms where it is imperative that the best presentation be made.

## I. U. Public Speaking Classes Graduate Outstanding Orators Recording Routine Proven Success

Indiana University is another one of the many mid-western schools who depend heavily on recording in their department of speech.

In the public speaking classes at the Hoosier school, each student is required to make a recording of his voice delivery at the beginning of the semester. This disc is analyzed by both the student and the instructor, for the purpose of determining defects which should be corrected during the progress of the course. Near the end of the semester, the student again makes a recording to gauge the degree of his improvement.

Such a recording routine has proven very successful at Indiana and has given the school many outstanding orators.

## Quaker City Station Records Interviews With Phils, A's

From the Florida baseball training camps of the Philadelphia Phillies and Athletics, WFIL—Philadelphia is bringing its listeners recorded interviews with players, managers and coaches of the two big league clubs.

These transcribed interviews are rushed from the Southland for rebroadcast on Tom Moorehead's WFIL's sport show at 6:30 P. M. daily.



Major Martin H. Work and Mr. V. T. Rupp.

### Ninety Thousandth Audiogram Presented to AFRS Commandant

Last month in Los Angeles, Mr. V. T. Rupp, Audio Devices' Southern California representative, presented the 90,000th Audiogram produced for the Armed Forces Radio Service, to Major Martin H. Works, AFRS Commandant.

Although hostilities ceased eight months ago and millions of victorious servicemen have returned to civilian pursuits, the Armed Forces Radio Service continues to present some 800 radio programs monthly to troops still overseas.

AFRS uses Audiograms 24 hours a day in transcribing continuously the top programs off the four major networks in this country. Fast Air Transport Command planes carry these recordings to GI radio outlets overseas.

Of the 90,000 Audiograms supplied since the start of the war, over one third have been Master discs used in the production of a large part of the more than 1,500,000 vinylite pressings made and distributed by the AFRS.

### Technical Men Meet

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All the record strips used to reveal these fractional effects were cut with master styli personally developed by Miss Capps and on which the included angle and burnishing facet were controlled. She demonstrated in connection with the controlling of the burnishing facet that this facet must be very small at a point corresponding to the top of the groove if clean corners are to be obtained.

She also showed record strips cut with regular styli to show the normal error in shape that must be present in styli made on a mass production basis.

Finally, Miss Capps pointed out that if the portion of the Sapphire involved in cutting is incredibly small, the portion of the playback sapphire reproducing the cut is even smaller since it is expected in most cases not to ride the bottom but the side walls of the groove.

### Orange Bowl Recordings Given to Miami U. Prexy

Handsomely bound in a leather album, a complete set of recordings of the 1946 Miami-Holy Cross Orange Bowl football game, broadcast last New Years Day by Ted Husing over CBS through WQAM—Miami has been presented by the Gator Station to Dr. Bowman Ash, President of Miami University.

Highlights from the two-hour and 45 minute album will be featured once a year hereafter at Miami's Midnight Victory Pep Rally held on the campus the eve of the "Hurricanes" most important game.

### College Radio Trainees Record

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who worked on the programs (all of the work except direction was done by students) learned more about radio than they would in many classes or from innumerable lectures.

Iowa State College is but one of the many schools, boasting outstanding radio courses, who believes that there is no better teaching device in speech than the recording which allows one to hear their own voice as it sounds to others.

Glossary of Disc Recording Terms Will Be Continued in the May Issue of Audio Record.

**ANOTHER HISTORIC EVENT  
— ON audiograms**

**R**ADAR contact with the moon, broadcast over the nation-wide facilities of the Mutual Broadcasting System on Sunday, January 27th, emphasized once again the essential value of recording in radio broadcasting.

\* \* \* \*

From their Belmar, New Jersey laboratories, engineers of the Army Signal Corps made this memorable contact early in the morning of January 27th, while in the studios of WOR-New York, the Special Features Division of MBS were recording the event on an AUDIOMATIC. A few hours later, at a more appropriate time, the recorded program was broadcast to the nation.

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In this, as in countless other instances, AUDIOMOTICS have made it possible for radio listeners to hear a history-making event exactly as it occurred with all the true fidelity of a "live" broadcast.

**AUDIO DEVICES, INC.,**  
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New York 22, N. Y.

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