



Five programs aired over the Keystone Broadcasting System via transcriptions. Above: Bobby Gregory and His Cactus Cowboys on "Western Serenade." Pictured clockwise: Lum 'n Abner, Spike Featherstone and his Orchestra on "Tune Tabloid," Rita Carroll, also on "Tune Tabloid" and Jimmy Atkins and Hal Kanners' Band of the "Flit-Frolics" show.

Airing of Corwin's "One World Flight" Series Good Testimonial to Unlimited Value of Discs

(Last October, Norman Corwin, CBS writer-producer-director, and his assistant, Lee Bland of CBS' Documentary Unit, returned to the U. S. after a 42,000 mile air trip around-the-world; Mr. Corwin's prize us winner of the first "One World Award." During Mr. Corwin's journey he recorded his conversations with hundreds of people in many foreign lands. Upon his return, and after nearly three months of boiling this material down, Columbia broadcast a series of 13 programs. In the accompanying article, Mr. Bland tells of some of the complex recording problems encountered while the series was being prepared for the air.)

Turntable operators can best appreciate the complex recording problems of Norman Corwin's recent CBS series, "One World Flight."

For the 13 broadcasts we used discs as insurance against mechanical failure and also to facilitate cueing. On each broadcast, our two turntable engineers alternated in playing the recorded excerpts. Each man had a complete set of all recorded material, generally consisting of about 30 separate cuts on double-faced 16" 33 1/3 rpm platters.

One of our main problems was to preserve the highest possible quality for the air shows. Since the engineers alternated cuts, it was therefore possible to save each man's untouched recordings for the dress rehearsal and broadcast by the simple expedient of switching

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That's Not Me!

Leo, MGM's famous lion, certainly was embarrassed when he learned how he sounded to the sound effects crew of WHN-New York. Seems that a lion's roar was needed to authenticate the broadcast of the opening of Metro's new recording plant in Bloomfield, N. J. So, the voice of an orangutan, slowed to 33 1/3 rpm, was used. A real lion's roar when recorded, according to the engineers, "sounded like belches after a Hungarian meal."

The RUBBER NETWORK

By Michael M. Sillerman, President
KEYSTONE BROADCASTING
SYSTEM, Inc.

We at Keystone have been given a variety of names. Since we are the only transcription network in existence, the uniqueness of our set-up has apparently invited many novel appellations. In the press we are often referred to as the wax web, or the wire-less network, and ever so often the "rubber network." This name has intrigued me because in many ways it describes our operation very well. We do have a flexibility and a resilience that resembles the characteristics of rubber. This elasticity has shown itself in the transition from the pre-war period to war times and back again into post war. Our transcription mode of broadcasting has the necessary stretch in following the country's economic course. Also the need to follow the contortions of the advertiser's distribution and peculiar conditions call for a certain amount of stretching and snapping to meet the situation.

Two Hundred Sixty Affiliates

The Keystone Network, stretching from coast to coast and now consisting of 260 affiliated stations, concentrates solely on the small urban and rural areas. This is what we call BEYOND-METROPOLITAN America, now often referred to as "BMA."

This emphasis on the small town is timely in view of the country's changing economy. Leading economists today state that two-thirds of the nation's retail sales are made in the small towns.

In the light of the facts and figures showing this emphasis on the small town market, the leading advertising agencies have learned that the Keystone Network has, for the first time in many decades, made it economically possible for the advertiser to buy these increasingly important markets as a unit, something they could not do before.

And the leading advertisers of the country have learned that the Keystone plan of operation makes it possible for them to promote their products via radio in these small markets on a comparable cost basis with their promotions in the large metropolitan markets.

These achievements have been ac-
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audio record

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Published monthly by Audio Devices, Inc., 444 Madison Avenue, New York City, in the interests of better disc recording. Mailed without cost to radio stations, recording studios, motion picture studios, colleges, vocational schools and recording enthusiasts throughout the United States and Canada.



The writer (left) and Norman Corwin pictured as they wave goodbye to well-wishers who saw them off, a year ago this month, on their 42,000 mile, globe-circling trip.

Corwin Series Tribute to Discs

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sets of recordings after the preliminary rehearsals.

Our discs were produced at Columbia Records, from magnetic-type recordings made during the world flight. The original field recordings suffered frequently from faulty batteries picked up en route. Speed variations and quality differentials were corrected during the discing process, but only after hours of patient experimentation.

One of the most tedious aspects of the entire procedure was the job of splicing significant extracts, in the interests of time. This was accomplished manually by dexterous engineers who accepted the challenge to do the impossible and proved that the possibilities in re-recording are almost limitless.

Considering that all original field recordings were once dubbed before being piped for discing, that in the splicing operation— we dubbed again as often as necessary, and that the ultimate blends were copied to prepare the broadcast discs, there was surprisingly little loss of quality and intelligibility. To me, this is not only a testimonial to engineering "know-how" and equipment but it gives aid and comfort to producers and directors who wish to experiment with recorded documentaries.

This

Record Collecting Habit

By Jim Walsh, Day News Editor
WSLS-Roanoke, Va.

Playing old records on my "Jim Walsh's Wax Works" program over this station comes naturally to me. Why shouldn't it? I became fascinated by the miracle of recorded music before I was three years old and can still remember the first record I ever heard. It was a comic skit called "A Night Trip to Buffalo" and it was played on an old-time talking machine with a large external morning-glory horn.

Within a few years, there was a phonograph in my home and before I was old enough to go to school I had begun making the rounds of the dealers in my little town, begging the latest monthly supplement describing the new records. (I had taught myself to read.) From that time I have never stopped collecting records— mostly by looking for them in Salvation Army depots, Good Will outlets, second-hand furniture stores and junk shops—until now I have more than 10,000 discs and cylinders, some made as long ago as 1895 and others issued only a week or so back.

Have Studied Old-Timers

In addition, I have made a life-long study of the careers of men and women, such as Ada Jones, Billy Murray, Henry Burr, Len Spencer and many others, who were the first recording artists, and now have a nation-wide reputation as an authority on old records. For a considerable time I have been collecting material

Whoa—There Rich!

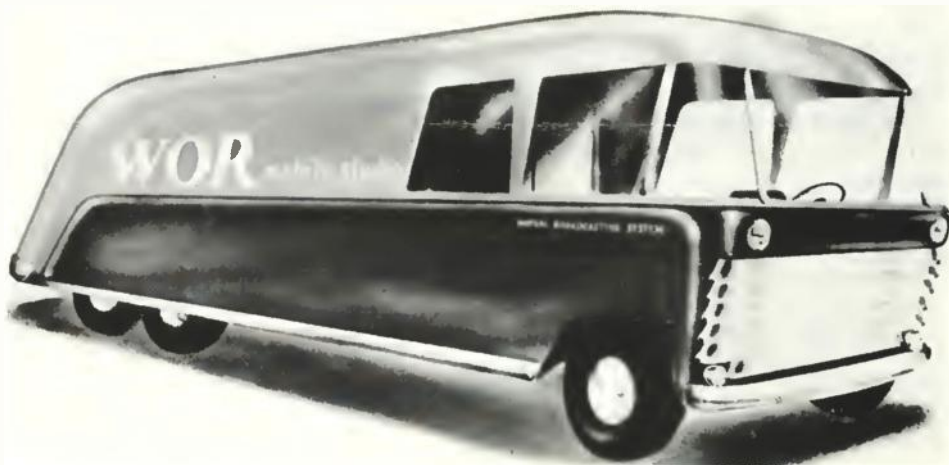
Ever wonder what would happen if on one of our recorded "whodunits", the fellow manipulating the discs would inadvertently spin the Wednesday installment before the Tuesdays? Some fun, eh? Well, the people in England aren't wondering any more, and to the ardent followers of BBC's ace detective Dick Barton, it wasn't funny either. A few Tuesday nights ago, sly Richard got himself out of a horrible predicament that none of his faithful knew he was in. No this sleuth is not that fast on the trigger. Some not-too-alert studio hand had given Barton's Wednesday night platter to Tuesday night's listeners.

for a book to be called "Record Makers," which will give the life stories of these old timers.

During the past five years, my monthly department, "Favorite Pioneer Recording Artists," has appeared in Hobbies Magazine, and I have also written extensively about record collecting for magazines such as the American Record Guide, This Week, Leisure, Magazine Digest and the Gramophone of London. Just before World War II, a Jap asked permission to translate some of my articles into Japanese for the benefit of the record collectors there. I don't know whether he ever got around to it!

Many of the surviving old-time recording artists, such as Billy Murray, who has been my particular hero since I was seven years old, have been my good friends of late years.

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WOR-New York's "Johnny on the Spot"

This streamlined studio on wheels will speed WOR newsmen and engineers to the scene of important newsbreaks and special events throughout the New York Metropolitan area. One of the largest mobile broadcasting studios in the country, the new unit is 27 feet long and houses a complete broadcasting studio, equipment room and driver's compartment. The 8' x 10' studio accommodates eight persons and is equipped with a full-size desk, chairs, and radio telephone to keep the unique broadcasting unit in touch with master control or the station's transmitters at Carteret, N. J. Four different short wave transmitters, as well as two fixed-studio-type recording units, two wire recorders and one spring-wound recorder are contained in the equipment room. An observation post and roof platform for news reporters, announcers and photographers will also facilitate televised special features.



for the Recordist

By C. J. LeBel, Vice President
AUDIO DEVICES, Inc.

SAPPHIRE QUALITY CONTROL

In view of the widespread current discussion¹ of the subject of quality control, it is felt that a few sidelights on this problem would be of interest to the recordist. Although American industry as a whole first fully realized the value of such programs during the war, quality control has been active at Audio Devices since the company's start. Space will permit us to touch only on cutting stylus control in this article, so disc quality control will be discussed in a later issue of Audio Record.



C. J. LeBel

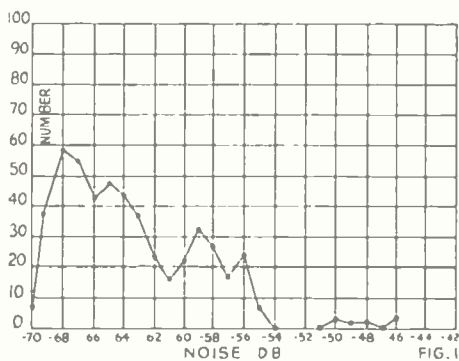
In a later issue of Audio Record.

Stylus Properties

Two main performance characteristics of a cutting stylus are noise level and high frequency response. The interrelation of these has already been discussed in detail by the writer², so it is enough to say here that a quieter groove may be cut, first, by increasing the length of the burnishing facet and, second, by improving the quality of the cutting of burnishing edges. Requirements for high frequency response set a definite upper limit to the length of burnishing facet which may be employed in a professional stylus. We are left, then, only one way to keep the noise level down; that is, to control the cutting edge and burnishing surface. In doing this we are controlling an invisible detail, for the small irregularities which cause differences in noise level are so minute that they are invisible under the most powerful microscope that can be brought to bear.

Quality Control at Audio Devices

Here at Audio Devices each sapphire is tested for noise level in a professional recording machine. Grooves are cut in lacquer discs then played back by a pickup feeding into a high gain amplifier and a standard VU meter. An 800 cycle high pass filter is used to remove the effect of turntable rumble, which because of its low frequency is virtually inaudible even though strong in meter



Noise Characteristics—Typical Styli

reading. We are then measuring only the voltage produced by the record scratch. A stylus with noise level above the rejection point is sent back to the lapidary's shop for reprocessing.

We are occasionally asked why a 100% test is necessary; why not use sampling methods? This can best be answered by a glance at test results, most conveniently shown as a number of distribution curves.

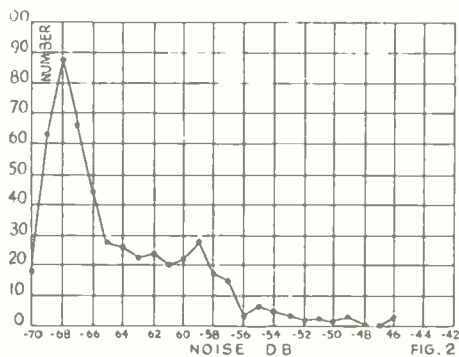
Distribution Curves

Figure 1 shows the distribution of noise levels in a batch of 501 points. The decibel values are meter readings, based on an arbitrary reference level. It is interesting to note the heavily skewed shape of the curve, as well as the double peak; the statistician would correctly say that this is not statistically "normal" data. This is a typical batch of styli, for rejects are only a small percentage.

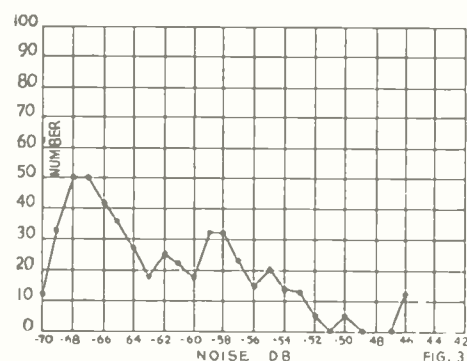
An exceedingly good batch of 511 points is shown in Figure 2. While the rejection percentage is about the same as in the previous case, the secondary peak at -59 db is smaller in area, and the area under the main curve at -68 is greater.

What happens when the lapidary's laps are not in quite as good condition is typified in Figure 3, for a batch of 500. Note that the rejectionable percentage is several times as great and that the secondary peak has broadened considerably on the noisy side.

These styli were made by the best



Noise Characteristics—Especially Good Batch

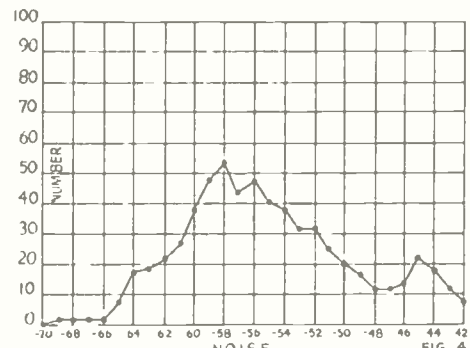


Noise Characteristics—Fair Quality Batch

lapidary in the country at a time when processing was running very smoothly. Figure 4 is taken from earlier data on 605 points, and shows the result when the laps are temperamental. It is also similar to the results of an inexperienced lapidary, in that the major peak is ten to fifteen db noisier, and the rejects many more. Note that the skewness is much reduced, and the standard deviation is visibly much greater.

Discussion

It is evident from this that 100% inspection is necessary. The recordist rightfully expects all his cutting styli to be usable. Sampling inspection would guarantee that the consumer would usually have to return not over several per cent but could not assure his finding all usable. According to the laws of chance, and since rejects run in clusters, a recordist might conceivably get three bad points in a single group of ten (i.e. 30% bad) these three being perhaps a quarter of the bad units from a batch of 500. So we must inspect all. Sampling is primarily useful where a defect will be caught at later stages of manufacture, or where so few rejects exist that it is cheaper to find one occasionally than to test all. A good example of the latter case may be found in small composition resistors. It was found that genuinely bad units would occur once in a hundred thousand units. It was cheaper to troubleshoot every twenty thousandth assembly for a bad



Noise Characteristics—Poor Batch
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The

Rubber Network

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completed by a simple but basic technique which finds much of its answer in the electrical transcription. The Keystone story is a success story of the transcription embellished with small station cooperation, seasoned with a firm belief in the selling power of the BEYOND-METROPOLITAN station and garnished with a realization of a tremendous aggregate market potential. These factors all crystalized into an integrated unit, are responsible for the realization of a national coast-to-coast transcription network. It is radio's adaptation of the old adage of the small strands woven together into a strong rope. Bound together into the transcription network, the small stations are a potent selling force.

KBS Operation Explained

Many of the country's leading advertisers and agencies know from first hand experience about the modus operandi of KBS. But some people outside the orbit of Keystone ask, how does it work. The answer is quite simple. KBS is organized and operates on a network basis. However the stations are linked together by transcription instead of leased telephone wires. Keystone distributes its sustaining and commercial programs on a transcribed basis. This gives the affiliates, as well as the advertiser and agency, flexibility and freedom of movement that is essential to good programming. Through its unique method of network operation utilizing the transcription, the commercial shows on the four major wired networks are potentially available through Keystone to the KBS affiliates. At the same time wired network advertisers can reach the BEYOND METROPOLITAN audiences by broadcasting their same wired network programs on a transcribed basis on KBS stations. Burns and Allen, and Lum 'n Abner, are typical of such commercial programs. The local stations benefit by such programming and the advertisers gain a tremendous audience in the Keystone areas. Some advertisers on the other hand, have developed their own such programs for the Keystone markets exclusively. Others find the KBS sustaining features valuable commercial programs. Grove Laboratories for example, sponsored a KBS sustainer titled "Western Serenade", featuring cowboy and hillbilly talent.

Advertiser—Small Market Radio Benefit

While Keystone has evolved the transcription and its network into a bull's eye for the last frontier of American domestic commerce, it serves the advertiser and at the same time helps small



Sam Hayes, Ace Sportscaster

THROUGH THE SPORT GLASS WITH SAM HAYES, well known sports authority, is an NBC recorded program which appeals to all sports lovers. In this quarter-hour show, Hayes, recounts thrilling moments in sports history and famous figures in the sports world. Memorable sports events are also dramatized. THROUGH THE SPORT GLASS is now being heard over NBC and independent stations from coast to coast.

market radio. Throughout its history KBS has led the fight for recognition of the transcription and the small market station. In the field of local sales every KBS transcribed sustaining program is in effect a cooperative show, since the affiliates are encouraged to sell it locally. In all industry matters such as music copyright affairs, NAB, BMB, and general commercial program trends, Keystone is in the forefront watching all factors that have any bearing on the small market stations. The elasticity of the so-called rubber network which Keystone operates is typified by the view of the radio director of the advertising agency which leads the nation in radio billing, who states:

"KBS, through its unique method of transcription network operation makes it possible for the advertiser to buy the small markets as a unit, and at a cost that compares favorably with competitive media. Therefore Keystone has placed the national advertiser within the reach of the small market station on a nation-wide unit basis. This to my mind is the real achievement of the network."

And on the other side of the fence, the manner in which the KBS rubber network lends its stretch in support of the affiliated station is typified by the

following statement of a KBS affiliate:

"Through KBS I have been able to get such programs as Lum 'n Abner, Burns and Allen, Philo Vance and others on transcription. I have been able to get such national accounts on my station as Sterling Drug, Miles Laboratories, General Foods, Lever Brothers, Emerson Drug, Lucky Strike, and others. The national advertiser, I feel, has found a way—through KBS and its transcription technique—to put shows on the small stations.

"I am affiliated with KBS because I think they have done one helluva job in selling the national advertisers on small market radio. Instead of 'doing it with mirrors', or wires, 'they do it with transcriptions. They perform a function that no other group or network does in radio—they sell the small markets exclusively.'"

This

Record Collecting Habit

(Continued from Page 2)

My collection contains more than 400 brands of records—most of them long since obsolete—from all parts of the world. There are many classical discs by dead or retired opera stars, but I have found for radio use it is best to restrict myself chiefly to playing old popular songs and humorous sketches. The "Wax Works", which began at WJHL in Johnson City, Tenn., in 1939 and was also given for four years at WDBJ-Roanoke, before moving to WSLS, where I am now day news editor, has been generally popular with all classes of listeners, but its appeal seems to increase for every decade the listener has lived. Many fans have thanked me for the relief it gives them from swing and crooners.

One of the outstanding items of the collection is a record of "Shine On, Harvest Moon," sung especially for me by Jack Norworth, who collaborated with the late Nora Bayes back in 1908 in writing the song. Jack said he had been so annoyed by persons who insisted that they had Bayes and Norworth records of "Shine On, Harvest Moon," despite the fact that they never recorded it, that he appreciated more than he could say my making no such claim. In fact, he appreciated it so much that he made the record and sent it to me for a Christmas present, so I could truthfully say, I was the only person in the world with a record of "Shine On, Harvest Moon," sung by the composer!

Recording's Advancement

By J. R. Poppele, V. P., Chief Engineer
WOR-NEW YORK

As C. J. LeBel, Vice-President of Audio Devices so aptly put it: "A device (or technique) may be radically improved either by re-design, or by merely improving every part (or procedure) by as little as ten per cent."

At the WOR Recording Studios, Mr. LeBel's statement concerning improvement and re-design has been put into practice with gratifying results.

New amplifiers have been installed, advanced technique having been put into practice. Record-



J. R. Poppele

ing distortion has been reduced to a minimum, and the over-all technical improvement in all types of recording has been marked. New type recording heads are now in use. These heads are more sensitive and include temperature control. All of which produces greatly improved recordings, and this improvement has been well received by broadcast stations throughout the country, who have found an ever-increasing and wider use of transcriptions and records.

Making further advances in the art of recording, we have found that the use of improved cutting styli contour appreciably increased the signal to noise ratio in the recordings. New reproducing turntables of the latest type with direct drive and improved construction have assured rumble free, constant speed recordings.

Uniform quality has been the aim of WOR Recording Studios, and has enabled the manufacturers of popular records to offer to the public records of uniform quality and greatly improved technique.

Although the recording industry has not seen any particularly spectacular changes during the war years, there is, during the present transitional period, a continuous effort to improve here and there, and we believe we have advanced our technique tremendously by taking advantage of new equipment as it becomes available, and by continuously striving to function as efficiently as we can.

One of the greatest advancements on an industry-wide basis was the adoption of the N.A.B. recording standards which, when considered in the light of the many other technical achievements during the past years, puts the recording

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Prof. A. W. Bleekschmidt stands by to offer advice to Converse College School of Music students Loris Dean Burnette, Sarah Fant Jones, Louis White and A. J. Smith as they prepare to cut a recording.

Converse College's Courses In Radio, Music, Speech Find Many Applications for Recordings

Making recordings and mastering recording techniques are two important functions in the Radio and Recording Workshop Course conducted each year at Converse College, Spartanburg, S. C. In addition, making recordings is a supplementary part of the plan for music, speech, and physical education courses at the South Carolina school.

Radio-Recording Class Airs Weekly Show Over WORD-Spartanburg, S. C.

The Radio and Recording Class, under the direction of Prof. A. W. Bleekschmidt, is responsible for the weekly production of a half-hour broadcast over Station WORD-Spartanburg. Programs usually originate in an acoustically treated radio studio on the campus, but occasional broadcasts, open to the public, are given from the stage of the college auditorium. Both the studio and the auditorium are wired for radio pick-up.

Recording and broadcasting skills are acquired simultaneously—recordings being prepared for test purposes before each program is aired. Scripts are recorded, studied further, and re-recorded, as many as three times. On each occasion, the discs are played back and carefully studied for possible improvement.

Music Students Record Twice Yearly

With a similar interest in performance improvement, many members of Converse's music faculty request their students to make recordings twice a year,

by which progress or lack of progress may be readily measured. Senior recitals are recorded in their entirety, and the facilities of the recording equipment owned by the college are available at any time to students who wish to record additional discs.

Many Disc Uses Found

A number of other campus uses for recording at Converse College have been discovered, too. Student and faculty compositions have been prepared for use in dance classes and dramatic productions, and duplicates of such records have been made when desirable. Speech and drama classes have taken advantage of the tool for corrective speech study provided by individual recordings. Finally, through the medium of recordings, original music by Converse School of Music students is submitted to publisher, and singers and instrumentalists bring their work to the attention of teachers and critics.

Audio Publication Standard Text

Basis for recording technique as taught at Converse College School of Music is Audio Devices' text book "How To Make Good Recordings". Audiocassettes, too, are used exclusively for all recordings made at the college.



"King of Jazz" Joins Disc Jockey Fold

Paul Whiteman, ABC's director of music, officially becomes a "disc jockey" June 30, when his "Paul Whiteman Club" begins its tenure over the American web. The dean of modern American music's new program will be a full-hour, afternoon, show and presented daily Monday through Friday over the entire ABC network. Whiteman is shown above, enjoying a hearty chuckle with another platter spinner, KXOK-St. Louis' Rush Hughes, during an interview in the Mound City's Kiel Auditorium where he was presenting an all-Gershwin concert.

Disc Data

(Continued from Page 3)

resistor, than to test all the hundred thousand resistors individually.

Quality Engineering

A running count of rejection percentages provides a valuable index to process quality and is sometimes the start of an engineering project. For example, see Figure 5, showing the percentage of rejects in 50 successive batches. Whereas rejections normally ran several per cent, they could run as great as 20% in irregular fashion. It was evident that, as the quality control engineer would say, the process was not under (statistical) control. We started an investigation and found that rejects in such noisy batches would often whistle, whereas whistlers were almost unheard of among the rejects of "normal" batches. After designing and building a special micro-

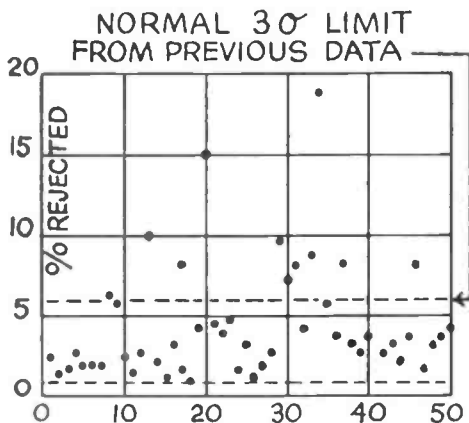


FIG. 5
Variation Symptomatic of Lack of Control

scope and making hitherto difficult measurements on 500 points at a time, some correlation studies became possible.

It was soon found that two fundamental dimensions were not under statistically adequate control. Bringing them under control and computing the optimum relation, the number of out-of-control batches dropped profoundly. Thread action became more reliable, the average quality improved 10 db, and remained better. We had coordinated stylus design with lacquer coating characteristics.

After several months of good results, trouble reoccurred. A brief study showed that tool wear was causing a return to lack of control. This was easily remedied permanently and the trouble has not reoccurred since.

This is a good example of how the

quality engineer can simultaneously improve product quality and reduce product cost.

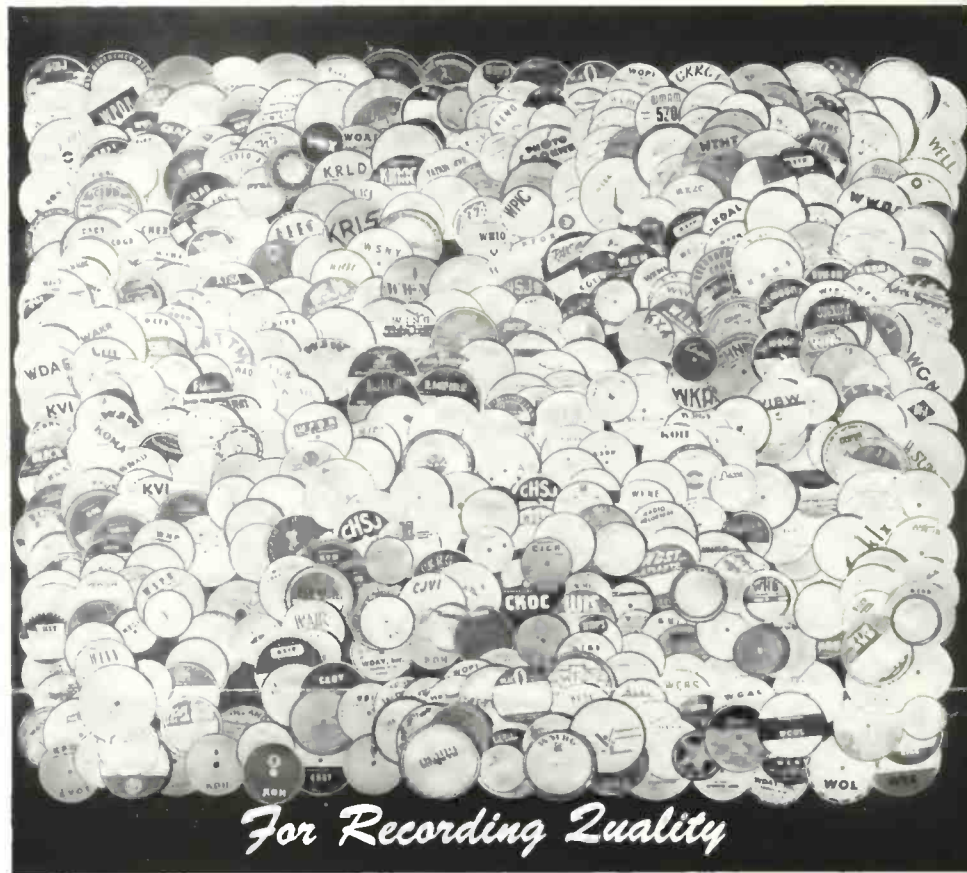
References

1. Cf. excellent monthly series in *Trans. A.I.E.E.*
2. *Properties of the Dulled Lacquer Cutting Stylus* C. J. LeBel, *JASA*, vol. 13, No. 3, pp. 265-273, Jun. 1942.

Recording's Advancement

(Continued from Page 5)

industry on more solid footing than ever before. This advancement and these improvements have been reflected in the increased use of transcriptions and records by the broadcast industry, and it will be interesting to follow the improvement in the art of recording, as AM, FM and television stations increase in numbers.



For Recording Quality

EVERYWHERE . . . it's audiodescs

Everywhere, when quality is important, **AUDIODESCS** are preferred over all other recording blanks combined.

This universal acceptance by recording engineers in radio, motion pictures, commercial recording studios, and in the production of phonograph records, is the natural result of the consistent high quality of these fine recording discs.

For **AUDIODESCS** are manufactured by a patented precision-machine process which assures uniform results, and **AUDIODESC** recording lacquer is produced in our own plant

from a formula developed by our research engineers. The manufacturing process is thus fully controlled from raw materials to the finished disc.

Praise of **AUDIODESCS** comes from everywhere, not only from all fields of recording, but from every type of climate. In arctic cold or the heat and humidity of the tropics, **AUDIODESCS** are consistently dependable.

There is an **AUDIODESC** designed for every recording need. See your local distributor or write:

AUDIO DEVICES, INC., 444 Madison Avenue, New York 22, N.Y.
Export Department: **Rocke International Corp.**, 13 E. 40th Street, New York 16, N.Y.
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