TUBE COLLECTOR

TUBE COLLECTORS ASSOCIATION
"HISTORY • PRESERVATION • APPLICATION"

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TUBE COLLECTOR

TUBE COLLECTORS ASSOCIATION, INC.

PO Box 636, Ashland, OR 97520, USA

The Tube Collectors Association is a nonprofit, noncommercial group of individuals active in the history, preservation, and use of electron-tube technology. *Tube Collector*, its bulletin, appears six times per year.

To join TCA: annual dues is $20.00 (in North America; $25.00 elsewhere), to the address above. Please make checks payable to "Tube Collectors Association." Payment by PayPal is welcomed, to *tca@jkasystems.com*. The membership year runs January-through-December. Those joining after February receive the year's back issues of TCA publications. Multi-year memberships are offered: in North America, $37 for two years or $54 for three; elsewhere, $49 for two years or $73 for three.

Articles on tube topics are invited. Editorial correspondence should go to the editor at *tubelore@jeffnet.org* or **102 McDonough Rd., Gold Hill, OR 97525**.

Renewals, changes of address, and other membership business should go to Bob Deuel at *tca@jkasystems.com* or **PO Box 636, Ashland, OR 97520**.

FRONT COVER: The front cover of an RCA service-dealer magazine from the mid-Twenties, featuring the "Selling Fool" doll). *Graphic: Joe Knight*
REAR COVER: A hard-to-find promotion sheet for the National Union "Inditron" numeric-indicator tube. *Image: Wm. Donzelli*

MICROPHONICS FROM THE EDITOR

RENEWAL TIME

Well, it's near the end on the year, and therefore time for members whose address labels specify "EXP=12/2020" to re-up for 2011. We urge that you do so now, before the holiday madness sets in. Multi-year memberships are particularly welcome, as they save you and us some administrative time, not to mention money. Likewise, renewals via PayPal are strongly encouraged. Details and dues rates are, of course, listed on the masthead to the left.

A bit of counter-advice: if renewing by registered mail, please do it *now* or in January. Doing so avoids standing in line at the post office.

NEW BOOK ON VIDEO HISTORY

Prof. Franz Pichler, who wrote a detailed centennial history of Robert von Lieben and his pioneering tube (Robert von Lieben - 100 Jahre Patent Kathodenstrahlen-relais) and followed up with an English-language article on the subject (*TC*, Aug. 2006), has a new paperback work in print. Titled Elektrische Bilder aus der Ferne - Technische Entwicklung von Bildtelegraphie und Fernsehen bis zum Jahre 1939 (roughly, Electrical Television - Technical Development of Facsimile and Television Up to 1939), is orderable from Trauner Verlag in Linz, Austria. The price is ε19.00 via the publisher's Web site (www.trauner.at).

The book covers the various attempts at wire-line facsimile, mechanical-scanning television systems, and the emergence of electronic television in the U. S., England, and Germany in the '30s. It is generously illustrated, and quite comprehensive.

CURTIS REED

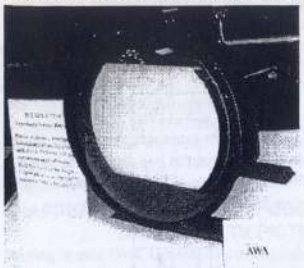
BSTJ ON-LINE

Alcatel-Lucent has made the complete set of back issues of the *Bell System Technical Journal*, 1922-1983, available online at http://bstj.bell-labs.com. The *BSTJ*, of course, published a great deal of tube-development material, starting with the first issue. This is not a "dial-up" matter: the initial issue, with its description of early water-cooled tubes, is about seven megs. Still, printed copies are rare outside good technical libraries.

IN THIS ISSUE

TUBE EXHIBITS AT AWA-ROCHESTER

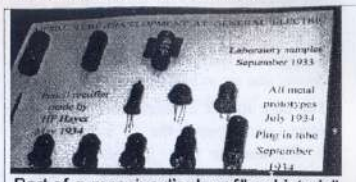
As usual, TCA members contributed heavily to the Equipment Contest at the AWA Rochester event in August. Here are a few photos, from John Dilks and Joe Knight. Other exhibits, not depicted, included a Multivalve entry from Robert Lozier and an RCA tube tester from the mid-'20s, WD-11 sockets included, from Dr. Eric Wenaas.



RCA C72936 color-tube prototype, ca. 1952, leading to the 15GP22

Telefunken EVN 94 (1914) and accompanying catalog pages

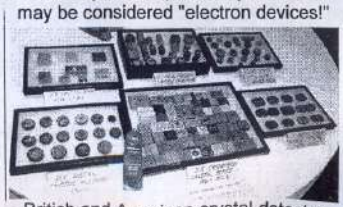
De Forest Radio Co. original advertising art, ca. 1932



Part of a massive display of "prehistoric" GE metal-tube prototypes (see photos in *Tube Collector*, Aug. 2010)

"All possible" '20s R-C-coupled amplifiers and colored-bulb tubes

A pair of coherers from AEG and Marconi - they're not specifically tubes, but may be considered "electron devices!"



British and American crystal-detector galena cans - 139 of them!

THE HISTORY OF VATEA RADIO AND ELECTRICAL CORP.

Baláz Bozó, arranged by **Abel Santoro**

The production of electron tubes in Hungary was begun by Egyesült Izzó (United Incandescent and Electric Co.) in 1917. Its tubes were used by the Army during World War I. After the war, civil radio communication began to spread worldwide and the amateur-radio movement began to boom as well. People with above-average skills spotted the opportunity and started to construct radio devices. These amateur devices were followed by factory-made radios. It may sound rather strange nowadays, but factories were unable to produce enough radios to meet demand.

Later, when the electron-tube manufacturers realized this opportunity, they began to supply not only the electronic parameters, but also radio circuit diagrams with their tubes.

Unfortunately, people generally know very little about Hungarian electron tube manufacture, though Tungsram is a world-famous brand. Another world-noted Hungarian brand is Vatea. My goal is to introduce its history by this little article, since there are very few things we can be as proud of as of this small manufacturing plant, which was able to survive amidst the Depression and crisis emerging at that time, and contributed to the development of the industry with technical inventions, the significance of which we can not properly appreciate till now.

There have been two operating electron-tube factories beside the Egyesült Izzó in Hungary: the Vatea and the John Kremenecky Co. Tungsten Lamp Factory, the owner of the brand name Orion.

Vatea was founded by Imre Patay (Fig. 1), who was born in 1894 and graduated from the University of Technology in 1917. He had held several jobs until joining the Egyelsült Izzó in 1919 as a research engineer.

He left the company in 1923 to establish a firm of his own, with seven of his colleagues He opened a vacuum and radio manufacturing workshop in Budapest, in the 1st District, in the cellar of a house at 7/b Csaba Street.

In the beginning, the shop made tungsten-filament receiving tubes. In 1925, when the Royal Hungarian Post began to operate its 250-W broadcast station at Csepel, they undertook rebuilding of the burn-out tubes of the station. The renewal included replacement of the tungsten filaments. They worked under the utmost secrecy, since the supplier of the tubes, the Telefunken company, would have sued them if it had come to light.

Later they undertook similar renewal work for the broadcast station at Székesfehérvár. It is quite typical of the quality of the work that the installation of additional broadcast stations was done by the Post almost exclusively with the rebuilt tubes. Mr. Patay lacked the capital to fill the growing demand, so he reorganized his fairly profitable small business into a shareholding company.

The VATEA Radio and Electrotechnics Co. was established on November 20 of 1925. Unfortunately the transformation did not improve the financial background of the company to the desired extent, thus Vatea began to conduct cooperative negotiations with Philips, which established its general agency as a shareholding company in Hungary.

Philips offered to buy Mr. Patay's firm with all of its patents. Negotiations lasted three years, however, and as Patay had to face new hardships during that time, Philips acquired a decisive share in Vatea by 1928.

The new tubes developed by Vatea appeared on the market in 1925. The tungsten cathodes were changed by thoriated cathodes. In 1927, the application of oxide cathodes, which operated with higher efficiency, began. They appeared in the market under the Miniwatt brand.

At that time, experiments were on the way to manufacture colloid-cathode tubes. The outstanding fineness, solidity and evenness of the cathode made by colloidation meant a significant development compared to the rough, uneven structure of the cathodes made at the time.

Tubes with cathodes manufactured with the colloidal process attained much greater conductance besides longer lifetime. This process also gained fame on the world market. The process was patented only a few years

Fig. 1. Dr. Imre Patay

Fig. 2. DGP3, with label in English

Fig. 3. DU412 data sheet

Fig. 4. Gas surge protector

Fig. 5. "Touring" receiver

Fig. 6. "Touring" receiver, rear view

later, probably to suppress the competitors. Vatea was world-first in experimenting with two- and three-grid electron tubes, double tubes and pentodes. The highly successful dual electron tubes with thorium are the DGP3 (Fig. 2), and the DU412 (Fig. 3), types with low anode voltage.

At that time electron tubes were typically battery-powered; this is why low anode voltage was so important. Another development aimed for the better use of space, which is shown outstandingly by the manufactured twin tubes. For example, a twin version of the DU412 was the DDU412. The tri-grid tubes (pentodes) were also highly appreciated abroad, e. g., the Parisian company C. Borghi advertised its radios with Vatea's TN4060 twin tube.

Vatea's Patay early recognized the importance of marketing activity, so he published and advertised in many places. Vatea developments included the invention gas-filled tubes for the indication of correct tuning of radios, before magic eyes appeared.

In the beginning, these operated on the principle of rotating coil devices (tuning meters), but later were superseded by completely electronic devices. The gas-filled indicators were the special products of Vatea. They were produced in three types designated VT1, VT2 and VT8. Among the Hungarian radio factories, Standard and Philips applied these in their products. *[The VT2, per the 1944 Brans Radio Valve Vade Mecum, equates to the Philips 4662, which corresponds to the American three-electrode Tune-A-Lite. - TCA Ed.]*

Vatea was also the first in making bimetal-operated gas-filled overvoltage arrester tubes (Fig. 4) which protected telephone devices. They also dealt with the production of photocells where cesium, potassium, and rubidium metals were applied across glass panels with electrolysis to the bulb walls of the photocells as cathodes.

Early Vatea tubes are characterized by a balloon format. In the beginning, the air-exhausting of the tubes was conducted from the top of the bulb. None of the competing Hungarian tube factories produced transmitting tubes, while Vatea had three types of them: EX410, EX412 and EX1050. The first number refers to the heating voltage, while the second number gives the anode dissipation. These types were manufactured for amateur-radio use, but the 50-W type was also recommended for audio amplifiers.

In 1929, Imre Patay was awarded a doctor-in-technology title, which was quite unusual that time, as a recognition of his results in vacuum electronics.

In 1930 in the pages of technical journals, not only electron tubes but a complete Vatea radio appears: the Vatea "Touring" (Figs. 5 and 6). This battery-powered set was suitable for receiving medium-wave transmissions and, what was quite extraordinary even abroad at that time, was portable. Its dimensions were 24 x 31 x 7.5 cm, while its mass with batteries and headphone 2.5 kg. It used one 1.5-V cell for heating and four 4.5-V batteries in series as power-pack. The case of the radio was made of varnished canvas, fashionable and preferred that time, glued to a wooden frame. If I am not mistaken, this material was originally used by bookbinders.

Looking at the controls of the Touring, it has two large knobs with numeric scales. One of them is the heating rheostat and power switch. (For better visibility, we made the embossed inscriptions on the front and the back of the device visible with chalk powder.) Unfortunately, we don't know of any other radio made by Vatea.

The small Vatea workshop at Csaba Street proved too small to the growing manufacting program, so on August 31, 1931 they purchased the property of the Hungarian Horn Factory at 169 Váci Street. Philips also took care of the welfare establishments of the workers; they gathered the necessary numbers of workers in advance, during construction, to begin production as early as possible.

The rebuilding was done in 50 days, which can be attributed to the fast binding of bauxite cement. Many notables were invited to the ceremonial inauguration of the factory: even Archduke Ferenc József was present and also Béla Kenéz, the trade minister, gave a speech.

The new production site meant widening of the product line and improvement in the quality of the products. From this time on, beside the rebuilding of transmitting tubes, they also conducted an extensive production of transmitting tubes, mainly under Dutch licence.

They also begin the production of 300-kW

Fig. 7. Original logotype

Fig. 8. Later logo

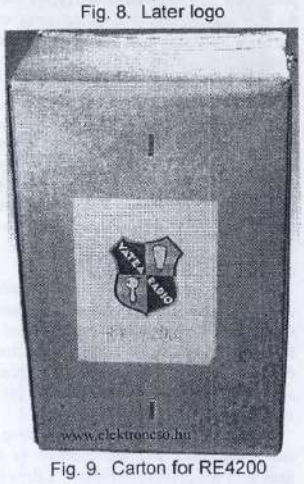


Fig. 9. Carton for RE4200

Fig. 10. Strap-isolated package for RE4200

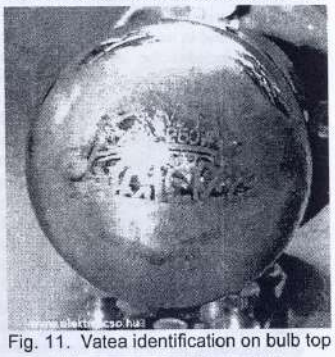


Fig. 11. Vatea identification on bulb top

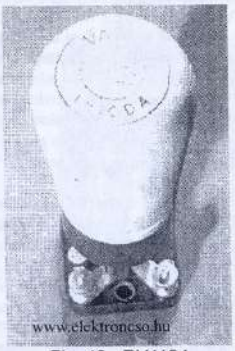


Fig. 12. RV4104

transmitting tubes, based on the agreement with Philips, but unfortunately none of their issues mention these, probably because only the transmitting stations of the Post applied them.

At the beginning, the Vatea factory used a logotype in the shape of a recumbent ellipse and a special font (Fig. 7), which was trademarked in December of 1924. This was changed in 1932 to a crest-shaped emblem (Fig. 8), which was divided into four parts. In the upper left quarter the word "VATEA" can be read while "RADIO appears in the bottom right. In the upper right quarter is a radio tube, while the silhouette of a photocell can be seen in the bottom left. This logo can be observed well on the box of the RE4200 rectifier (Fig. 9).

This box (Fig. 10).is worth examining closely, since the producers protected the tubes in shipping with an excellent package.

The milled outline of the balloon of Vatea tubes is quite characteristic, in the middle of an octagon with sides arching inside the word "VATEA," above some electronic data, beneath the labelling of the type can be seen in Fig. 11. This was later changed to a simpler outline of two circles: between the two circles the name "VATEA," below, some technical data, inside the type label as can be seen (Fig. 12).

On May 1, 1939, the Vatea Rádiótechnikai Rt., the Philips Rádió and the Villamossági Rt. (Electronic Co.) merged, and the Magyar Philips Müvec Rt. (Hungarian Philips Co.) was established. Thus the parent company exercised the right to use the Vatea trademark abroad, but allowed the use of those patents which the parent company obtained from Radio Group (International General Electric Company and the Westinghouse Electric International Company). So Vatea became a manufacturing unit of the global firm, the use of its own brand name ceased, and the tubes manufactured here bore the Philips brand name.

After the merger the Metalix-Röntgen Co., which belonged to the former interest of Philips, gave the right to the Magyar Philips Müvek, to produce X-ray devices, which had been produced by the Vatea unit, but the manufacture of X-ray tubes had not been initiated here.

The transmitter division of Vatea had been developed in such an extent during the former cooperation that it took into its production profile the manufacture of domestic, special transmitters. This facilitated the division of work between Standard and Magyar Philips Müvek, whereby Standard built large transmitters, while the Magyar Philips Müvek made low- and medium-power transmitters up to 30 kW. To build transmitters, the Magyar Philips Müvek had to request the approval of the parent company. The firm got the approval for the manufacture and marketing of transmitters on May 12, 1941. After this, production of not only tubes for the transmitters, but also transmitters themselves belonged to the interest of the company.

The Magyar Philips Müvek Rt. was brought under State control in 1949. From January 1951, the factory operated under the name Magyar Adócsögyár (Hungarian Transmitter Tube Factory), and in 1966 it became a production site of Egyesült Villamossági Rt. (United Electronics Co.), better known as Tungsram.

Imre Patay, the founder of the factory, left it at the time of the merger in 1939 and established a vacuum-technology firm, where he also dealt with transmitter-tube rebuilding. This rebuild activity, which was probably in an early stage, could have been changed with the production of optic devices, but the War affected the development of the firm so heavily, that there is very little known about it. Mr. Patay emigrated as early as 1946 to Sweden and in 1947 to America, where he also dealt with vacuum techniques. He died on January 19, 1949 at the age of 55.

ACKNOWLEDGEMENT

To Mr. Baláz Bozó (www.elektron cso.hu), for permission for adapt and reprint this article.

Fig. 13. Vatea factory

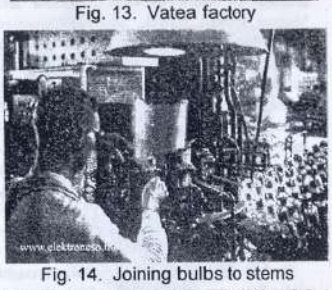


Fig. 14. Joining bulbs to stems

Fig. 15. Ovens for firing parts in hydrogen

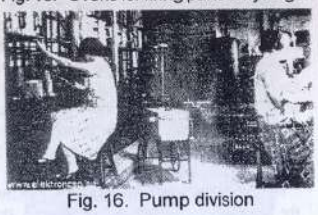


Fig. 16. Pump division

Fig. 17. Sealing-off

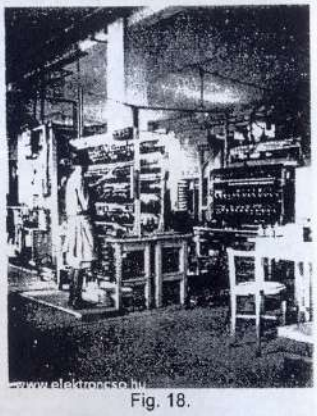


Fig. 18.

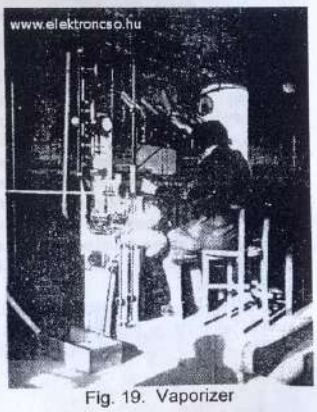


Fig. 19. Vaporizer

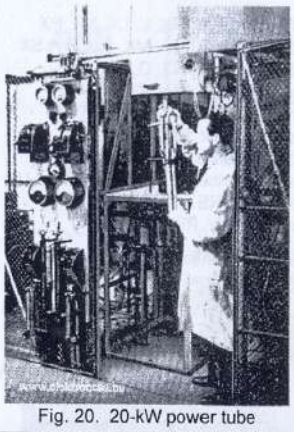


Fig. 20. 20-kW power tube

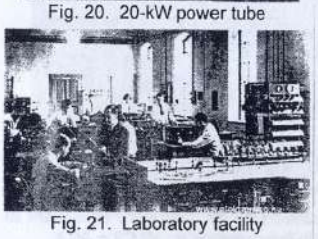


Fig. 21. Laboratory facility

www.elektroncso.hu

Fig. 22. "Colloidal" carton

Fig. 23. Parrot-themed carton

Fig. 24. Philips / Vatea advertisement

Fig. 25. Advertising design

Fig. 41. V425

FURTHER NOTES (TCA Ed.)

Keith Thrower's British Radio Valves / The Classic Years: 1926-1946 briefly discusses the distribution of Vatea tubes in England. The 1954 International Radio Tube Encyclopaedia (B. Babani) cites gives the address of a Vatea distributor in Paris.

VATEA NUMBERING SYSTEM

Example: AG 20 18

Letters

Triodes: AG, H, HV, R, RG, RV, RX, TD, TP, U, UX
Duodiodes: BB
Dual-grid types: DG, DGP, DN, DU, DV, DX
Triode-hexodes: HRV
Output triodes: HX, L, LX, NX, PX
Tetrodes: MG, MV, MX, SG, SV, SX
Pentodes: MT, NT, Q, ST, V
Octodes: OG, OV, SO
Hexodes: QT
Diode-triodes: RB
Diode-tetrodes: SB
Output pentodes: TG, TK, TL, TV, UV
Rectifiers: RE
Ballasts: CV, RR

First numbers: heater/filament voltage
2: 2 V; 4: 4V; 6: 6.3 V

Last number: heater/filament current
06: 60-100 mA
10, 11, 12, 14, 15, 16, 17, 20: 100-200 mA
18: 180 mA
25, 30: 200-400 mA
50: 500 mA
60: 600 mA
90: 1.0 A
100, 104: 1.0-1.2 A
110: 0.6-1.3 A
120: 1.1-1.3 A
200: 2.0 A and up

There was also a line of tubes designated with "V" that were equivalent to Philips types, e. g., VAC2 = AC2.

Above per Gerhard Salzmann, Röhrencodierungen der 20er und 30er Jahre (roughly, Tube Coding Systems of the '20s and '30s), 1988.

TOO MANY BOOTLEG RADIO TUBES ARE BEING SOLD

Radio Broadcast, *April, 1925, p. 1066*

As a result of the investigation of poor tubes being marketed in New York City, Joseph Haberman was found to have been guilty of fraud and misrepresentation and was recently sentenced to three months in the workhouse. He had been buying tubes from a New Jersey manufacturer and putting them up in cartons marked "Radio Corporation of America." The district Attorney who represented the state in the prosecution vouched for the statement that 10,000 spurious tubes were being sold each day in America.

Fig. 26. Promotional pamphlet

Fig. 27. TV425 and HX410S

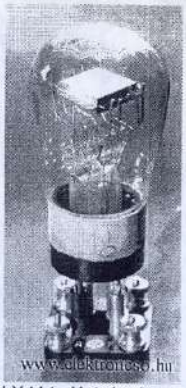


Fig. 28. LX414. Note horizontal mount.

Fig. 29. LX414 updated to "ST" bulb

Fig. 30. PL414

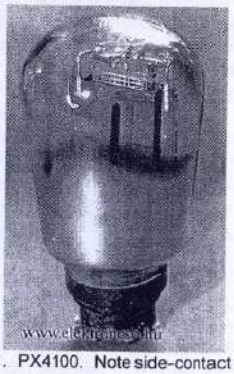


Fig. 31. PX4100. Note side-contact base.

Fig. 32. RE450

Fig. 35. RV4100

Fig. 38. TL218

Fig. 33. RE4100

Fig. 36. SV4100

Fig. 39. RV4104, "ST" bulb

Fig. 34. RE425

Fig. 37. SX410S

Fig. 40. U406

NATIONAL UNION

Ludwell Sibley

INTRODUCTION

A tubemaker with a complex and entertaining history was the National Union Radio Corporation. It began making "commodity" receiving tubes, added TV picture tubes, tried to do solid-state devices, and finally repositioned itself into design and sale of highly ingenious specialty tubes.

Receiving-tube makers are normally easy to trace history-wise: they usually issued promotional material and tube handbooks, put out "house organ" newsletters and press material, and advertised heavily. The specialty firms are much more obscure. If they were focusing on Government contract business, especially, they didn't advertise much or leave other hints of their history. General Electronics and Marshall Electronics are two such firms. National Union, in its "specialty" mode, is another.


Nathan Chirelstein in 1930

ORIGINS

This company came out of the merger of the Sonatron Tube Company, the Magnatron Corporation, Marathon (Northern Manufacturing Corporation), and the Televocal Corporation. The merger was announced on August 24, 1929. The company had an RCA license. The organizer [1] was Nathan Chirelstein, who had "gotten into radio" in 1922 with his brother Harry. Their initial venture was the Radio Tube Corporation, which evolved into Sonatron.

The new company presumably chose its name in imitation of the Western Union Telegraph Company, which was still a blue-chip firm at the time and had arisen from merger of multiple smaller companies. Officers of NU weren't particularly modest, claiming to be making 35,000 tubes a day, planning for 100,000 a day by 1930. The firm termed itself "one of the three largest tube companies in the world" that "takes its place beside RCA and Cunningham." In reality, the merger probably saved all of the initial firms when the Depression set in.

NU lighted service-shop clock

The company was promotion-oriented from the start. A full-page ad in *Radio Engineering* for October 1930 boasted "Crosley and Zenith, after countless exhaustive tests, have expressed their confidence in National Union Radio Tubes by approving them for shipment with their latest sets."

Oddly, the Televocal brand remained in use through (at least) January 1930, the source being identified as a division of NU.

EX-WESTINGHOUSE PERSONNEL

In March 1930, NU hired 16 engineers who had become redundant when Westinghouse cut back operations at its Bloomfield, NJ plant. One was Dr. Ralph Myers, veteran tube engineer, who had a career as head of engineering at NU. Another was Herman Kuthe, who after WW II founded