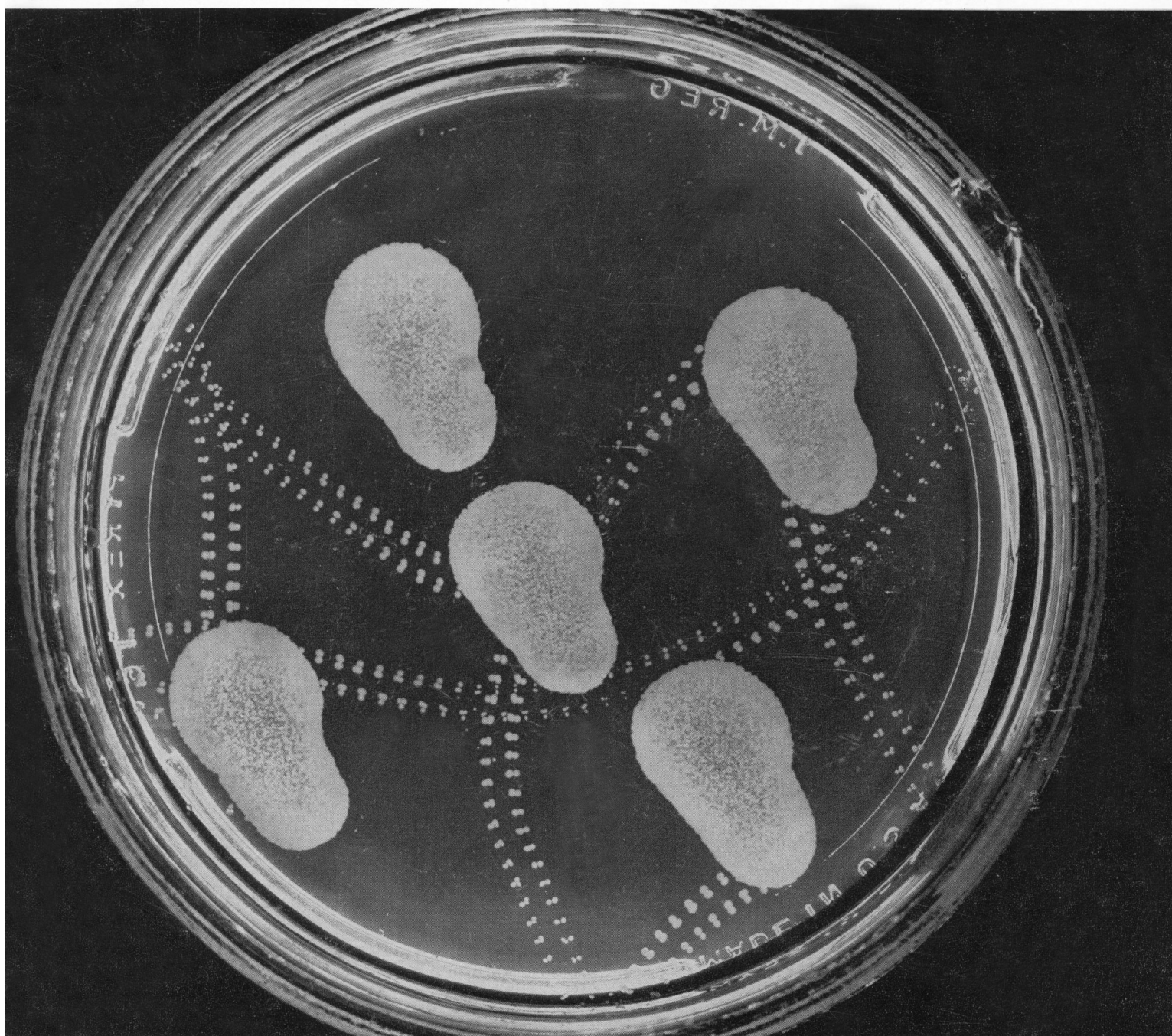


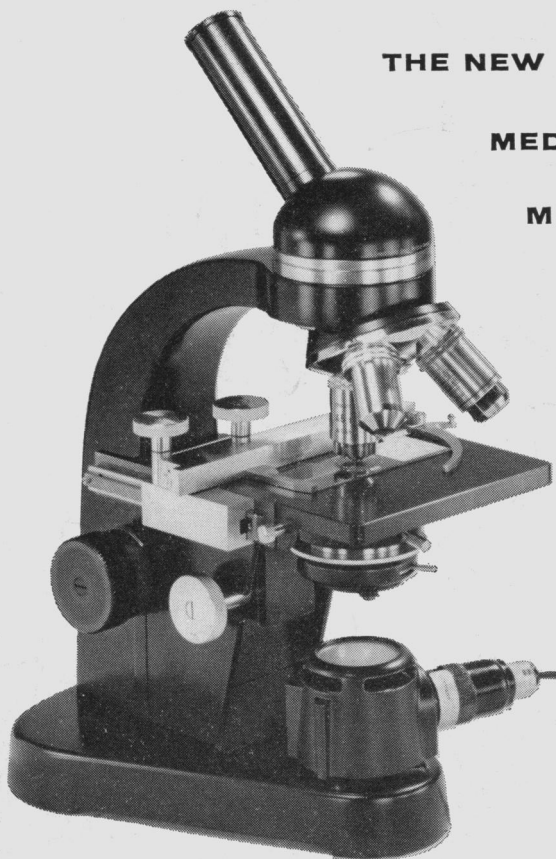
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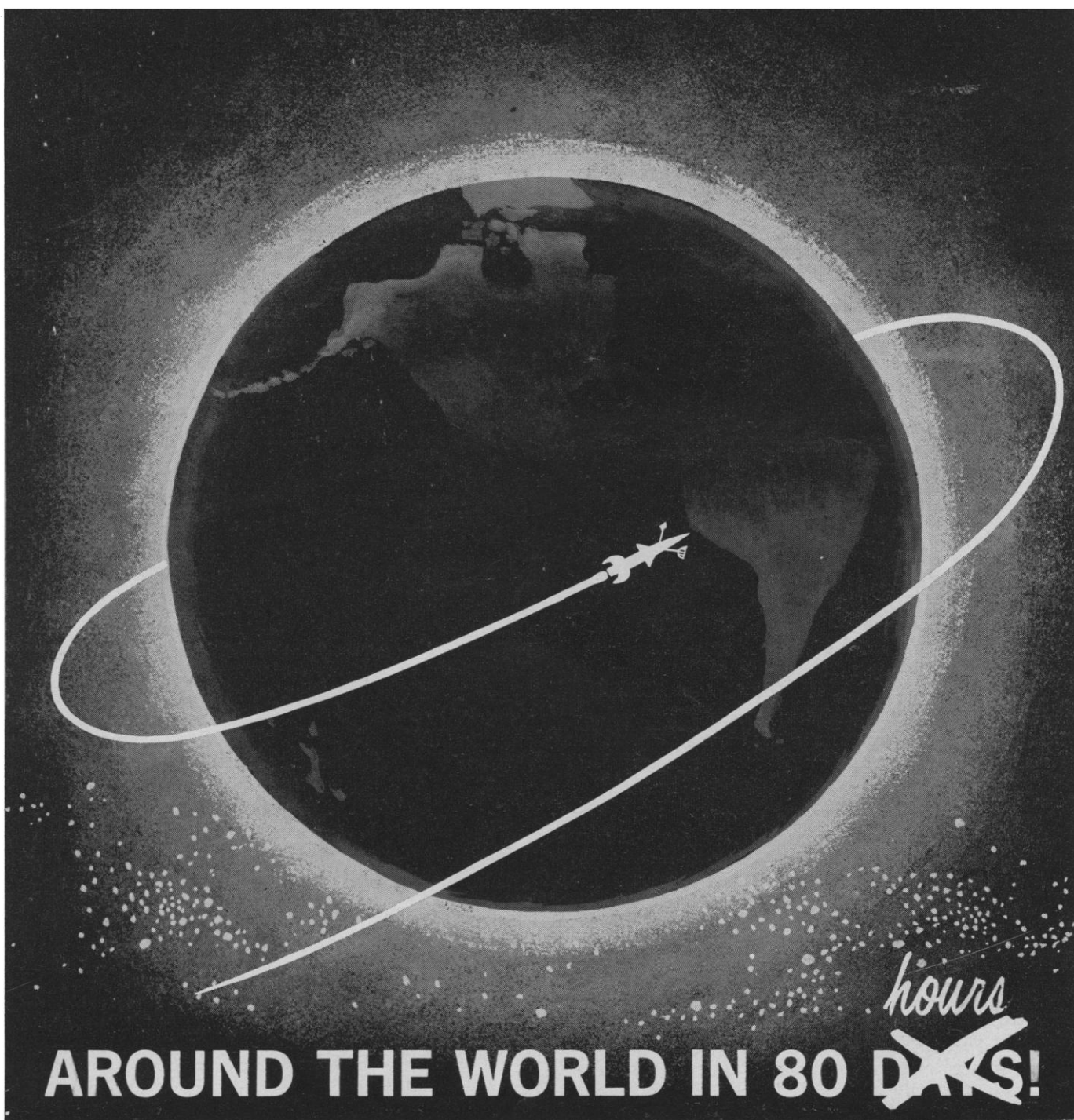
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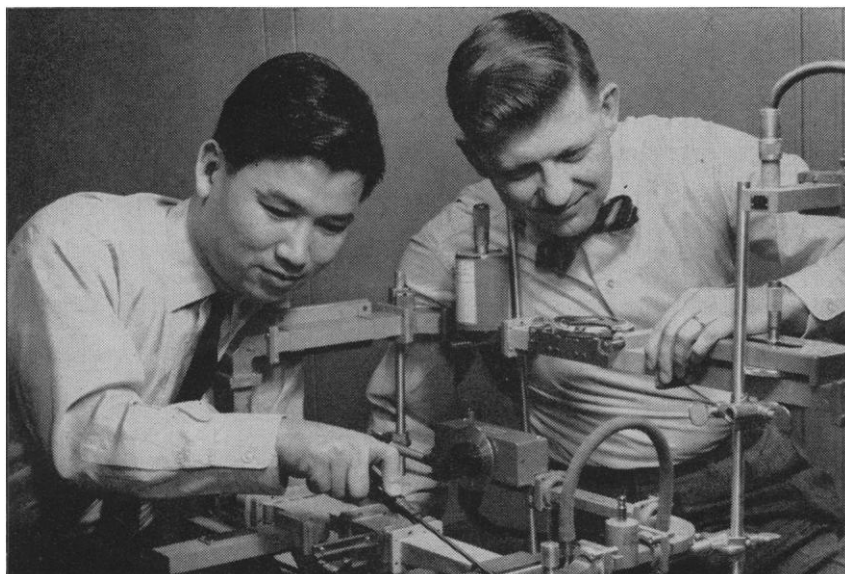


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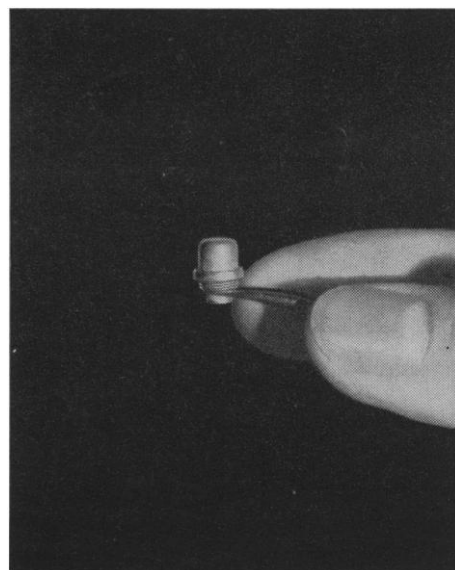


THE IDEA THAT GREW FOR 100 YEARS



At Bell Laboratories, M. Uenohara (left) adjusts his reactance amplifier, assisted by A. E. Bakanowski, who helped develop first suitable diode. Extremely low "noise" is achieved when certain diodes are cooled in liquid nitrogen.

First practical diode for amplifier, shown here held by tweezers, was jointly developed by A. E. Bakanowski and A. Uhler.



How basic scientific ideas develop in the light of expanding knowledge is strikingly illustrated by the development of Bell Laboratories' new "parametric" or "reactance" amplifier.

Over 100 years ago, scientists experimenting with vibrating strings observed that vibrations could be amplified by giving them a push at strategic moments, using properly synchronized tuning forks. This is done in much the same way a child on a swing "pumps" in new energy by shifting his center of gravity in step with his motion.

At the turn of the century, scientists theorized that *electrical* vibrations, too, could be amplified by synchronously varying the *reactance* of an inductor or capacitor. Later amplifiers were made to work on this principle but none at microwave frequencies.

Then came the middle 50's. Bell Telephone Laboratories scientists, by applying their new transistor technology, developed semiconductor diodes of greatly improved capabilities. They determined theoretically *how* the electrical capacitance of these new diodes could be utilized to amplify at *microwave* frequencies. They created a new microwave amplifier with far less "noise" than conventional amplifiers.

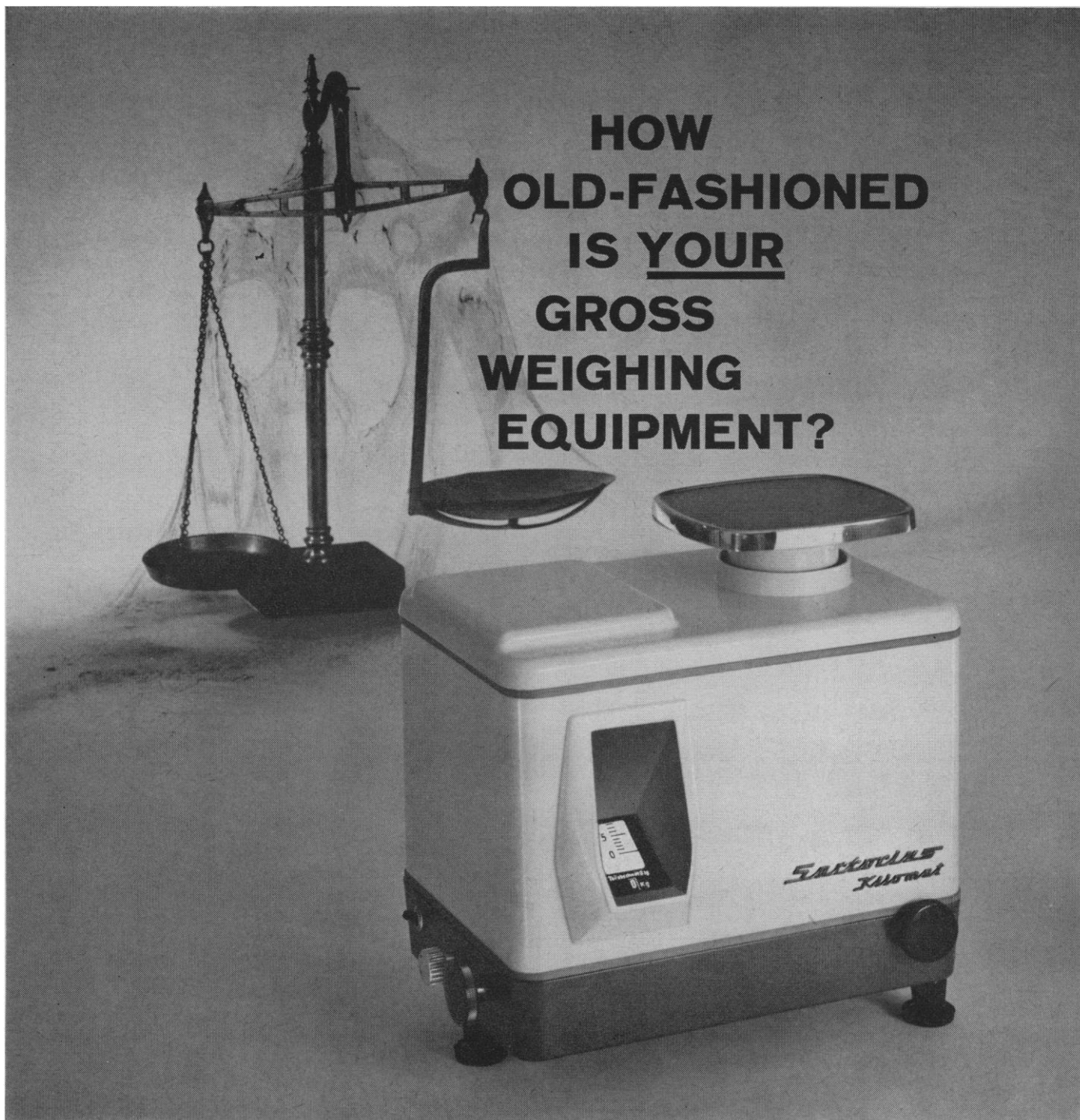
The new reactance amplifier has a busy future in the battle with "noise." At present, it is being developed for applications in tropospheric transmission and radar. But it has many other possible applications, as well. It can be used, for instance, in the reception of signals reflected from satellites. It is still another example of the continuing efforts to improve your Bell System communications.



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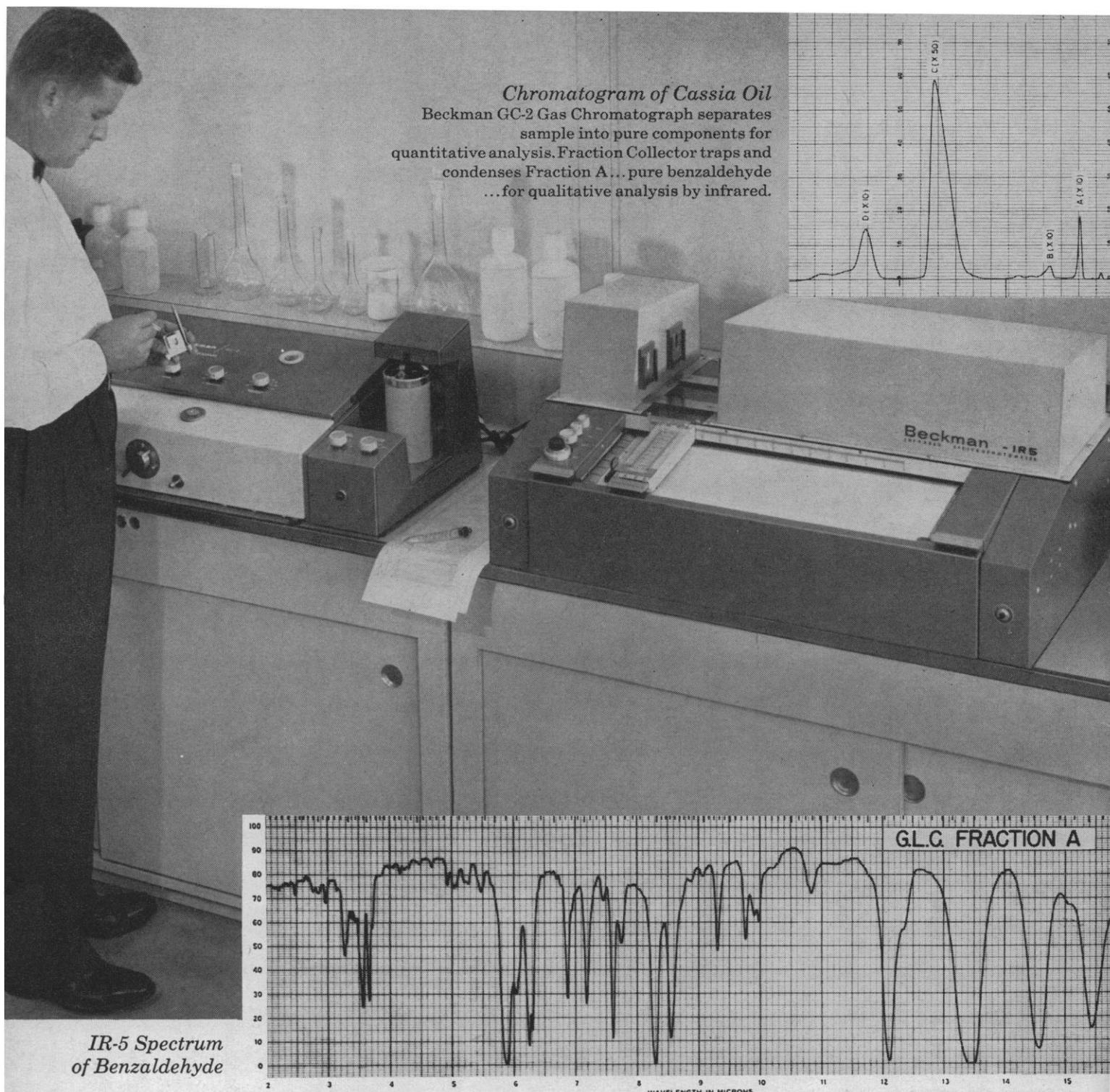
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The Florence Agreement

In 1948 the policy-making body of the United Nations Educational, Scientific and Cultural Organization decided to seek an international agreement to promote the flow of cultural and educational materials among nations. Representatives of 25 member states drafted an instrument for this purpose which was unanimously adopted at a meeting of the General Conference of UNESCO in Florence in July 1950. This Agreement on the Importation of Educational, Scientific, and Cultural Materials (commonly referred to as the Florence Agreement) became operative in 1952, when it had been ratified by ten member states.

The central feature of the agreement is that certain materials will be exempt from customs duties: books, documents, articles for the blind, and, if they are of an "educational, scientific or cultural character," works of art, visual and auditory materials, and scientific instruments or apparatus.

In October 1957 representatives of 52 nations attended a UNESCO meeting held to appraise the first five years of operation of the agreement. They concluded that the agreement was "a valuable and, on the whole, highly effective instrument" and recommended that all states "should apply it and in the most liberal manner."

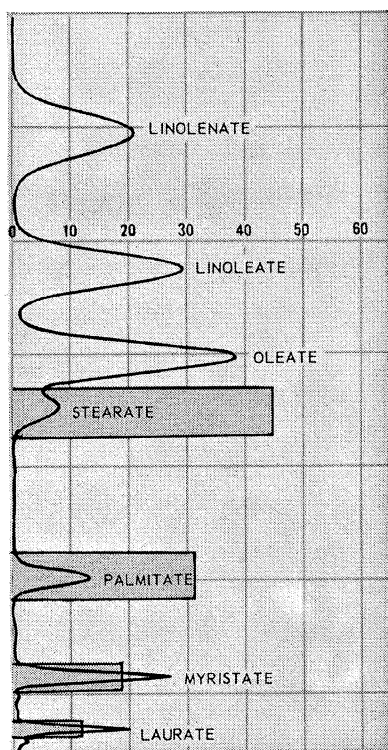
The United States, although it has been a party to the negotiations since the beginning, has been slow to move toward adherence. Finally, on 24 June 1959, the U.S. became the 32nd nation to sign the agreement. This action was ratified by the Senate by a 76 to 14 vote on 23 February 1960.

But one last hurdle remains. Since the agreement proposes removal of tariffs, the enabling legislation must be introduced in the House of Representatives. A bill is now being prepared by the Executive branch (the delay is puzzling since the State Department might well have begun preparation of appropriate legislation last June) which should be ready for introduction in the House within the next few weeks.

In the House the bill will be assigned to the Ways and Means Committee. Those in favor of the bill—the American Council on Education, the American Council of Learned Societies, the American Library Association, the American Book Publishers Council, and the American Association of Physics Teachers—will continue to testify in its support. The only group opposed prior to Senate ratification was the Scientific Apparatus Makers Association, which feared that a liberal interpretation and administration of the agreement might damage their industry. This position seems unrealistic, but will doubtless be put forward again. The only instruments that will be duty-free are those that are purchased by educational and scientific research institutions, and then only if "instruments or apparatus of equivalent scientific value are not being manufactured in the country of importation." Thus, most scientific instruments will not qualify. Furthermore, to facilitate U.S. participation, a special reservation was added, stating in effect that if any product is being imported in such relatively increased quantities as to threaten serious injury to the industry producing competitive products, "the contracting State shall be free . . . to suspend in whole or in part, any obligation under the Agreement with respect to such product."

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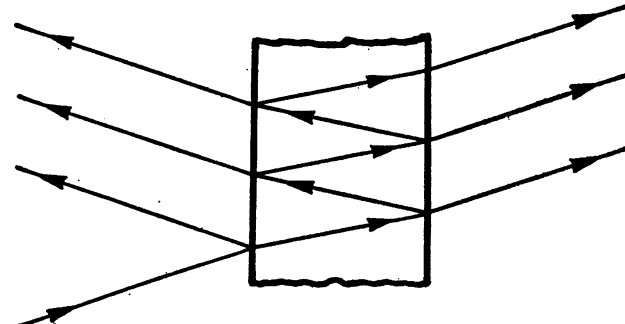
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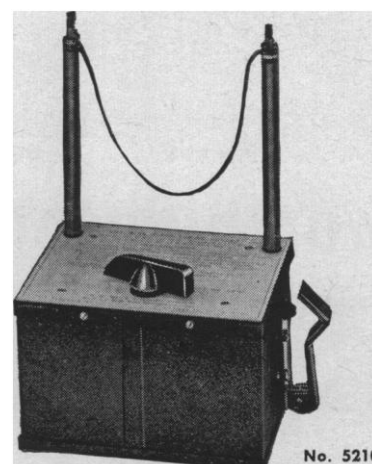
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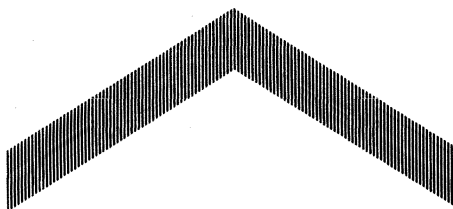
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Meetings

New Jersey Academy of Science

The New Jersey Academy of Science, a recent affiliate of the AAAS, came into being during the year 1954 through the efforts of a small group of individuals, guided largely by Roger H. Charlier and Courtlandt J. Daley, who were interested in founding an organization that would eventually accomplish for science on a state-wide basis what the AAAS achieves on a nationwide scale. Such an organization, they felt, could be made to serve all disciplines in science by bringing together at regular intervals scientists, engineers, and members of the medical and dental professions. It would thus effect a degree of cross-fertilization in science which ordinarily is unattainable in professional organizations devoted to specialized fields. It was also hoped that by embracing all facets of science, engineering, and medicine, the organization might be able to bring together and to share the points of view reflected in these areas and to apply them to state as well as to national problems of a scientific nature. It would thus serve not only to unify the scientific interests of the state but also to encourage interdisciplinary study and research. Concomitantly it would, as stated in the constitution, "promote fraternal relationship among those engaged in scientific work."

The first annual meeting was held at Township Hall in Chester, N.J., on 29 January 1955, with about 40 members in attendance. At this meeting several of the members presented papers, officers were elected for a 2-year period, and an executive committee and an editorial staff for the academy publication, the *Bulletin*, were appointed. The executive committee was empowered to draw up a constitution and bylaws. The draft constitution and bylaws, with minor alterations, were approved by the members at the annual meeting held in 1956.

According to provisions of the constitution all officers are elected for a period of 2 years, the newly elected officers assuming their duties at the conclusion of the annual meeting of the election year. Election is by secret ballot, a proposed slate of officers being submitted to the members by a nominating committee appointed by the president. Nominations may also be made from the floor at the time of the election. The present officers, whose terms expire in 1961, are as follows: president, Robert K. Zuck (Drew University, Madison); vice presidents, James H. Leatham (Rutgers University, New

Brunswick) and M. Lelyn Branin (Newark College of Engineering, Newark, N.J.); executive secretary, Hirsch L. Silverman (Yeshiva University, New York, N.Y.); recording secretary, Michael Charney (Hackensack Biochemical Laboratory, Hackensack); and treasurer, Louise F. Bush (Drew University). The academy representative on the AAAS Council is M. Lelyn Branin.

The *Bulletin* is published semiannually under the co-editorship of M. Lelyn Branin and Hirsch L. Silverman. Original contributions to science are published, together with news items and announcements of particular interest to members. Plans are under way for the creation of a monthly or bimonthly newsletter to supplement the *Bulletin* and thus make more space available in the latter for publication of scholarly contributions.

The annual meeting of the academy is held in March or April of each year, ordinarily on the campus of one of the New Jersey colleges or universities. It consists of a business meeting and technical sessions in the afternoon, followed by an informal dinner and an evening session at which a nationally known scientist speaks on some subject of broad public interest. All sessions except the business meeting are open to the public. This year's annual meeting was held on 25 March at Newark College of Engineering, in conjunction with the college's 75th anniversary celebration.

The academy is now planning to establish, with the cooperation of the New Jersey Science Teachers Association, a junior academy of science for public and private high-school and junior high-school students throughout the state. Committees representing both the academy and the science teachers association have recently held a series of meetings to determine what form the organization should take and how the plan finally agreed upon should be implemented. It is hoped that the details of an organizational plan for the junior academy can be agreed upon before the spring meetings of the two sponsoring societies so that the plan can be presented to the members for discussion and possible approval.

During the past 5 years the academy has grown from the original small group to an organization of approximately 250 members, including some out-of-state and foreign members. Membership is open to anyone who has an interest in science. The annual membership fee of \$3 includes a subscription to the *Bulletin*. Student membership is available to high-school and college students for one-half the regular annual fee.

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