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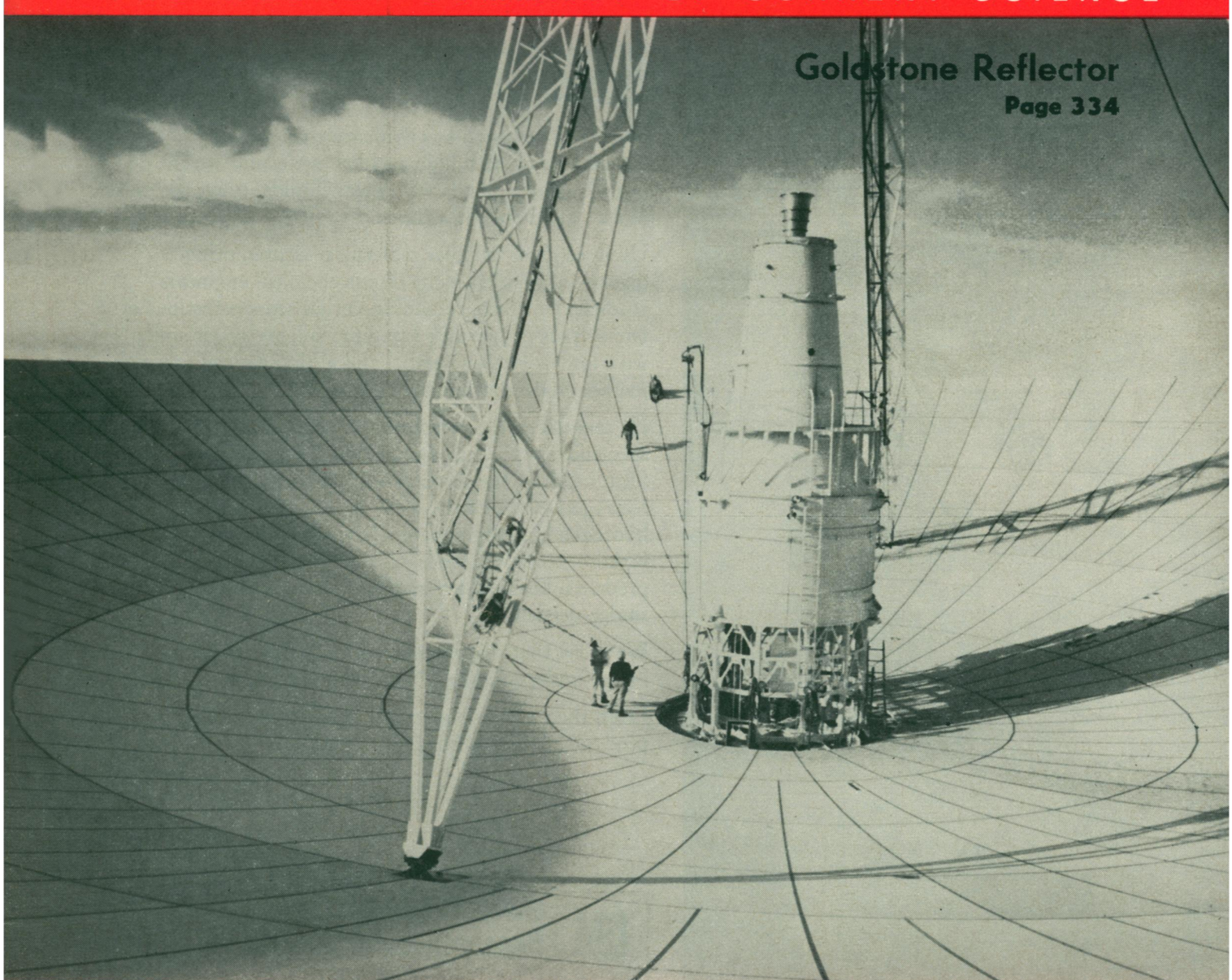
SCIENCE NEWS

SCIENCE NEWS LETTER ®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



A SCIENCE SERVICE PUBLICATION

One of a series briefly describing GM's research in depth

Hydrogen Bonds→Clean Engines +Dirty Oils

One way to keep an engine clean inside is to keep the oil dirty.

Oil additives—dispersants—help to do this. But how?

Chemists have postulated that one way is through a dispersant's ability to form hydrogen bonds with polar oxidation products—products such as acids and solids that result from cooking the oil and burning the fuel during engine operation. But experimental evidence has been scarce.

Now GM Research has evidence that ashless dispersants of both high and low molecular weight do form hydrogen bonds with polar liquids, tying the polar molecules to the dispersants.

Using alcohols as polar molecules—representing oxidation products—one of our chemical engineers studied the effects of adding various concentrations of two ashless dispersants (an aminoalkenylsuccinimide, with low molecular weight, and a high molecular weight methacrylate-pyrrolidone copolymer).

He monitored the interactions, using infrared spectroscopy . . . and found that hydrogen bonds did form between the dispersants and the hydroxylic hydrogen atoms of the alcohols. In an engine oil, hydrogen bonding apparently enables the dispersants to form protective shrouds around the polar oxidation products, keeping any sludge in the oil, preventing sludge deposition.

We knew that dispersants worked. Now we have a better understanding of how. But that's not the end.

From the new understanding may come a better product . . . and even cleaner engines.

GM **General Motors Research Laboratories**
Warren, Michigan 48090

SENIORS OF 1967

Start ***NOW*** *on your Scientific Project*

TO WIN IN THE

TWENTY-SIXTH ANNUAL

Science Talent Search®

Conducted by Science Clubs of America, a Science Service activity, and sponsored by the Westinghouse Educational Foundation, an organization supported by the Westinghouse Electric Corporation for the purpose of promoting education and science.

REWARDS: TRIPS TO WASHINGTON, $34,250 IN WESTINGHOUSE SCHOLARSHIPS AND AWARDS, RECOMMENDATIONS FOR ADMISSION AND SUPPORT IN COLLEGE

WRITE A REPORT of about 1,000 words on your Science Project. Your report should tell what you are doing or have done in science in the way of experimentation or other research activity. It should be original and creative in character. Now, before the school year ends, is the time for high school seniors of 1967 to get started on science projects. With an early start you can plan a project, carry it through more carefully and write a better report. Next December take an examination which tests your ability rather than your fund of information. Supply your school with information about yourself to be sent in with your report and examination papers.

Do these three things and you may be among the 40 boys and girls who will win all-expense trips to the Science Talent Institute and compete for Westinghouse Science Scholarships and Awards to continue their education.

The top 10% of those who complete entries in the Science Talent Search will be awarded Honors. Names and addresses of those in the Honors Group will be circulated to all the universities, colleges and technical schools of the nation as worthy of careful consideration for admittance to institutions of higher learning and for scholarship aid. All winners in the Science Talent Search receive many offers of opportunities to continue their education and pursue the careers they desire through summer employment in scientific laboratories. Such benefits come also to those in the Honors Group and to those who place in State Science Talent Searches.

Start your project NOW!

1. Pick a subject you can investigate at first hand, one about which you can do more than just read. Typical projects of Science Talent Search winners have been in such fields as Aeronautics, Agriculture, Astronomy, Botany, Chemistry, Electronics, Geology, Mathematics, Meteorology, Medical Sciences, Nutrition, Physics, Psychology and Zoology.

2. Whatever your project may be—read about it. Learn what already has been done. It is often desirable to repeat previous experiments, but it should be done deliberately and for a purpose.

3. Write what you did, not merely what you read. Tell it in simple language; follow it through step by step. Then tell what you observed as a result of your experiments, and what conclusions you draw from those observations.

4. Fancy writing has no place in science. There has been great writing in the sciences but it is the greatness of strength and simplicity.

Planning a career in Science? Take advantage of Science Talent Search opportunities. In the previous twenty-five years more than 7,600 students, because of their Science Talent Search standing, have been offered educational aid from many sources.

Science Talent Search®

Who May Compete?

Any boy or girl who is in his last year of secondary school (public, private, parochial) in the United States, but excluding U.S. possessions, who is expected by the certifying school official to complete college entrance qualifications before October 1, 1967 and who has not competed in any previous Science Talent Search is eligible to enter this competition.

Must Trip Winners Come to the Science Talent Institute?

Yes, if they wish to be considered for the awards. The scholarship and award winners will be selected by a board of judges at the Nation's Capital. Expenses to Washington and return will be paid.

Can Scholarship Winners Use the Money for Any Purpose?

Yes, as long as it contributes to their science or engineering education. It can be used for tuition, room rent, board, clothes, books, laboratory fees, etc. Award winners may use the money as they choose.

Will Entrants Have Other Scholarship Opportunities?

Entries may be made available by Science Service to cooperating agencies and committees in various states and regions for use in state and regional Science Talent Searches, coordinated with the national competition. In 1966, 43 State Searches were held.

Is a Pupil Who Already Has a Scholarship Eligible to Compete?

Yes, so far as the rules of the Science Talent Search are concerned.

Are Previous Examinations Available?

Yes, you may purchase copies of previous examinations (with answers) for 15¢ per copy. Write to SCA for authorized practice copies for ten years.

Will Girls Have As Much Chance As Boys?

Yes. The trips to Washington will be distributed between girls and boys approximately in proportion to the number of girls and boys entering the contest, and so, in general, will the awards.

Are Titles of Previous Projects Available?

Yes, SCIENCE PROJECTS HANDBOOK, a guidebook for experimentation by youthful scientists—55¢ each (10 or more 50¢ each). PROJECTS: SPACE, the story of space exploration and reports of student projects—45¢ each. THOUSANDS OF SCIENCE PROJECTS, listing titles of projects done by contestants in past years—25¢ each (10 copies—$1.00).

What Are the Official Rules?

Detailed rules and regulations will be issued at the beginning of the new school year. Write for them or consult the copy sent to your school or Science Clubs of America sponsor.

What Is the Purpose of the Report?

An entrant in the Science Talent Search presents a report of about a thousand words on a science project as evidence of research ability in science. It is your opportunity to prove that you can plan and carry out to completion some problem or project in science; your chance to show that you have the ability to approach a problem with the originality of thinking that is essential to research.

Should the Report Be Historical?

Only incidentally. Investigate the literature pertaining to your subject. But do not use this as your report. It is merely the background for your own work. A report devoted to a complete history of cancer research, for instance, is not suitable for this competition because it offers almost no chance to express any original thinking or planning. In the main, it is wise to avoid such a large subject. Choose a smaller one that you can investigate first hand.

Must the Report Record Only Original Work?

No. We realize that students may not have training or apparatus to do work that is entirely original (though many contestants have). But, if you repeat the experiments of someone else, try to have some originality about it. If you build a piece of equipment, indicate the parts that you designed. If you follow plans of others, show what you have done in addition that is your own work. Thus you demonstrate research ability as well as skill in following directions.

Can I Get Help on My Project?

Yes, you already have. You know what you do now because you have received counsel from many people during your lifetime. A scientist never stops seeking more information. Exhaust every possibility of help from books, magazines and people as you work on your project and plan your report.

What Is Meant by a Science Project?

A study in any field which is of interest to you and for which you have the equipment to deal adequately. For a project in mathematics a pencil and some paper may be all that is needed; for one in biology you might use a window box as your laboratory. Do not think that expensive equipment, like cyclotrons and electron microscopes, is essential to good projects. If you are fortunate enough to have plenty of equipment, that is fine, but if you aren't, remember that some of the best projects have been done with equipment made from materials salvaged from junk yards, attics and cellars.

Should the Report Be Biographical?

No. Do not go into lengthy autobiographical detail about the development of your interest in science. Most other contestants have passed through the same phases of interest in nature, radio, chemistry sets, model building, etc. This personal history, while interesting, does not prove anything about your present ability as a scientist.

How Should My Report Look?

When it comes to writing the report of your work you can only report on what has actually become your information through study and experiment. Winners in state and national competitions are interviewed by judges and no contestant would therefore make claims in his report that he could not substantiate "in person."

Type your report or have it typed on white paper. Use one side of the paper only. Include a bibliography of the most important items of your reading. Consult journals of scientific research in your field to see how research is reported. Do not dress up your report with fancy covers or other extraneous decorations. The judges are interested in seeing the content of the report! **KEEP A CARBON COPY OF YOUR REPORT; THE ONE SUBMITTED CANNOT BE RETURNED TO YOU.** Try to stay within the limits set: "about 1,000 words." The judges are impressed with quality—not quantity. As much as you can, relegate details to tables, diagrams, charts, photographs, drawings or maps. It is not necessary to send your equipment to prove you did the work, but the judges appreciate photographs to illustrate your procedures and results.

How Soon Should I Start on My Project?

As soon as you can. The closing date is December 27. Some contestants report on work they have been doing for years; others report on a project they did in a few months. Emergencies or changes in plan always arise that take more time than you anticipate. Think through all details of definition of your problem, setting up controls, how to collect and record your data and what you are seeking in your final results. Give yourself an ample time allowance because as your work progresses you will see opportunities for constant improvement.

Are the Project and Report Fun?

Yes. The winners have told us repeatedly that the project and report have been the most stimulating part of their entry in the Science Talent Search.

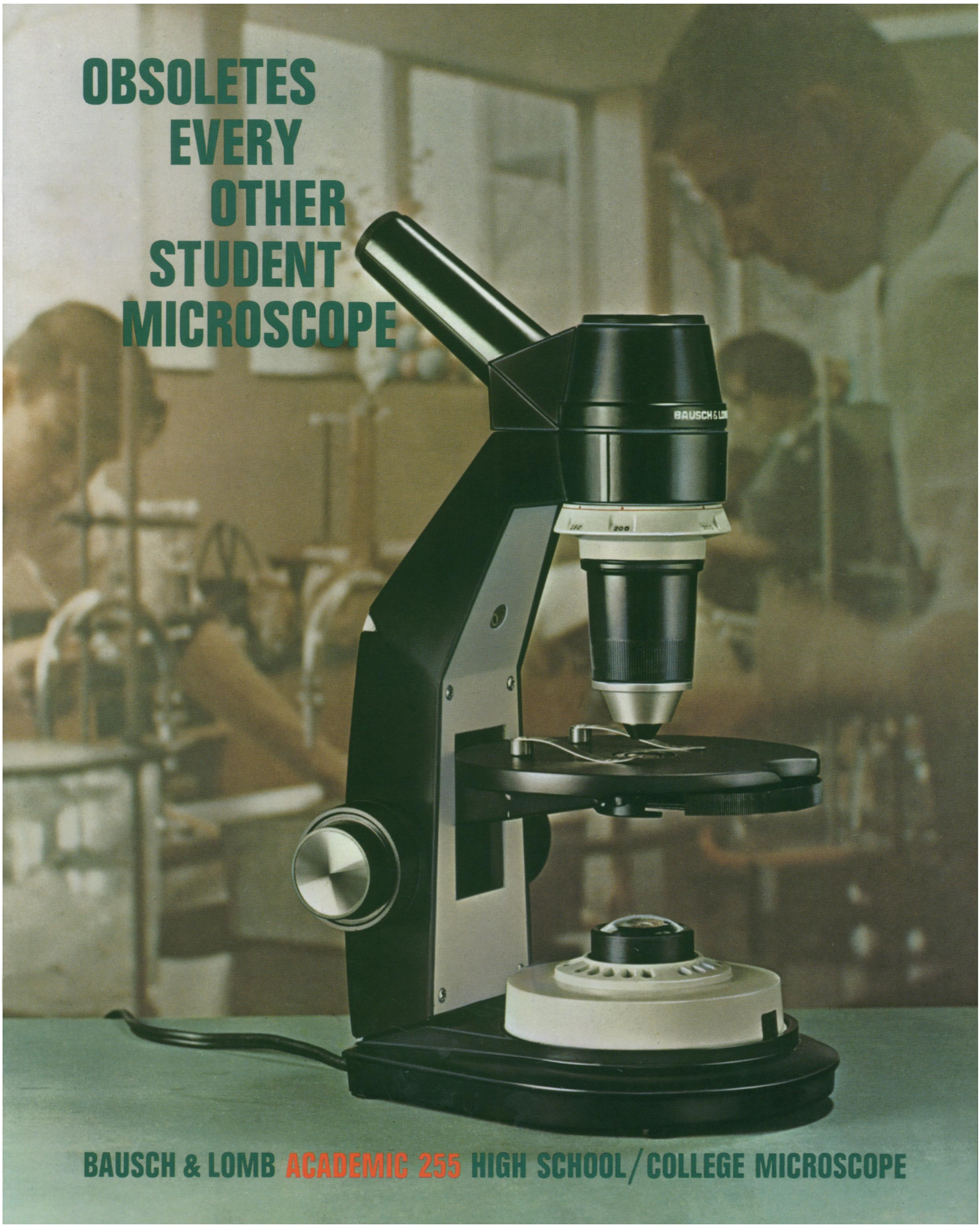
We wish for you this same feeling of high adventure that every scientist before you has felt upon venturing into some frontier of science new to him or her.

How Can Our Club Affiliate With SCA?

The science teacher should send name and permanent teaching address to SCA for free affiliation. All communications about the Science Talent Search and other matters of interest to young scientists will then come automatically.

SEE YOUR SCIENCE TEACHER OR WRITE SCIENCE CLUBS OF AMERICA

1719 N STREET, N. W., WASHINGTON, D. C. 20036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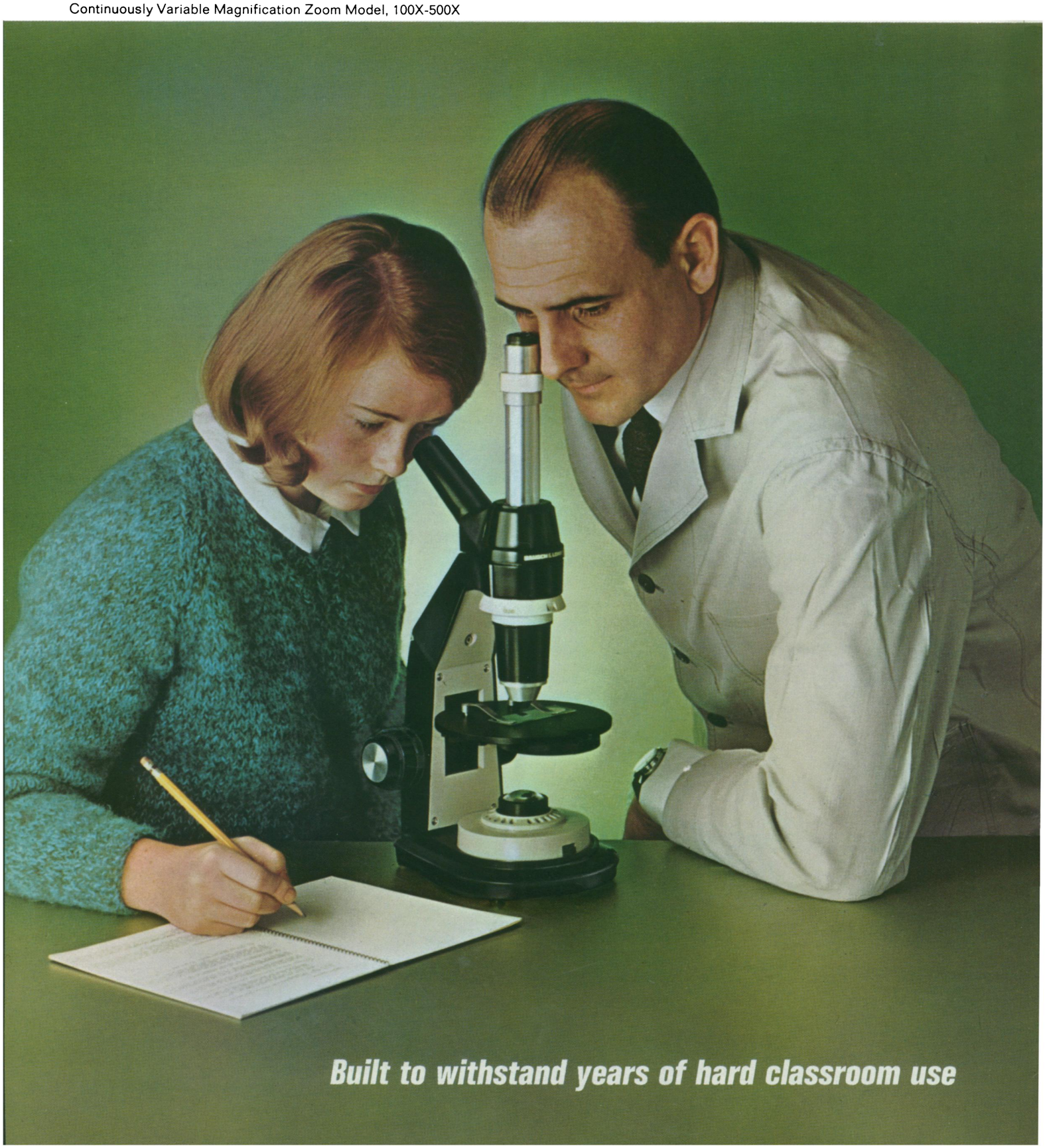

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The Bausch & Lomb name stands behind every Academic 255 Microscope. The company's world-wide reputation for high quality is your guarantee that these microscopes will perform to your complete satisfaction for many years to come. Low initial cost, excellent performance, and minimum maintenance combine to make the the Academic 255 the ideal science teaching tool for your school.

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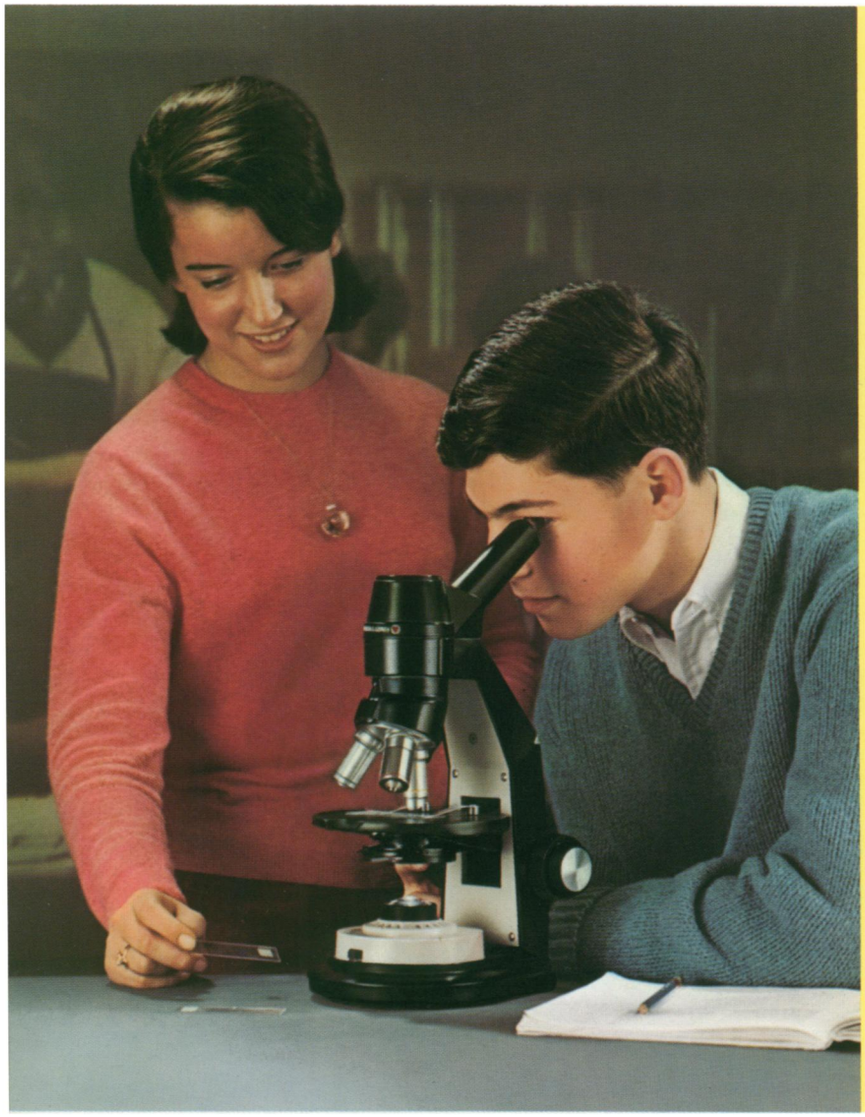

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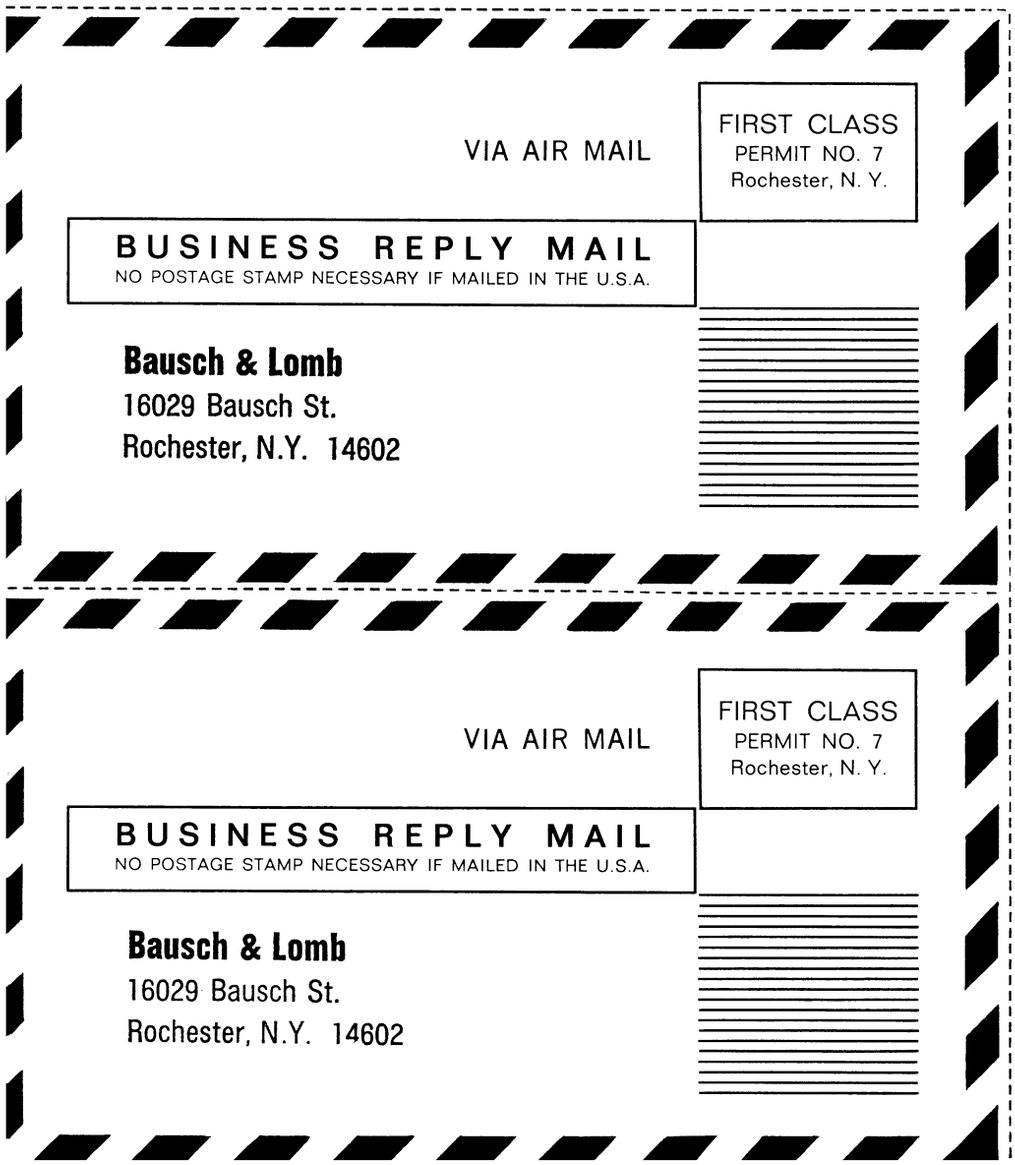

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