

Yang, Yuxin

AFVS 160: Modernization in the Visual United States Environment, 1890-2035

*Physics Today* 1 (1), May 1948 – 2 (4), April 1949

### **Women in Post-war Popular Science Magazine**

*Physics Today* is a popular science magazine of the American Institute of Physics (AIP) that made its debut in 1948. It contains fresh perspectives of physics research and insights for a better physicists' community. Throughout the year of the magazine, the post-war atmosphere hasn't faded. Traces as "bargains in war surplus" (1 (1), 40; 1 (2), 34; 1(3), 30; 1 (4), 30; 1 (5), 32; 1 (6), 34; 1 (7), 32; 1 (8), 36; 2 (1), 38; 2 (2), 34; 2 (3), 38; 2 (4), 38)<sup>1</sup> and relevant post-war science debates still prevail. Also, this was a scorching time when physics was widely believed to be a career for men. Still, women have started receiving physics education and engaging in physics jobs during wartime. I counted and recorded the women's images in the debut year of *Physics Today* as various roles in articles and advertisements (Table 1). Women's appearances in a popular science magazine directly reflect women's status in science. Even today, an astonishing number is that while women make up almost half of the US workforce, women hold only 24% of STEM jobs. This paper examines the post-war women in science through the one-year reading of women images in *Physics Today*. More importantly, it interrogates how a popular science magazine should function in breaking the stereotypes and advocating for women researchers.

Issue	Page	Description	Category
July 1948 Vol 1 No 3	Inside Cover	"Mr. Micawber was only half-right", a cartoon girl	Advertisement
July 1948 Vol 1 No 3	11, 12	"The Christmas Lectures at the Royal Institution," women audience	Article
July 1948	16,17	"Stipend: 1000\$," a woman	Article

<sup>1</sup> The annotation of this paper includes two types. The citation format is as Vol (No), page number when referring to the *Physics Today* Magazine. For example, 1(1), 40 means Vol1 No1, page forty. When referring to any other literature outside *Physics Today*, the citation format is Chicago Style, author-date citation.

Vol 1 No 3		housewife	
November 1948	Inside Cover	Tuberculosis ads, a woman	Advertisement
Vol1 No 7			
December 1948	Cover	“Science as reparations,” women	Cover
Vol1 No 8		passers-by	
December 1948	16,17	“Women in ...Physics,” women	Article
Vol1 No 8		researchers	
December 1948	25	“Low Temperature Physics in Britain,” a woman researcher	Article
Vol1 No 8			
February 1949	Inside Cover	“Only your help could give them hope now,” National Cancer Foundation, a little girl	Advertisement
Vol2 No2			
February 1949	2	“Bell Telephone Laboratories,” a woman	Advertisement
Vol2 No2			
March 1949	Inside Cover	“Sometimes women have to carry the banners,” a woman	Advertisement
Vol2 No3			
April 1949	Inside Cover	“Easy on the eyes with high vacuum,” a woman	Advertisement
Vol2 No4			

Table 1. Count of women images in the *Physics Today*

According to this table, within the limited women image pages, advertisements dominant. “By the end of World War II, the practice of using a female figure in advertising reached a frequency and sophistication not previously evident (Freeman 1984)<sup>2</sup>.” Also, inside the articles capturing women figures, seldom are they women researchers but are women housewives.

### **Trace 1 Women in article illustrations: Marginal women, unfortunate postwar repatriation, and early biased advocacy of women in science**

Women appear as researchers and non-researcher in the articles of *Physics Today* (Table 2). Women researchers refer to images of women engaging in scientific activities, such as conducting experiments, listening to scientific lectures, or appearing in scientific

---

<sup>2</sup> This is an example of general citation outside *Physics Today*, using Chicago style format.

institutions in professional dresses codes. In contrast, the non-women researchers identify homemaker wives and women with no science reference activities. Articles of *Physics Today* are primarily two types. One is the editorials that comment widely on the contemporary science-related context, relevant science propagation, and physicist life. Another is the popular science articles that introduce scientific discovery and research, such as color vision, atomic particles, and low-temperature physics.

Issue	Page	Description	Article type	Women
July 1948 Vol 1 No 3	11, 12	“The Christmas Lectures at the Royal Institution”	Editorial	Potential researcher
July 1948 Vol 1 No 3	16,17	“Stipend: 1000\$,”	Editorial	Non-researcher (housewife)
December 1948 Vol1 No 8	Cover	“Science as reparations,”	Editorial	Researcher in loss
December 1948 Vol1 No 8	16,17	“Women in ...Physics,”	Editorial	Researchers
December 1948 Vol1 No 8	25	“Low Temperature Physics in Britain,”	Popular science article	A researcher

Table 2. Count of Articles Including Women Images in *Physics Today*

Looking through magazines, it is not surprising to find women appear more often in editorials than in popular science articles and usually in the inconspicuous or marginal corner of the magazine. For example, the non-researcher women figure in the magazines is the wife of a graduate researcher (1(3), 16-17, Fig. 1). The article delineates how a graduate man researcher lives upon a thousand stipend. The image corresponds to the postwar social conventions of women as homemakers to assist their husbands' success. And the only appearance of women in popular science articles is only a distant view silhouette (1(8), 25, Fig. 2)

The women researcher images reflect the unstable postwar context when repatriating women researchers. Women appear as central characters but are not a marginal corner in

*Physics Today* for the first time. The image titled "science as reparations"(1(8), Cover, Fig. 3) records three women and a man walking head-on on a damp street, carrying suitcases, in front of a Berlin University architecture damaged. The annotation marks, "The Berlin University in early July 1945, as it looked to an advance party of British troops from the 7th Armored Division (Desert Rats). Black Star." I ponder on who these women might be. Likely they were women students from Berlin University, and I would feel empathy. They have to endure the sorrow of clearing and reconstructing the bombed cities. And what happened later was Berlin's occupation by the Soviets and Axis countries. It is believed that at least 100,000 women were raped then. ("Rape during the Occupation of Germany" 2020) Even worse, women workers were driven back home in the post-war period, with discharged men soldiers returning home and eliminating women researchers' jobs again. During WWII, the value of women in science awakened. The number of women students increased considerably due to the shortage of men in academics and the men's workforce. Women researchers started to take on the roles exclusive to men workers. Nevertheless, the G.I. Bill of Rights guaranteed the education and employment benefits to the veterans. In the 1940s-1960s, postwar and before the arisen of feminism, women were expected to be homemakers, caring for the home management, the children, and husbands.

Traces of intentionally and unintentionally advocating for women in science exist in the inaugural year of *Physics Today* and, at the same time, reflect perceptions of women's role in science. The unintentional depiction of Christmas science lectures for young people at the Royal Institution in 1855 and 1947 (1(3), 11-12, Fig. 4) reflects a delightful portion of the women audience, above 30 percent. This image implies that women are not an invisible group in pursuing science during the post-war period and at the time science outreach activities provide equal opportunities for women to approach science as men.

"Women ... in Physics" (1(8), 16-19) is the most prominent intentional effort of advocating

women in science. Walter Michels, the author and the professor who taught physics at Bryn Mawr, a women's liberal arts college in Pennsylvania, from 1932 until his death in 1975, posited that women with an aptitude for physics could overcome the difficulties and take on the same science jobs as men. He depicted the psycho difference between women and men researchers when women might start with a different background than men in science. Her psycho cognition might call for lab-focused rather than theory-focused training. Michel's opinion is biased in believing women's exploration in science only after completing their duty as housewives and as companions at social balls. Valid and positive though this article was, the two abstract illustrations (1(8), 18-19, Fig. 5) emphasizing the dress code differences between women in physics and social life received protest later in the next issue's letters to the editor. M. Phillips from Brooklyn College voiced that "I do, however, protest his unconscious (I trust) prescription for schizophrenia in the differentiation between professional and social behavior."

Comparing the dominant mass media advocating for women homemakers and *Physics Today* and other media depicting women researchers, I find the supporting arguments differ significantly. Supporting women in science in 1948 for a popular science magazine seems not in line with the times' call for women homemakers. I thought of the post-war period as the dark ages for women in science. Primary mass media claim that women should support the family at the back, conducive to a stable social structure. Post-war homemaker posters (Fig. 6) convinced many women to go home for birth and family satisfactorily. On the other side, article illustrations in *Physics Today* and many contemporary efforts delineate the two mainstreams of supporting women in science. First, women are advocated to engage in science with the fear that the intellectual contributions of men have not been adequate for science. Women enter science as supplemental intellectual forces rather than critical ones, for instance, caused by the war the national security concern. In *Searching for Scientific Womanpower: Technocratic Feminism and the Politics of National Security, 1940-1980*

(Puaca 2014), Puaca pivoted on the national security issue resulting from the STEM shortage and the relevant feminist tactics for compensating for the shortage. Second, women do science psychologically differently, proving that women are more capable in specific fields of science jobs than men. And for many technology companies hiring women, personnel sometimes hire women out of fulfilling the diversity requirement of the community instead of believing the woman is capable. These arguments reveal a post-war biased perception of women and should influence on the norm considerations for popular science magazine to feature women, such as whether to show differentiated attitudes and arguments when introducing women into science versus men.

**Manifesto 1 Women in article illustrations: Popular science magazines should embrace more insights on gender-based differentiation influencing women's niches in family and science**

It is not wise to disregard the gender-based differentiation of women and men and its influence on women's niches in family and science. For one, admitting and classifying career niches for women is a must for efficiency advancement in a family and society. What hinders many women in science is the fixed family and social structure. It is inevitably a complicated issue for women scientists to choose both motherhood and a scientific career, though it shouldn't be. Articles on modifying and tweeting the fixed impression of family and social structures could be featured more. For reference, in "Stipend: 1000\$," (1(3), 16-17) Nathan L. Nichols writes about how a physics graduate balance the family life and research stipend, which provides a family norm for researchers at the beginning of the post-war period. Similar guidance for women researchers without discrimination on family and societal norms and policies in popular science magazines will encourage more women to enter science.

On the other side, the emphasis on the psycho differentiation between women and men leads to two poles, diversity and discrimination. For example, women are frequently

considered to have more chances of excelling in the observant-based science career, such as biology and chemistry, instead of those requiring critical thinking, such as physics and mathematics. The differentiation analysis of women researchers might initially propose encouraging women in science, but it might create the tension of finding an idealized career position in society. Women's career choices are far less likely to be personalized than men's, and they have to suffer more social conventions' influence. Hence, the undifferentiation featuring women researchers in popular science magazines might encourage women better to see it as a social norm to enter science. Also, the popular science magazine should be more careful in representing the diversity of women's careers.

### **Trace 2 Women in advertisements: A glamourous lady, a vulnerable girl, a homemaker warrior, but not a confident woman researcher...**

Women appear much more frequently as main characters than men in advertisements for the 1948 issues of *Physics Today* (Table 2). The advertisements lie in three categories: science, charity and investments. The science part is mainly research and lab publicity, and the charity advertisements are related with cancers or medical disease, and the investment in savings. Before analysis, it is important to note that though this magazine is intended for the general audience, with limited women researchers in Physics, the dominant subscribers of the magazine are men.

Issue	Page	Description	Category	Women	Audience
July 1948 Vol 1 No 3	Inside Cover	the U.S. savings bonds ad	Investment (Savings)	A cartoon innocent girl	General audience (men dominant)
November 1948 Vol 1 No 7	Inside Cover	Christmas Seals ads	Charity	A glamourous lady	General audience (men dominant)
February 1949	Inside Cover	"Only your help could give them hope now",	Charity	A vulnerable girl	General audience (men

Vol2 No2		little girl in need of help, National Cancer Foundation				dominant)
February 1949	2	"Bell Telephone Laboratories", a woman telephone recipient	Science	A glamourous lady	General audience (men dominant)	
Vol2 No2						
March 1949	Inside Cover	"Sometimes women have to carry the banners"	Investment (Savings)	A dutiful homemaker	Women	
Vol2 No3						
April 1949	3	"Easy on the eyes with high vacuum"	Science	A glamourous lady	General audience (men dominant)	
Vol2 No4						

Table 3. Count of Advertisements Featuring Women in *Physics Today*

Science advertisements showcase women's glamour, which directly contrasts the men researcher's image in suits. In the 1940s-1960s, manufacturers found women's glamour image by depicting role stereotypes, objectifying women, and minimizing their human qualities as advertisements. (Freeman 1984) For example, in Distillation Products, Inc (DPI) 's advertisements for high-vacuum distillation products (2(4), 3, Fig. 7), a woman is featured on a sailboat wearing the sunglass that utilizes the company's high-vacuum coater, the metallic vapor of stainless-steel technique. The woman is dressed in short skirts and tight tops, and the photo is taken from a looking-up perspective, reinforcing her long legs. It won't surprise me even if people see it in a cruise magazine. Also, the woman telephone recipient in the Bell Telephone Laboratories advertisement (2(2), 3, Fig. 8) is wearing delicate makeup and gently opens her mouth to reveal her white teeth. These women's advertisements are far more entertaining than scientific. Featuring women in science magazine advertisements whose dominant audience is men successfully captures the eyes among dull instruments advertisements. Nevertheless, this narrow, traditionally feminine definition of women's roles could only frustrate women readers, who bare a scientific dream of reading social expectations like this.

The charity advertisements depict women and children's helplessness. For example, in the National Cancer Foundation advertisements (2(2), inside cover, Fig. 9), a little girl tearing in her father's arm is captured to represent a family in a dilemma. Though women and children are more vulnerable in today's society than nowadays' cancer advertisements, where fighter images emerge more frequently, these advertisements in the 1940s showed an inferior social impression of women. The science and charity advertisements reflect the undifferentiated stereotyped template of women.

Interestingly, in contrast, an ad breaks the women's template of glamour and helplessness but instead exhibits power and responsibility by depicting a woman in a warrior suit, waving the flag, and on a horse. In "sometimes women have to carry the banners (2(3), inside cover, Fig. 10)", such an image is a savings investment ad regarding women as a homemaker. The bold texts such as "modern women," implicate that this advertisement targets women instead of men, revealing conventional social imagery of women as homemakers and centers of consumerism in the postwar time. The warrior woman image shows some traces of awakening feminism and convinces women to guard their homes as the battlefield. It is of great significance for Physics Today in 1948 to advertise an ad targeted toward women. It signals those women homemakers could pursue science as leisure, and women are not a neglectable force in participating in science work. Moreover, this image doesn't default on women's identity as household wives. By saying "If your home is your career," and "If you are working," it presents the various possibility of women at that time. The only sheer contrast between women's employment experiences during World War II and the images of women in advertising during the post-war years generated expressions in the revitalized feminist movement in the 1960s. (Freeman, 1984)

## **Manifesto 2 Women in advertisements: Popular science magazine is responsible for**

**supporting active women's intelligence charm instead of passive women's body glamor; Household and purchasing women's identity limits the sourcing of science advertisements to women.**

Physics Today is among the pioneering magazines that advocate women's role in science. They are most encouraging and influential than other media in shouldering the responsibility of breaking the stereotyped women's impression. Depicting scientific intelligence instead of body glamour and exhibiting women researchers in various scientific jobs and working environments than showing them in the labs in laboratory protective clothing are tangible and powerful ways for science advertisements.

The other thing to note is that since modernization, the impression that women have substantial purchasing power, and those women are domestic-centric has a durable impact forestalling women's advancement in science careers even today. It is indicated that men disproportionately see more science career advertisements because women are pricier to reach. Since women generally make more household purchasing decisions than men, marketing algorithms apparently recognize women's substantial purchasing power and set higher prices for their views of science advertisements. (Maron, 2018) The marketing algorithms of advertisements represent a vicious feedback loop of enforcing unwanted social conventions. Respecting women's mental differences from men, for now, there haven't been enough efforts to deliver scientific news to women and enough associated organizations in promoting women in science.

## **Conclusion**

Reflecting on *Physics Today* in 1948, the contrast of frequency between women in articles as researchers and women in the advertisement as an eyeball catcher is astonishing. These

images reflect women's marginal status in science, the postwar domestic role of women, and early-day limited and biased advocacy of women in science. They also reveal the deeper root issues hindering women in science, such as the fixed social structure, the gender-based psycho differentiation, and stereotyped publicity. These issues inform how a popular science magazine could shape its differentiated but non-discriminated publicity and foster a community diversity of women.

## Bibliography

American Institute of Physics. 1948. Physics Today. College Park, Md.]: American Institute of Physics.

Freeman, Judith. 1984. "The Distorting Image : Women and Advertising, 1900-1960/." Masters Theses 1911 - February 2014, January. <https://doi.org/10.7275/wt9x-4n86>.

Maron, Dina Fine. n.d. "Science Career Ads Are Disproportionately Seen by Men." Scientific American. <https://www.scientificamerican.com/article/science-career-ads-are-disproportionately-seen-by-men/>.

"Rape during the Occupation of Germany." 2020. Wikipedia. January 16, 2020. [https://en.wikipedia.org/wiki/Rape\\_during\\_the\\_occupation\\_of\\_Germany](https://en.wikipedia.org/wiki/Rape_during_the_occupation_of_Germany).

Puaca, Laura Micheletti. 2014. Searching for Scientific Womanpower Technocratic Feminism and the Politics of National Security, 1940-1980. Chapel Hill: The University

of North Carolina Press.

STIPEND:



Fig. 1 Women as housewife of the researcher



Fig. 2 Women researcher depicted in a distant view

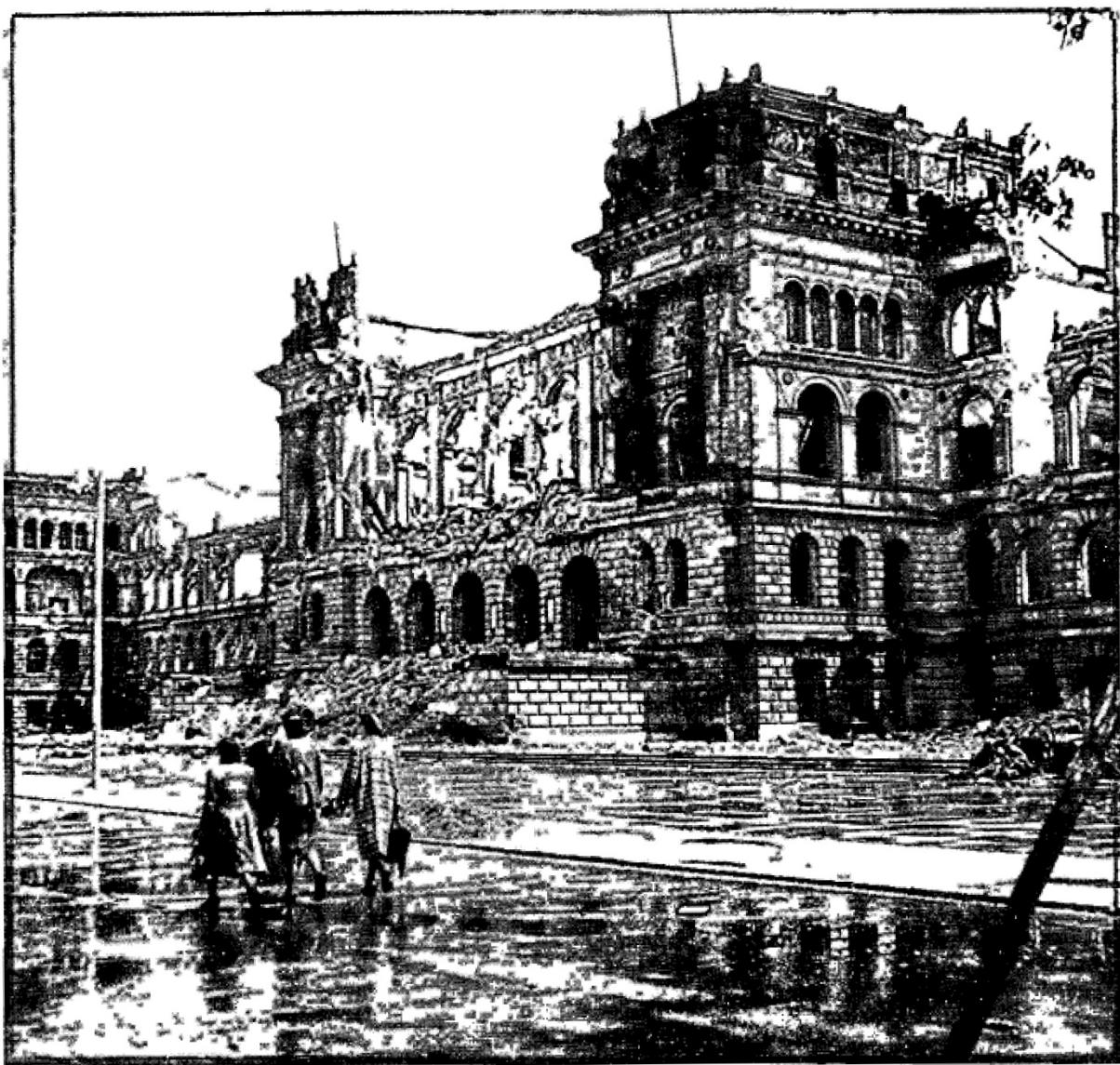


Fig. 3 Women in "Science as Reparations"

Me?  
Back a  
picture?



Yes, you. An important picture. In fact, thousands of them!

Among many other uses, your Christmas Seal money buys X-ray units for chest "pictures" . . . to detect tuberculosis so that it can be checked.

Since 1904, the whole program has helped cut the TB death rate by *eighty per cent*. Yet tuberculosis still kills more people between the ages of 15 and 44 than any other disease.

So please, send in your contribution today to your Tuberculosis Association.



## Buy Christmas Seals

AMERICAN INSTITUTE OF PHYSICS

57 East 55 Street

New York 22, N. Y.

Fig. 4 Women in "Science as Reparations"

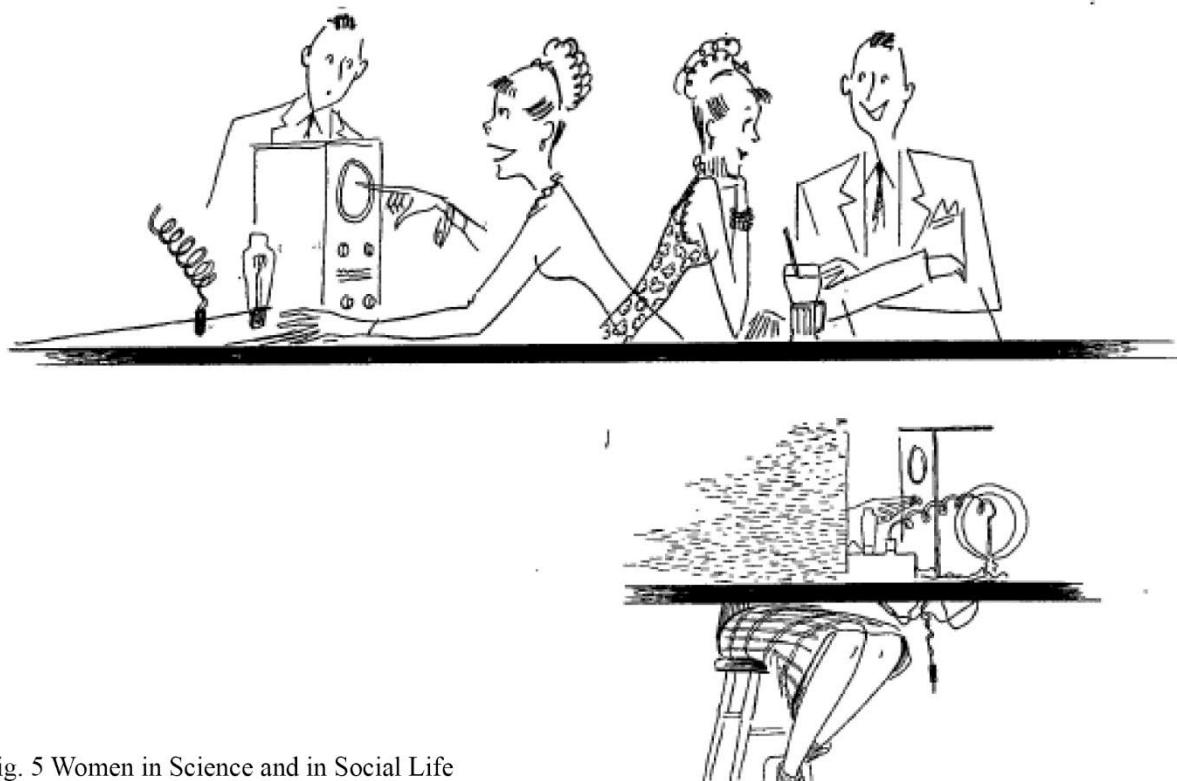
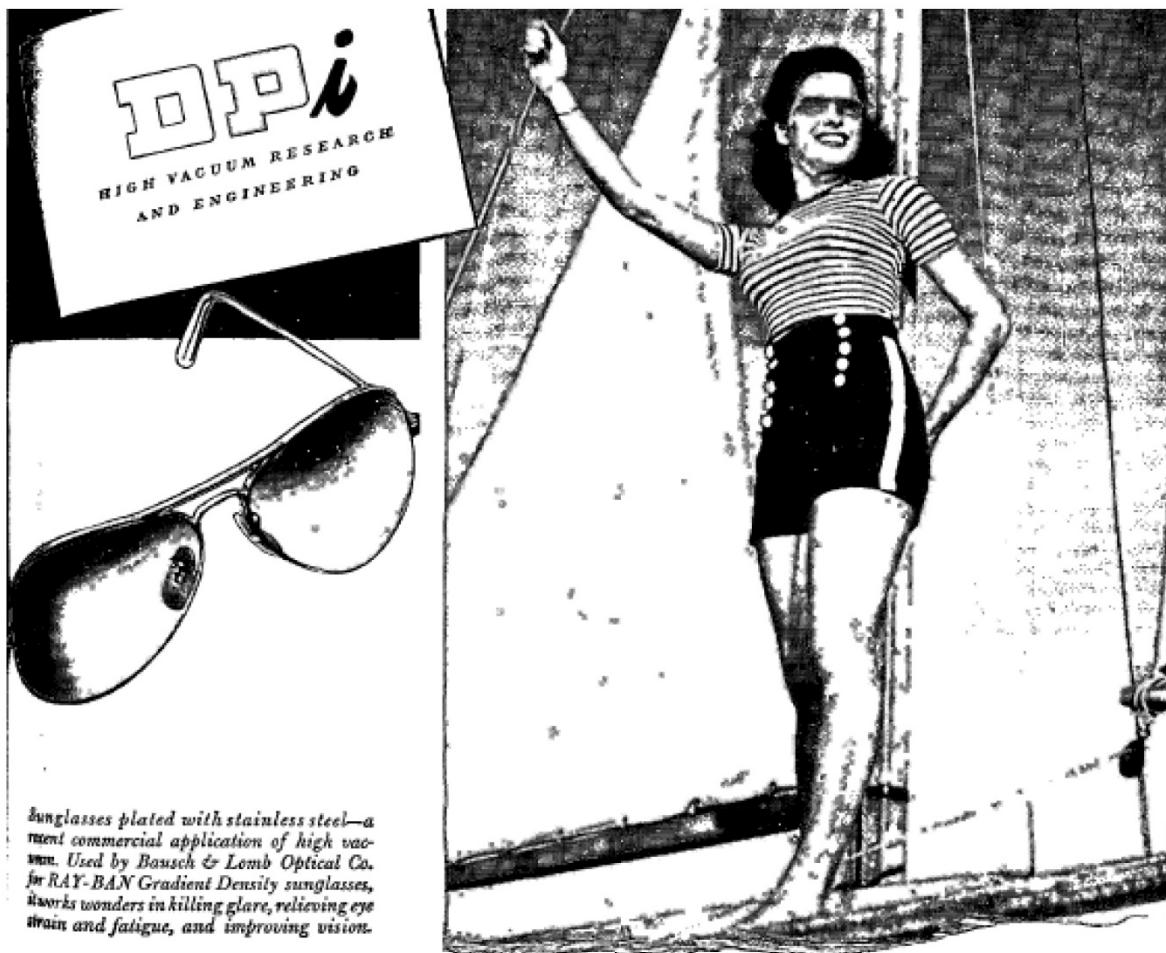


Fig. 5 Women in Science and in Social Life



Fig. 6 Post-war homemaker posters



## Easy on the Eyes with High Vacuum

During the war, planes jockeyed back and forth in the sun—battleships maneuvered to get the sun at their backs. The sun glare impairing vision, and accuracy of optical instruments made them a poor target for the enemy.

Counter strategy developed telescopic sights, range finders, and aerial cameras whose lenses were coated under high vacuum with transparent fluorescent salts. Thus treated lens surfaces were less reflective, more light was admitted, instruments could work better against the sun.

Improving aviators' sunglasses presented a different problem. Here the same

serve to *cut down* passage of light through the lens. Experiments disclosed stainless steel as the ideal material.

The process has been adopted for commercial use. At Bausch & Lomb, in the chamber of a DPI high-vacuum coater, metallic vapor of stainless steel is deposited in a scientifically controlled "gradient" pattern of density and area. These stainless steel coated sunglasses are now available at optometrists.

This is but one of many applications of high vacuum in science and industry to make improved products at lower cost.

Do you know what high-vacuum distillation, dehydration or fusion may do to improve your products—to decrease processing costs, or to salvage waste materials into valuable commodities? DPI research men and engineers may be able to tell you. Write

**DISTILLATION PRODUCTS, INC.**

731 RIDGE ROAD WEST, ROCHESTER 13, N. Y.



Fig. 7 Women in Distillation Products Advertisements



only inches of sound!

When you talk by telephone, far or near, the actual sound travels much less than when you talk across the room!

That's because the telephone system carries not sound itself but an electrical facsimile of sound. When you speak into a telephone transmitter your voice is converted into electrical vibrations which are not changed back into sound until they reach the receiver diaphragm.

Conversion of sound into its electrical equivalent, through the invention of the telephone, opened the way to the measurement of sound by accurate electrical methods. In developing means to make the telephone talk farther and sound clearer, the scientists of Bell Telephone Laboratories had to develop the tools for sound-wave analysis and measurement.

The condenser microphone, the wave filter, the amplifier—each the product of telephone research—have helped to reveal the structure of sound as never before. Each has helped to build a better telephone.

BELL TELEPHONE LABORATORIES



Fig. 8 Women in Bell Telephone Laboratories



Fig. 9 Girl in National Cancer Advertisements

# Sometimes women have to carry the banners

PERHAPS you'll see the story of Joan of Arc, as portrayed on the screen by Miss Ingrid Bergman.

It's a thrilling episode in the world's history, proving that sometimes a *woman* must take the lead in the fight she believes in.

Modern women, too, must often pick up the banners . . . in *their* struggle for the security and well-being of their family.

Though earning the necessities of life is primarily a man's job, sometimes it takes a *woman* to *insure* her family's future by setting them on the *only sure road* to security . . . through adequate, regular savings.

For the modern woman, there is one foolproof method of winning her fight for savings. It's United States Savings Bonds—an investment with the soundest backing in the world . . . an investment that pays back *four* dollars for every *three*.

And there are two foolproof savings plans, too. One is the Payroll Savings Plan, for those on a company payroll. The other is the Bond-A-Month Plan, for those not on a payroll, whereby bonds are purchased through the checking account.

If your home is your career, urge your husband, and all other working members of your family, to start now—today—on the bond-saving plan for which they are eligible.

If you are working, sign up yourself at your firm or bank, and influence the other working members of your family to do the same.

Soon the bonds will start piling up.

Soon you'll know that confidence in the future which only comes through saving.

It's a wonderful feeling for anyone. And for a woman—how doubly wonderful!

**AUTOMATIC SAVING  
IS SURE SAVING  
U.S. SAVINGS BONDS**



Contributed by this magazine in co-operation with the

Fig. 9 Women in U.S. Saving Bonds Advertisements



