DOCUMENT RESUME

ED 275 014 CS 505 386

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TITLE Feminist Approaches to Technology: Implications for Communications Scholarship.
PUB DATE May 86
NOTE 25p.; Paper presented at the Annual Meeting of the International Communication Association (36th, Chicago, IL, May 22-26, 1986).
PUB TYPE Speeches/Conference Papers (150) -- Information Analyses (070)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Employed Women; Females; *Feminism; Males; Science History; *Sex Role; *Social History; *Speech Communication; *Technological Advancement; Womens Studies
IDENTIFIERS Feminist Criticism

ABSTRACT

Feminist thinkers offer new interpretations of the role of technology in social life. As society has progressed, men have become culture-centered rather than nature-centered, while women have remained nature-centered. Thus, women's devaluation resides in man's desire to control both nature and women. The values of objectivity, progress, rationality, production, and competition are masculine, while nurturance, emotionality, intuition, and cooperation are values traditionally assigned to women. Even so, women have been active creators and innovators throughout history, though most of the knowledge of women's roles as technological developers has been erased. Women will be affected most as new technologies invade the home, the office, and other workplaces. For example, as technology revolutionizes life in third world countries, it has had both positive and negative effects on women's status and situation. Also, the spheres of men and women traditionally have been public and private, respectively, and urban design has only exacerbated women's lack of access to the public sphere, to mobility, to employment opportunities, and to public services. Unless women become involved in the decision making, new technologies will embody the same sexism, racism, and classicism they do now. Communication scholarship should attend to the contributions of women, especially in the field of technology. A four-page bibliography is provided. (SRT)

Feminist Approaches to Technology: Implications for Communications Scholarship

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Presented to the International Communication Association annual conference
Chicago, IL, May 1986

Feminist Approaches to Technology: Implications for Communications Scholarship

The intersection of technology, culture, and communication is a crossroads that has been traversed by thinkers and scholars representing diverse academic disciplines and political perspectives. A few historians, economists, marxists, literary critics, social theorists, and communications scholars have tarried and occasionally set up tent at this point because it is a fruitful spot for examining social processes and the organization of social life. Technology has often been seen from these perspectives as the cause of or symptomatic of problems of social life--reproducing relations of production, weakening community life and public discourse, producing a rationalistic consciousness, invading the symbolic and organic.

Another approach to technology, culture, and communication has been growing over the past decade. Feminist thinkers have raised new questions, re-examined old answers, and offered other interpretations and solutions for the role of technology in social life. In fact, the intersection of these three forces seems to hold at least the partial key to understanding women's experiences and to offering possibilities for the kind of social changes envisioned by feminists. Surveys of the literature about women and technology have been written (for example, Ruth Schwartz Cowan 1979 and Judith McGaw 1982), but these deal primarily with the effects of technology on women and draw upon work by men and women that is not necessarily feminist. This paper is concerned, instead, with providing a framework for understanding what feminists have to say--explicitly and

implicitly--about technology.

There is no single feminist position on technology, but there is feminist analysis and research approaching the topic from a number of directions. The framework used here draws those approaches together to illustrate some of their common themes. The first theme, "Nature and Culture," draws together feminist work concerned with explaining the organizational structure of gender in culture and the underlying logic of gender that produces particular technological effects. A second topic area, "Masculine and Feminine Values," examines how culturally assigned masculine values of objectivity and rationality have produced alienating and destructive technologies. "Women Creators and Inventors" is concerned with feminist attention to women's technological contributions. The topic of "Domestic and Paid Labor" deals with women's uses of technologies in the private sphere and in the workplace, while the effect of technological change in developing countries is suggested in the topic area "Women and Development." "Time and Space" deals with the construction of gender relations through the cultural organization of time and space, organized through the built environment. Feminist assessments of the technological future in the topic area, "The Future," demonstrates that many feminists tend to be pessimistic about the potential of new technologies to make any substantial changes for the better for women.

NATURE AND CULTURE

A number of feminist writers--anthropologists, philosophers, literary critics, and others--have stepped back from the particularities of culture and technology to try to account for the logic that produced and produces

the pervasive, historical devaluation of women. This kind of analysis centers around the organization of cultural processes and men's capacity to position women outside of these processes and hence as subject to domination. Technology, if explicitly discussed, is generally given a derivative or symptomatic role in the explanation. Sherry Ortner and Michelle Zimbalist Rosaldo were prominent voices in the first attempts to articulate a generalized relationship between women, nature, and culture upon which much of this work is built.

Ortner (1974) argues that women's devaluation resides in women's identification with or symbolic association with nature as opposed to men's identification with culture. Variations in women's status and roles can be accounted for by variations within the role women play between nature and culture, Ortner believes. Women can occupy a middle position, where they are seen as lower than culture and man, a mediating position, where women must be restricted so that culture can maintain its actual and symbolic control over the conversion of nature to culture, and an ambiguous position, where women are assigned contradictory functions and meanings in the same cultural system.

Rosaldo (1974) elaborates upon this explanation. She points out, "Insofar as men are defined in terms of their achievement in socially elaborated institutions, they are participants, par excellence, in the made-made systems of human experience. On a moral level, theirs is the world of 'culture.' Women, on the other hand, lead lives that appear to be irrelevant to the formal articulations of social order. Their status is derived from their stage in a life cycle, from their biological functions, and, in particular, from their sexual or biological ties to particular

men" (p.30).

If a connection between culture and technology is drawn, technology can be seen from this perspective, then, as being part of the male order of things. One feminist, in fact, sees technology as both expressive of and instrumental to the development of a patriarchal culture. Azizah Al-Hibri (1981) bases her analysis of technology on male envy of women's reproductive creativity. Technology was created because 1) the male desires immortality; 2) the male considers reproduction a path to immortality; 3) the male considers production a path to immortality. The male's desire for immortality, which the female possesses through reproduction and which is denied to him, led him to two courses of action: the appropriation of the female's reproductive capacity and her offspring and the creation of technology as compensation for his inadequacy. She summarizes:

> Thus, one may conclude that both male technology and patriarchy are based on the male's feeling of inadequacy and mortality vis-a-vis the female, and his desire to transcend his human condition by forcing himself into the cycle of life from which he perceived himself to be cut off through no fault of his own (p.174).

Other feminists have pointed out that equating women with nature led men to dominate both. Carolyn Merchant (1980 and 1983) and Annette Kolody (1975 and 1984) deal with the metaphoric association of women with nature. Merchant sees the metaphorical shift that occurred when men began thinking of the world in mechanical rather than organic terms as resulting in the domination of both nature and women. Kolodny critiques the female metaphors used by men for the "virgin" land of the frontier that they fantasized about despoiling and possessing. Susan Griffin (1978) explores the logic of patriarchal thought and its historical judgments about the

nature of nature and of women. Control is exerted by men over both through the rationalistic impulse to dominate and quantify.

Dorothy Smith (1978) argues that women are excluded from the making of culture because men control the institutionalized processes of social life. Women have not had the material or social means for participating in intellectual discourse; rather "women have been largely excluded from the work of producing the forms of thought and the images and symbols in which thought is expressed and ordered" (p.281). Control of technology, it can be inferred, is a means by which women's exclusion from the processes of cultural production and social discourse is ensured.

MASCULINE AND FEMININE VALUES

Closely related to this feminist attempt to explain the root causes of women's oppression through an understanding of the organization of culture and technology is a widespread feminist critique of the dominant masculine value system of Western culture, which values "objectivity," progress, rationality, production, and competition. Because other values--nurturance, emotionality, intuition, cooperation--have been assigned to women and hence have been devalued and relegated to domestic life, the argument runs, public policy, technological decision-making, and the processes of science are impersonal and destructive.

Joan Rothschild (1981) articulates this position when she argues that technology reflects the values that create it:

> Therefore, how and for what productive purposes that knowledge shall be shaped is not a random choice, but subject to what the scientific, technological, and political community will support. Since the institutional forces of corporate wealth, of the military, university, and political establishments combine today to set the priorities for technological development, as well as use, we are

guaranteed that ideals reflecting the values of these powerful institutional forces shall be perpetuated in our technology (p.65).

Since these institutions are male, built upon culturally determined and prized male values of aggression, independence, strength, objectivity, and rationality, technology is male, anti-humanistic and anti-ecological. She suggests that if technology were built on feminist values--nurturance, life-support, sensitivity, empathy, intuition--technology has the potential for a liberating and appropriate role in social life.

The theme of reconnecting these separated value systems in a new social life is also articulated by Barbara Ehrenriech and Deirdre English (1979). They point out that "The Woman Question" that has puzzled the "experts" for the last one hundred years is not a question about women but about values:

> A synthesis which transcends both the rationalist and romanticist poles must necessarily challenge the masculinist social order itself. It must insist that the human values that women were assigned to preserve expand out of the confines of private life and become the organizing principles of society. This is the vision that is implicit in feminism--a society that is organized around human needs . . .
>
> This is the most radical vision but there are no human alternatives. The Market, with its financial abstractions, deformed science, and obsession with dead things--must be pushed back to the margins. And the 'womanly' values of community and caring must rise to the center as the only <u>human</u> principles (p.324).

Others have discussed the potential for feminine values to change the nature of science and engineering, primarily male activities and careers, if more women enter their ranks. Anne Fausto-Sterling (1981) examines the justifications given for excluding women from scientific fields and the explanations given for why they tend not to go into them, noting that science is a patriarchal and ideological construct. She suggests, "The problem of women and science turns out to be both a problem of women i...

science and one of science without women. Its ultimate resolution will involve vast changes in the way we view the organization and development of knowledge" (p.49). She concludes that the patriarchal structure of science must change to include traditional feminine values.

Judy Smith's work in the "appropriate technology" movement has led her to conclude that even where alternatives are being proposed, the same values held by traditional technologists that leave women out of the discussions and decision-making and ignore implications for women are controlling the movement (1983). If appropriate technologies are to be proposed, ones that are small scale, labor intensive, decentralized, and functioning on a human scale to meet human needs, women must raise questions about the impact of these technologies on women, she argues, or women may well end up back in the kitchen baking break and canning, sustaining the new value system with their time and labor for the benefit of men.

WOMEN CREATORS AND INNOVATORS

Though masculine values may be associated by many feminists with the kind of science and technology that commands contemporary life, that does not mean that women are consequently seen as only recipients of or subjects for technology. Women are also seen by feminists as being active creators and innovators through history, though most of the knowledge of women's roles as technological developers has been erased. Some feminists have been excavating evidence of women's historic roles as innovators. Their attention to specific technologies and processes suggests it is unwise to categorize and indict all technology as being male and

dominative.

Several writers--anthropologists and historians--make the case that women were, if not the first innovators and responsible for the introduction of culture, at the least at the forefront of technological innovation. Autumn Stanley argues, "Women were probably the primary technologists of the species, inventing most of the early tools, arts, crafts, and machines" (1983:55). Stanley retrieves the history of a number of inventions by black women while questioning the tendency of male historians of technology to privilege certain technologies. Contraception, she argues, is a woman's invention and "one of the most important of all time" that ranks "with the taming of fire, language, and the computer" (p. 58).

Elsewhere, Stanley suggests women most logically invented tools and methods for food gathering, processing, and storing, and were also responsible for the innovation of horticulture (1982). She hypothesizes that diet changes with increased cultivation raised fertility rates--grain-based diets lower the age for the onset of puberty and regulate ovulation--leading to women being burdened with more children and to the ultimate domination of men over agriculture and women. Nancy Tanner and Adrienne Zihlmann (1976) also argue that women were innovators because of their historic role as gatherers and their need to carry and transport food. As the primary socializers of children, women passed on innovations and hence were responsible for initial systems of social organization.

Maria and Hypatia of Alexandria are identified by Margaret Alic (1982) as the inventors of what may be the earliest technological work that can

be ascribed to individual women. Maria was one of the founders of theoretical and experimental alchemy and of laboratory apparatus which remain basic tools of chemistry today; Hypatia was renowned for her mathematical work and designs of scientific instruments. Deborah Warner (1979) resuscitates the women inventors who had exhibits in The Women's Pavilion at the 1876 centennial. She concludes that most of the inventing done by the women was done for money. Invention was widely recommended as a vocation for women because it could be done at home, as could novel-writing. Martha Moore Trescott (1979) gives Julia Hall credit for a great degree of her brother's, Charles Martin Hall's, success in inventing the process used to manufacture aluminum metal cheaply. She suggests female relatives of inventors are slighted or ignored by historians, yet the invention process should be understood as a social process involving the investments of time, energy, and capital of others, often the women in male inventors' lives. Helen Deiss Irvin (1982) credits Shaker women with embracing technology's potential for liberating them from drudgery by inventing such tools as the buzz saw, cut nails, and the revolving oven.

DOMESTIC AND PAID LABOR

The historic effects of technology on women's unpaid domestic labor and their paid labor in the workforce is a topic that has received perhaps the most attention from men and women historians of technology. Contemporary feminists have also been quick to note the women workers will be particularly affected--in the home, the office, and in other workplaces--by new electronic technologies.

Several histories have been written about changes wrought in the

household and in the housewife's role as the result of industrialization and the introduction of technologies, ranging from Susan Strasser's book-length history, Never Done: A History of American Housework (1982) to articles more geographically or temporally localized, such as Ruth Schwartz Cowan's "The 'Industrial Revolution' in the Home" (1976) and "A Case Study of Technological and Social Change: The Washing Machine and the Working Wife" (1974). Judith McGaw (1982) summarizes most of the findings about changes in housework by debunking the myth that housework shortened women's work day and relieved them of hard work. Technology and industrialization tended to change the nature of the housewife's labor but did not make it less time-consuming because standards of living and notions of cleanliness were raised. Housework became more isolating and inefficient as each single-family home acquired its own technological appliances and equipment and as housewives increasingly did without the labor of servants and female relatives.

Susan Kleinberg (1979) points out that the rate of diffusion of technology was very uneven, so that when middle and upper class urban women after the turn of the century had running water and sanitary systems to ease their burdens, rural and working class urban women still hauled water and waste and did without electricity and telephones long after the technologies had been introduced. Though working class wives were often not in the labor force themselves, they sustained the new industrial system with the unpaid labor that supported their husbands and sons.

Assumptions about women's roles in the labor force under the new industrial order have also undergone examination. Judith McGaw concluded that industrialization affected women workers in Berkshire paper mills

very little: "Women worked in paper mills before mechanization. Machines brought virtually no change in the kind of work women performed or in the division of labor between the sexes. Women continued to hold unskilled jobs and to receive less pay, but in other respects their jobs became more desirable than those held by men" (1979:78). Elsewhere, McGaw (1982) points out that women's relationship to the changing workplace was often different from men's and not at all uniform, depending upon the industry. Women in many industries did not tend machines at all, and they remained in sex-typed jobs, though the jobs had sometimes been considered male before industrialization. They continued to be paid lower wages than men, which often provoked the hostility of skilled male workers and male unions.

Changes for women in the contemporary workplace because of the growth and development of new technologies are of increasing concern to many feminist writers. Evelyn Glenn and Roslyn Feldberg (1977) see that clerical work will become further proletarianized, with new technologies reorganizing the office, isolating women from each other, and increasing managers' control of the work process. Erik Arnold, Lynda Birke, and Wendy Faulkner (1982) identify at least three changes they believe microelectronics will bring upon clerical workers. First, there will be a loss of jobs for women as some technologies replace and consolidate human labor; second, social relations within the office will change, bosses will have more control over work, and workers will have less opportunity to move about and make contact with other workers; third, with increased division of labor, certain clerical jobs will be even further devalued.

Significant changes in how information is used and processed as a

consequence of changes in office technology are also being documented by women who work in offices. Sally Otos and Ellen Levy (1983) give a first-person account of the differences that a word processor made in an academic department, differences both in the lowered quality of their jobs and of the processes of writing, editing, and publishing. Barbara Garson's account (1981) of her job for Kelly Services as a data entry operator at Bankers Trust and her interviews with workers and managers in other offices undergoing technological change provides insight into the process of rationalizing office work through the control of motion and productivity. Sally Hacker (1979) has looked at how technological changes at AT&T displaced traditionally minority and white women's jobs. She concluded that since corporations are able to select their technologies, military and economic interests predominated in AT&T's case, at the expense of the most disadvantaged groups in society.

WOMEN AND DEVELOPMENT

Technological changes in developing countries, often introduced through the expansion of Western industrialization in the form of production plants or in the form of "foreign aid" have implications for women. The Winter, 1981 issue of Signs was devoted to the topic. Articles pointed out that changes in technology can have varying beneficial or negative effects on women's status and situations. Women can lose control over their traditional products and crops and become marginal to the economy or they can become migrant wage earners. In some ways patriarchal control may be loosened. Other articles pointed out that First World multinational corporations are creating a world-wide female industrial proletariat as

women become a source of cheap labor for their production plants.

Maria Patricia Fernandez Kelly (1983) documents the case of women workers in electronics assembly plants on the U.S.-Mexico border in order to demonstrate how technology designed by industrial powers is affecting employment opportunities and the quality of worklife for women in developing nations. Industry is aware of the advantages of hiring Mexican women:

> Because of their behavior, expectations, and attitudes (which are the result of socialization processes in which gender plays an important part); because of their comparative youth; and because of their subordinate position in their own households, these women constitute a highly vulnerable, docile, and manipulatable workforce. Their employment in low-paying unskilled and semiskilled jobs offers distinct advantages from industry's point of view (p.22).

The electronics industry has been particularly adept at fragmenting the labor process into its smallest components, requiring unskilled, monotonous, manual labor. To Kelly, the industry reaps these advantages: 1) less dependence on any particular workforce; 2) geographical dispersion of subprocesses maximizing international capital investments; and 3) maximum flexibility in dealing with labor. Kelly acknowledges, however, that given the situation of many women in Third World countries, even these exploitative jobs provide a valuable option and may provide avenues for autonomy. In fact, she suggests that with women now globally sharing a similar experience, a new basis for organizing and strengthening solidarity may present itself.

TIME AND SPACE

Social life is organized both spatially and temporally. Technology, including the built environment, is instrumental in the organization of

social relations and of the experience of space and time. The work by feminist geographers and feminist analysis of public and private spheres and of masculine and feminine principles in design illuminate some of the possibilities for understanding the role of technology in constructing gender and men's and women's experiences.

The concepts of public and private have been important to a feminist analysis of gender. According to Eva Gamarnikow and June Purvis (1983), "The public/private split is a metaphor for the social patterning of gender, a description of sociological practice, and a category grounded in experience" (p.5). The public and private have also been characterized as a set of power relations in which men control the social meanings and resources to define what they do as acting within the public sphere and to control the private sphere (Imray and Middleton 1983).

Public and private spheres are at least in part seen to be constructed through the physical spaces that men and women occupy. Rayna Reiter (1975), an anthropologist, notes this physical differentiation in a French village:

> They [village men] were often in the cafes, or on the square playing boules, or standing around the mayor's office at regular times during the day. I found it much harder in the beginning to meet the women. They were rarely seen in public places, and stayed inside their homes. Throughout the time I lived in the village, I was constantly aware of how distinct the lives of the two sexes were. They inhabited different domains, one public, once private. While men fraternized with whomever they found to talk to in public places, women were much more enmeshed in their families and their kinship networks. They exchanged visits and errands with female relatives, but didn't do much socializing beyond the kinship sphere (pp.252-253)

Feminist geographers have been using the concept of public and private to examine how the physical structuring of society is involved in women's oppression. They are finding that men and women have different movement

bars, clubs, playing fields, typing pools, and boardrooms are segregated by gender. Urban design has exacerbated women's lack of access to the public sphere, to mobility, to employment opportunities, and to public services (Wekerle, Peterson, and Morley 1980).

The consequences of male-defined urban space as it effects women's time are explored by Ann Markusen (1983). She argues that urban space absorbs tremendous amounts of women's time because urban homes and residential areas are inefficient and isolating--kitchens are too small for shared work, homes are separated from stores, daycare, and work, and there are no neighborhood social relationships or possibilities for street socializing and group childcare. She concludes:

> It is not an unforeseen consequence that women have difficulties using urban space the way it is structured. I am going to suggest that cities are built in a gender-based manner, built for men, and that they function to preserve men's privileges and power over women. Changing technology first requires changing social relationships that have begotten the old technology . . . we need a strategy that changes relationships as well as changes the urban built environment (p.95).

Other feminists have been interested in exploring how women design space and what the principles of a "feminine" design might be. Margrit Kennedy (1981) suggests that because men and women experience space differently and use it for different purposes, the male-dominated fields of architecture and design have created a male-defined built space. Feminine principles of design would instead be user-oriented, ergonomic, functional, flexible, organic, holistic, and based on social needs. Susana Torre's edited book (1977) is a testament to the historical presence of women designers of both public and private spaces. Attention is given to the domestic reformers of the nineteenth century who sought to alter

private and social space for cooperative domestic life as well as to women's contemporary experiments with social space and living space. Underlying the presentation is the notion that women approach space differently than men and would create different built environments.

THE FUTURE

Though there certainly are feminists who are optimistic about the direction that technology seems to be leading, who see new career possibilities for women and progress in women's lived situations accompanying technological change, feminists for the most part are a skeptical lot about what new technologies have in store for women. These feminists are not technological determinists; they recognize that technology is created and adopted by people and institutions with particular interests and values. There is a widespread, if implicit, belief that unless women become involved in the decision-making, new technologies will embody the same sexism, racism, and classicism. Jan Zimmerman expresses this sentiment when she notes that women's future looks disquietingly like their past (1983:4).

Changes in health and reproductive procedures, particularly those portended by genetic engineering, alarm many feminists. Others recognize that changes in communications technologies and delivery systems are likely to remain outside the control of women and exacerbate women's exclusion from the means of communicating and from finding public means for the expression of their experiences and concerns. Computerization of the home and office are seen as another means to isolate and fragment women that may result in the loss of jobs and the creation of even more

alienating ones, while perpetuating women's powerlessness. Research and development money directed toward technologies benefiting industry and the military short-change the needs of women for public transportation and safer health care practices.

Jan Zimmerman (1981) suggests what part of the feminist project for the future must be:

> But women can park themselves in the path of technological determinism. They can call the lie claiming that the laws of nature decree how technology must be applied. They can name the processes of male-defined politics that determine what projects will be funded, what research items will be subsidized by the government, what priorities will be set, whose needs will be served (p. 365).

She expresses the caution and distrust of other feminists as well when she says, "New technologies--computers, communication networks, energy production, genetic engineering--have the potential of improving women's lives if, and only if, women gain political and financial control over the development and implementation of these inventions. Without such control, women will find themselves replaying a familiar scenario in which new technologies serve to reinforce old values" (p.355).

IMPLICATIONS FOR COMMUNICATIONS SCHOLARSHIP

A number of implications for communications scholarship arise out of this examination of feminist approaches to technology. The three general implications and the questions posed here are not intended to be exhaustive but rather suggestive of the possibilities.

1) Women have a distinct relationship to social life, to technology, and to the production and processes of communication. To approach

communication as if communication experiences and opportunities or the consequences of technology are generalizable phenonoma about both men and women or as if gender is only another variable on a par with age, income, educational level, or occupation is to mask the distinctions between men's and women's experiences and to participate in the silencing of women. The endeavor of communications scholarship should be to hold itself accountable for discovering the contributions of women as active creators and communicators and the alternate forms of communicating they have used; for discovering the differential impact technology has had on women's social relationships, lived experiences, and means for participating in public discourse; for revealing the implications for women entailed in new electronic technologies; and for revealing the impediments that block women's ability to participate in the discussions and decision-making about technology and the future of social life.

2) Feminist scholarship, if it hopes to understand women's communication, needs to ask questions that cut across many boundaries. Looking only at "communications technology" if defined as it typically is as the print, broadcast, and electronic media obscures the ways that technology in general structures and organizes social processes and relationships, producing opportunities for some kinds of communication processes and altering others.

3) As communications scholars and/or feminist scholars, we have much to learn and much to make known. Each of the categories described here suggests questions to be asked. How has technology through history altered the structure of patriarchy? How has technology constructed women's space and time, their ability to move themselves and their

thoughts, to associate with others, to participate in cultural processes? How can women participate in decision-making about communications policy and technology when they are restricted in their avenues of communication and their use of technology at the outset? What alternate design and use of technology is suggested if we consider women's needs and experiences? What can women working in their homes and at their jobs tell us now about how social life is changing around them as technologies are produced and introduced? How have women been "sold" on the acceptance of new technologies? How have communication technologies participated in the silencing of women and the questions they raise?

Perhaps the most fundamental question that must be addressed is why as a field it has taken so long for us to finally listen to what women have to say about technology.

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