

**Towards A Critical History of the
35mm Still Photographic Camera in North America
1896 to 1980**

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ABSTRACT

This study analyses certain aspects of the relationship between culture and technology by using the example of the 35mm still photographic camera. Methodologically, the study integrates two perspectives in communication theory, namely diffusion of innovation and cultural studies. The study consists of five segments. First, the need for technological innovation is defined in terms of developing social formations. Secondly, the history of photographic research and development is traced in terms of various models of industrial development, and in terms of the horizontal and vertical integration of manufacturing. The commercialization of the camera is treated in relation to the history of markets, and their disturbances by war and other political developments. Next, the study provides an analysis of specialty magazine advertising as it relates to the 35mm camera. Finally, the adoption and utilization of this new technology are discussed in terms of the competing interests of various social formations in modern society.

Abstrait

Cette thèse analyse certain aspects de la relation entre la culture et la technologie en se servant de l'exemple de l'appareil photographique 35mm. Pour sa méthodologie, la thèse unifier deux perspectives sur la communication: la diffusion de l'innovation et les études culturelles. Cette étude a cinq parties. Premièrement, le besoin pour l'innovation technologique est défini au contexte des formations sociales. Deuxièmement, l'histoire de recherche photographiques est suivie par référence aux modèles du développement industriel, et par référence à l'intégration horizontale et verticale de l'industrie. L'étude examine la commercialisation de l'appareil photographique en relation de l'histoire des marchés, et de leurs perturbations par la guerre et d'autres événements. Ensuite, la thèse donne une analyse de la publicité pour l'appareil photographique 35mm dans les magazines spécialisés pour les photographes amateurs. En fin, l'adoption et l'utilisation de cette technologie nouvelle est discutée en relation des intérêts concourant des différentes formations sociales.

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The following abbreviations are used in this text:

NYT = New York Times

NPD = National Photo Dealer Magazine

POP = Popular Photography Magazine

MOD = Modern Photography Magazine

CR = Consumers' (Union) Reports

OE = Oriental Economist

ZH = Zeiss Historica

All references are given in author-date parenthetical fashion as cited in Webster's Standard American Style Manual, Springfield, Mass., Merriam-Webster Inc., 1985:193-198.

INTRODUCTION: THE HERMENEUTICS OF EVERYDAY OBJECTS

In what is possibly the first novel in the European tradition to deal with the transformative effects of communications technology, Victor Hugo expressed the belief that "when a man understands the art of seeing, he can trace the spirit of an age and the features of a king even in the knocker on a door" (Sturrock 1978:149). Hugo's fascination with the texture of everyday life in Paris, later echoed in the photographs of Eugene Atget (Szarkowski and Hambourg, 1981-1985) and the poetic meditations of Walter Benjamin (Demetz 1978:146-162; Buck-Morss 1989), is very much a part of that Romantic sensibility which sought to find a microcosm even in the most mundane of objects and gestures. As with William Blake's desire "to see the world in a grain of sand", and as in the emerging nineteenth-century sciences of archaeology, ethnography and paleontology, the idea of recreating a culture based on its fragments--its shards, its graffiti, its tools and writing implements--has provided a series of alternatives to social and cultural interpretations based on the larger, perhaps more official objects such as conventional documents, monuments, and recorded histories.

To an unfortunate extent, many histories of communica-

tions technologies reflect a preoccupation with the large scale effects of various media on society, while overlooking the characteristics of the objects through which those effects are presumably mediated. Studies in the vein of Innis and McLuhan have for example dealt with the transition from orality to literacy in ancient Greek civilization (Ong 1982; Havelock 1982, 1986; Goody 1987), or have offered speculative interpretations of electronic media in relation to "the global village" or of late capitalism and its "excremental" culture (Kroker and Cook 1984). Yet like the original work of Innis and McLuhan, these studies have concentrated on media effects without investigating the question of how media technologies evolve and spread. Questions of economics, legal regulation, nationalism and professionalization in media use and deployment are generally left unanswered, because they tend not to be posed by this research tradition.

Other branches of media scholarship have dealt with new technologies in light of government policy decisions and economic regulation. The standard histories of broadcasting, for example, have typically been concerned with the differences among free market, socialist, and mixed economy models of licensing, or with issues of technology and national development, or--as in Canada--the role of the mass media in creating, protecting, and preserving a distinctive national identity. Again, while many of these studies are

are rooted in the discipline of political economy, they have tended to underscore what, paraphrasing Marx, one could call "the relations of cultural production" rather than the technical forces behind them. Indeed, it is only with the interruption of technological hegemonies, as in the challenge of cable systems to broadcast networks, that the technological specifics of modern communications come to both public and scholarly attention. Yet the development of phenomena such as network broadcasting and its regulation are largely incomprehensible without the understanding that television was traditionally based on the transmission of impulses using the limited and finite frequencies of the electromagnetic wavelength spectrum (Williams 1974:23).

On the other hand, one must typically consult specialized histories of engineering, invention and science to investigate the "nuts and bolts" production of machinery such as the personal computer, modem and fax machine, cellular telephone, CB radio, laser printer, and other devices upon which claims for "The Information Age" are based. Interestingly, some of this material, along with design and manufacturing histories, has been gathered by collectors and other amateurs. But to consumers and users concerned with the utilitarian aspects of these devices, their seemingly endless and uncontrolled proliferation, their increasing sophistication and ingenuity, and even their rapid obsolescence often contribute to the general sense that technical

developments arise directly out of scientific research and the progressive application of special expertise. In this public opinion generally echoes those histories of technology that are based on a concept of unilinear progress derived from the optimistic intellectual heritage of the Enlightenment. Even Marxism has evolved under this influence (E. Fischer 1963:15-23). Although that concept has little demonstrable validity (Ellul 1964: 190-193; Pacey 1983:13-34), and is increasingly under fire (Conrath and Thompson 1973), it is still used in discussions of technological efficiency and perfection, and in advertisements for domestic communications apparatus such as telephones, radios, television sets, and video cassette recorders (e.g. "Panasonic - just slightly ahead of our time").

Thus conventional media history is seen from the point of view of either large scale social transformations in which the specifics of technology and its spread are taken for granted, or from a somewhat closer view of technological minutiae as embedded in the "grand recit" (Lyotard 1979) of civilization unfolding in inspired, progressive stages of invention. Strictly speaking then, both approaches could be criticized as unhistorical in that they assume that which needs to be proved, namely that technology enters into social life in distinctive fashion, and that perturbations in culture and society, "progressive" or otherwise, can be directly linked to those particular entries. An adequate

history of communications technology must therefore take into direct account that technology in its formal and material embodiments, without losing itself in a mere chronology of invention. Recapturing Hugo's "art of seeing", such a history might begin to document with greater precision the actual linkages between media use and social change, and between the products of technology and the messages they are used to convey.

Photography as Communicative Practice

To begin to write such a history one could easily start with the medium of photography, for a variety of methodological reasons. Although its presence is almost universal in modern, industrial societies, still photography remains one of the most neglected areas of contemporary North American media scholarship. Harold Innis, for example, mentions it only in passing, in connection with newspapers and the cinema (Innis 1951:78ff.; 1972:162), while Marshall McLuhan's Understanding Media (1964: 188-202) contains a provocative but unsystematic and flawed set of remarks that deliberately "explore rather than explain" (McLuhan in Stearn 1967:xii); McLuhan errs quite dramatically in claiming that lenses turn the images of the camera

obscura "right side up" (McLuhan 1964:191). Many of the editors and contributors to standard university textbooks on mass communications--Schramm (1960), Schramm and Roberts (1974), Steinberg (1966), Fischer and Merrill (1976), Klap- per (1960), Peterson et al. (1965) and so on--also ignore the subject, to the point of neglecting even photojournalism as a topic of importance. Indeed, a search through bibliographies on communication research, notably those compiled by Hansen and Parsons (1968), Bretz (1971), Blum (1980), or Gitter and Grunin (1980), suggests a profound bias against the consideration of photography as a mass medium.

Research in the area of popular culture, beginning with Nye's classic study The Unembarrassed Muse (1970), is also remarkably thin in this area, despite the fact that 90 per cent of households in America currently own cameras, that some eleven billion exposures were taken by amateur photographers in 1982 (Wolfman 1984:100, 63, 16). Nevertheless, in over twenty years of publication on subjects as diverse as rock music, humor, TV, comics, hay derricks and strip clubs, The Journal of Popular Culture has run only two small photoessays (Van Revs 1971:562-566; Michalik 1975:279-284) and made one passing reference to the James Agee/Walker Evans collaboration in Let Us Now Praise Famous Men (Kramer 1972:757). And though Popular Science Magazine's May 1941 survey indicated that photography was America's number one hobby [19,000,000 amateur snapshooters, 9,000 camera clubs,

and over \$100,000,000 in annual amateur expenditures], with philately not even a close second, the literature on leisure studies has concentrated instead on amateur sports, music, drama and handicrafts.

To some degree this lacuna is matched by similar gaps in other intellectual traditions. Within the arena of Critical Studies associated with the Frankfurt school, the personal interests of Theodor Adorno in literature and music, and his brief sojourn with Max Horkheimer in Hollywood, obviously inflect their critique of the "cultural industry" (Horkheimer and Adorno 1982:120-167), leaving still photography unmentioned. Arnold Hauser, a Hegelian Marxist not directly associated with this school but sharing perhaps its taste in cultural matters, fails to discuss the subject in either his The Social History of Art (1951) or The Sociology of Art (1982). These omissions are surprising given the prominence of photography within the culture of the Weimar republic and especially in its popular press (Willett 1978:139-148). On the other hand, Walter Benjamin's essays, "A Short History of Photography" (1977:46-51) and "The Work of Art in the Age of Mechanical Reproduction" (1969:219-239) are considered canonical texts for the Post-Modernist movement.

Within other traditions of scholarly research, Raymond Williams' Communications (1966) discusses many media that utilize or incorporate still photography--books, magazines,

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television and film--but without mentioning it in particular. [Williams did give it brief consideration in his book on Television (1974:22-23), and his remarks will be examined below]. However, within the Birmingham school, Stuart Hall (1977; 1980) has dealt with news photography as part of a general concern with signifying practices and their ideological import, and has also written a short study of photographs of black immigrants to Britain taken during the 50s and 60s (Hall 1984:2-9). Yet despite the publication in Britain of the quarterly magazine Ten.8, closely allied to the theories and membership of the Centre for Cultural Studies, this tradition has yet to produce a monograph or anthology on photography per se.

Perhaps there are several reasons for this neglect. First, photography does not readily fit under the heading of mass communication, conventionally defined as "(a) relatively few creative individuals (b) prepare and transmit various kinds of expensive messages (c) to a large audience (d) through a relatively few scarce channels" (Brietrose in Emery, Ault and Agee 1970:71). As an instrument that until now neither transmits nor receives messages, the camera cannot be incorporated into "S-M-R" models of communication. Considered in this light, still photography is close in nature to the telephone, ham radio, CB, electronic bulletin board and other "interactive" media (ibid.:75-77), or at least it stands midway between them and media such as com-

mercial television, radio, and newspaper/magazine/book publishing. Secondly, like McLuhan's famous parable about fish failing to understand that they swim in water, it is perhaps easy to overlook the extent to which contemporary society is based upon what A.D. Coleman has termed a "lens" or "lenticular" culture (Coleman 1986:10-18). Coleman argues that the invention of photography was only the final capstone to three hundred years of development in optical technology. The creation and refinement of instruments such as the telescope and microscope [and, one could add, the navigational and surveying theodolite] were major factors in the downfall of a medieval worldview that was geocentric, spiritual, and anti-empiricist in character. The rationalization and secularization of Western civilization since the Renaissance finds epistemological grounding in the observational techniques and practical information made available to science through optical instruments. The frequency of visual metaphors in intellectual work--terms such as "insight, perspective, overview, far-sighted, survey, point of view, demonstration, and synopsis" (Jay in Hoy 1986:176) and "theory" itself--suggests how easily still photography might be taken for granted.

The Camera as Social and Cultural Artifact

If still photography is barely mentioned in standard accounts of mass media, consideration of the camera as an instrument or artifact has never, to this writer's knowledge, been attempted. To be sure, there is a growing body of literature centered around technology itself as a communicative or signifying practice, one involving the definition and display of personal, subcultural, or cultural identities. One thinks here of Barthes' essay on the automobile as "the cathedral of modern times" (Barthes 1957), followed by Hebdige's study of the motor scooter and motorcycle in relation to British youth groups of the post-war period (Hebdige 1981). Banham (1960), Heskett (1980), Hillier (1983) and others have demonstrated the intimate connections between the industrial design of technological consumer goods and movements in the art world at large such as British Arts and Crafts, Futurism, Expressionism, De-Stijl, Cubism, Bauhaus functionalist Modernism, and architectural Post-Modernism. Investigations in the areas of cultural anthropology and market research have, especially in recent years, brought attention to domestic consumer goods as repositories of multiform cultural meanings (Bronner 1983; Douglas and Isherwood 1978; Felson 1976; Fiddle 1979; Furby, 1978; Hirschman 1980; Leiss, Kline and Jhally 1986:259-297; Levy 1981; McCracken 1986). The relatively new

academic discipline of "material culture", which sees itself as "a branch of cultural history or cultural anthropology...based upon the obvious fact that the existence of a man-made object is concrete evidence of the presence of a human intelligence operating at the time of fabrication" has also opened up interest in the artifactual nature of technology (Prown 1982:1). In William Leiss' phrase, referring to everyday commodities, these "things come alive" as symbolic tokens in social activities such as gift-exchange, status display and courtship, or simply as what Forty (1986) has called "objects of desire". Finally, the historiography of communication is expanding from its basis in the history of individual media, and toward broader considerations of culture and civilization (Crowley and Heyer 1991).

An examination of the camera as a social and cultural artifact in general, and of the 35mm camera in particular, promises to be of interest to communication scholars for several reasons:

1. The 35mm still photographic camera utilizes the one technology that is central to all twentieth-century communications media, namely the coating of sensitized material onto long strips of a flexible base. This technology is crucial not only for the cinema and amateur photography, but for the sound and video recording and playback industries, as well as for computer memory, programming, and software

development (Armes 1988:74-90). The creation, dissemination, and utilization of this technique tie together articles as seemingly diverse as the motion picture camera and projector, the reel-to-reel and cassette sound and video recorder, editing equipment for all of these, as well as both the mainframe and personal computer.

2. The 35mm camera, more than the gramophone or radio, was one of the first and foremost high quality technological products to enter the sphere of middle class and lower middle class domestic use and consumption. As such, the 35mm still photographic camera was an important precursor to the domestic tape recorder, home video camera, and personal computer. The 35mm camera represents therefore an important case history in the movement of advanced technologies from industrial to domestic spheres of consumption, and from mechanical to electronic consumer items. It also represents an increasing use of leisure time and discretionary income devoted to media-related activity.

3. Following immediately from the first point is the argument that the 35mm still camera marks an important if unintended effect of technology in minimizing the kinds of technical competence that has traditionally marked off the media amateur from the professional. As will be shown, the introduction of high quality and portable photographic

apparatus into popular use is linked to newer categories such as "advanced amateur" and "semi-professional", which are more typical of current conditions of production than the older distinctions based on expertise and years of formal training. Here again, this trend precedes the undermining of older graphic arts skills by the "clip art" of computer desktop publishing.

4. The 35mm still camera is one of the first and most characteristic items of international trade in advanced image-producing technologies. The economic history of the camera is largely bound up, as will be shown, with the decline of American manufacturing and marketing hegemony in domestic technological goods, especially in the face of successful Japanese incursions in this area. Moreover, the story of the camera's manufacture and sale is an instructive example of the role of the entire photographic/photochemical industry in international affairs, including military and strategic questions.

5. As part of its economic history, the camera is intertwined with an important anomaly in the "free market" philosophy because its manufacture--like the mass manufacture of all communications technologies--has long been dependent upon international patent protection. Inasmuch as the role [and current decline] of the patent system is generally

taken for granted in most histories of communications, a profile of the camera can help correct that oversight.

6. The mass marketing of the 35mm still camera coincides, in American history, with the advent of the post-war youth culture or "counter-culture". As with many subcultures, it was quick to adapt new audio-visual technologies for its own purposes, which included the creation of an alternative press. Although it may be a slight exaggeration to claim that the 35mm camera was the visual counterpart of the guitar for the youth culture of the 60s and 70s, it is also difficult to conceive of a magazine such as Rolling Stone, or of rock album cover art, except in terms of the candid, behind-the-scenes, off-stage, diaristic visual styles made possible by the small, lightweight, precision camera. Indeed, the fragmentation of the then-emerging photo art world into large-camera/small-camera camps provides an illustration of how new technologies enter into the realm of aesthetic and cultural signifying practices.

7. Insofar as it partakes of the history of invention, the 35mm camera is part of what Everett M. Rogers and Floyd Shoemaker (1971) have called the "communication of innovations", or what Rogers (1983) identified as the "diffusion of innovation". Rogers and Shoemaker have argued that "diffusion research is that subset of communication research

dealing with the transfer of new ideas" (Rogers and Shoemaker 1971:12). Although initially based on a linear Source-Message-Channel-Receiver-Effects model derived from Shannon and Weaver's The Mathematical Theory of Communication (1949), [subsequently modified by the work of Schramm (1971), Lasswell (1972), Lazarsfeld (1944) and others], Rogers and Shoemaker's research led them to adopt a

multi-step flow model...based on a sequential relaying function that seems to occur in most communication situations. It does not call for any particular number of steps nor does it specify that the message must emanate from a source by mass media channels. This model suggests that there are a variable number of relays in the communication flow from a source to a large audience. Some members will obtain the message directly through channels from the source, while others may be several times removed from the message origin. The exact number of steps in this process depends on the intent of the source, the availability of mass media and the extent of audience exposure, the nature of the message, and salience of the message to the receiving audience (Rogers and Shoemaker 1971:209).

Nevertheless, as the above passage indicates, the backbone of this diffusion theory remains the S-M-C-R-E communication model (Rogers and Shoemaker 1971:20). As Rogers pointed out, this model has formed the basis for most "tracer studies" that follow technological innovation through the distinct stages of "research, development, and commercialization" (Rogers 1983:155), or through what have been identified as six "main phases" of technological devel-

opment, namely (1) identification of a problem or of needs for a new invention (2) basic and/or applied research in this area (3) development of ideas and prototypes (4) commercialization (5) diffusion and adoption by segments or the totality of a social system, and (6) consequences. Noting that most studies have dealt with phases (2) to (6), Rogers calls for more attention to be paid to the entire process of innovation, from its origins to its ultimate consequences (Rogers 1983:134-162). A combination tracer/diffusion study of the 35mm camera would assist in both testing existing hypotheses about technical innovation, and in filling some of the gaps in this literature. In reviewing the state of diffusion research in 1979, Rogers cited new possibilities in the investigation of narrow-casting (i.e. small-scale) communication; in innovation based on the re-invention or modification of basic innovations; in the role of organizations that support or seek out innovation; and in the measurement of acceptance of new ideas and technologies (Rogers and Adhikarya 1979:67-89). In addition to these avenues of inquiry, the 35mm still camera also presents the opportunity for qualitative studies in the relationship between social formations and new technologies.

Technology: Emancipation versus Enslavement

8. Finally, communication scholars should be among the first to note that 1989 marked both the sesquicentennial of the invention of photography, and the bicentennial of the French Revolution. The symbolism of this coincidence serves as a reminder of the numerous emancipatory hopes that have been attached to various forms of technology since the eighteenth century, hopes that science and research would raise living standards throughout the world, eradicate disease and minimize physical labor, increase leisure and promote cultural pursuits, and bring all of humankind together in a harmony based on unprecedented levels of understanding. Against these hopes are posited fears that modern technologies tend to centralize power, pacify audiences and marginalize dissent, minimalize regional identities, encourage the standardization of commodities, and dehumanize social relations by circumscribing face-to-face contact.

Claims for photography's ability to dissolve age-old prejudices, stereotypes and superstitions were voiced in a radio talk given by August Sander in 1931, and were summarized in the phrase, "photography is the universal language" (Halley 1978:674-675). Several years later Edward Steichen stated his belief that the nature of photographic imagery itself--its use of optical perspective, its reduction of three-dimensional space to two-dimensional representation,

its use of monotone to suggest color gradations--were all central to "the new literacy" of modern, global civilization (Steichen 1966:107). Steichen's world-touring exhibition, The Family of Man, whose introductory text by Carl Sandburg argued for a universality of human nature and condition, was also in keeping with Modernist beliefs in the transcultural, transhistorical nature of art and the aesthetic faculties (Sekula 1984:87-95, based on Barthes 1972:101-102).

Opposition to emancipatory claims for photography has often come out of what one could identify as both literary and sociological positions. The former was first articulated by the poet Baudelaire who wrote,

If photography is allowed to supplement art in some of its functions, it will soon have supplanted or corrupted it altogether...It is time then, for it to return to its true duty, which is to be the servant of the sciences and arts - but the very humble servant, like printing or shorthand, which have neither created nor supplemented literature (1859, in Newhall 1982:83).

Susan Sontag, known primarily as a literary figure, has also attacked photography, but in terms that, like Baudelaire's could hardly be labeled ideological. Like Marshall McLuhan, Sontag offers a set of memorable one-liners--"Photography is consciousness in its acquisitive mode...To photograph something is to objectify it" (Sontag 1977:178)--but few testable hypotheses. Like other critics such as Janet Malcolm (1980), Sontag operates out of an essentially literary sensibility, and her writing is couched

in rhetorical flourishes which do not lend themselves to empirical verification. It is partly because of this that Sontag's call for "an ecology of images" remains on a level of idealism that John Berger, among others, has found objectionable (Berger 1980:48-63).

The literary and idealist strains in Marshall McLuhan's writing on photography has surfaced in the work of Neil Postman, particularly in Amusing Ourselves to Death (1985). Postman presents the case that the era of the printed word, of typography, was a time of great achievement in the areas of education, intellectual discovery, and public discourse (Postman 1985:30-63). But photography is one of those media, according to Postman, that helped move American society away from "The Age of Exposition" to "The Age of Show Business", from a society characterized by contemplative reflection to one dominated by spectacle and display. In particular, photography represents the world as a vast set of disconnected and fragmented facts whose truth-value is not subject to dispute (ibid.:71-80).

Whatever its merits, Postman's argument is subject to the same criticisms usually leveled at the Frankfurt school: use of a "hypodermic needle" model of media and society, cultural elitism, and a homogenized, undifferentiated view of media audiences that lumps all viewers into one large category. The same charges can be used against not only Sontag and Postman, but at the most important expressions of

a literary opposition to photography, namely that originating in semiology as demonstrated in the work of Roland Barthes. Barthes himself contributed three challenges to the discussion on photography. The first, in Mythologies (1972), was a placement of specific images--campaign posters, The Family of Man exhibit--within the larger realm of ideological meaning that Barthes called "myth" (Barthes 1972:91-93, 100-102), whose function is to mystify politics and culture by making them appear to be "natural". Here Barthes took the terminology of Ferdinand de Saussure's structural linguistics [terms such as "sign", "signifier" and "code"] and used it to introduce an unprecedented formalism into North American critical parlance. The second challenge, a 1961 article on "The Photographic Message" (Barthes 1977:15-31), suggested that the naturalizing power of the photograph lies in the fact that "it is a message without a code", an "analogon" of the real world without evidence of transcription (cf. Ivins 1953:113-157). Thirdly, Barthes' Camera Lucida (1980) presented a phenomenological, even autobiographical meditation on photography and its relation to death, a theme also explored by Philippe Dubois (1983). Barthes first notes a methodological distinction between what he calls the punctum and the studium of the photograph, between the private meanings generated by the image and its public connotations. Much of the rest of the book is taken up with Barthes' account of his search for an image

of his recently deceased mother, for a photograph of her that would contain a particularly revelatory punctum for him in the midst of his mourning. This search is also for what Barthes hoped would be a non-reductive phenomenology, one that would respect photography's "magic". Had this book been written by anyone else but Barthes it is doubtful that it would have received public attention (Burgin 1986:71-92). Here, as elsewhere, admiration for Barthes' masterful writing may discourage a critical analysis of his ideas. Specifically, Barthes' positioning of himself as a normative viewer of photography, a procedure typical of phenomenological thinking, is no more justifiable than Descartes, Husserl, Heidegger or Sartre using their own minds as examples of normative consciousness. Like many phenomenologists, Barthes failed to account for the extent to which his thoughts, perceptions, and sentiments were embedded in a predominantly white, male, urbanized philosophical tradition. Barthes assumes a unity of common ground between his audience and himself as writer, but that assumption cannot remain unchallenged.

Post-Structuralist and Non-Structuralist Perspectives

It is partly in answer to the question of the audience that the literary tradition has turned to psychoanalysis,

and especially to the writing of Jacques Lacan, seeking to establish viewer response in the workings of the unconscious. Lacan's integration of Saussurian linguistic theory with Freud's views on the ego and on sexual development, has been adopted by some feminist critics to produce a concept and critique of "the male gaze" in patriarchal society. This concept is based on the Freudian diagnosis of fetishism as a fascination with/revulsion for the "missing" or castrated penis, with all its supposed connotations of the absence and death found in photography by Barthes. Originally introduced into film theory of Laura Mulvey (1975) and E. Ann Kaplan (1982), it has been extended to still photography by Victor Burgin (1980), Christian Metz (1985) and Abigail Solomon-Godeau (1988), all of whom advance the idea that photography is inherently voyeuristic, and that photographs of women [nude or fully clothed] are especially attractive to men because they exist on the safest outer limits of sexual taboos. Yet for all its use of emotionally charged terms such as "castration", "fetishism" and even "Desire", the theory of the "scopophilic male gaze" says little about women as viewers in a patriarchal society. Moreover, as a theoretical construction the idea of the male gaze rests on foundations that are themselves far from sturdy: Saussurian linguistics are as far from the current mainstream of linguistic theory as Lacanian psychoanalysis is from the body of orthodox analysis, or as psy-

choanalysis itself is to experimental psychology. That is to say, while all three have contributed a hermeneutic formalism to their respective fields, the idea of a deep structure in language, culture or the unconscious remains, by strict definition, inaccessible to direct methods of inquiry (Giddens 1984:1-5, 16-28ff). The tendency to determinism in their approaches also bears cautious consideration.

While the literary or linguistic perspective tends to problematize the meaning of photography, to explore its supposedly hidden signification, critics with a visual background have been more concerned with historicizing the photograph and exploring the shifts in its meaning to various audiences over time. The prime example here is John Berger, a writer of fiction and non-fiction who began his career as a painter. Although often categorized as a Marxist, Berger's early writing on Picasso (1965) and the Russian sculptor Ernst Neizvesty (1969) are deliberate repudiations of Socialist Realism, repudiations that take place partly through recourse to a vocabulary of subjectivity derived from phenomenology. Berger has also been concerned throughout his work with time as an existential category, and with its relationship to self-consciousness, memory, hope, bereavement and loss (Berger 1975:176-201). Berger sees time, along with light, as the "primary raw materials" of photography (1982:85); this and the temporal distance between the event photographed and the production of the

photograph itself contribute to the "ambiguity" of the image. Berger thus disputes the inherently factual authority usually assigned to photography (Berger 1975:85-129), and in direct answer to Sontag he conceives of photography as a potential form of collective memory, one that might be used for self-critical, self-reflective and even historically transformative purposes (Berger 1980:48-63). In actual practice Berger has collaborated with the photojournalist Jean Mohr to produce books on a British country doctor (1967), migrant workers in Europe (1982), and contemporary peasant life (1982). Berger is primarily known to the general public through his television series Ways of Seeing, published in book form in 1977. In both formats Berger situates commercial advertising photography within a tradition of capitalist displays of wealth first embodied in European oil painting (Berger 1977:83-154). For Berger however, this does not preclude alternative practices; like Walter Benjamin, to whom he makes explicit reference, Berger sees in photography a means for puncturing "the bogus religiosity" of high culture and its fetishizing of "great works of art" (Berger 1977:23).

The so-called Post Modernist movement has also turned to the use of photography to dethrone mainstream aesthetics. On one level, artist-critics such as Martha Rosler (1981: 59-86) and Allan Sekula (1984:53-75) have attacked the aestheticization of documentary photography. Rosler has

protested that "The expose, the compassion and outrage of documentary fueled by the dedication to reform has shaded over into combinations of exoticism, tourism, voyeurism, psychologism and metaphysics, trophy hunting - and careerism" (Rosler 1981:72). On another level Douglas Crimp (1980:91-101; 1983:43-56) and Craig Owens (1983:57-88) have spoken of how photography undermines Modernist beliefs in the originality, autonomy, and even seriousness of fine art. Unfortunately, at this point in time the Post-Modernist argument is largely confined to those privileged institutional sites--the museum, gallery, art journal and academic conference--which it also condemns. Although a few feminist photographers such as Jo Spence (1986:24-39) have reinvestigated such mundane forms as the family photo album, even their work remains within a circle of informed viewership.

Towards A Systematic Critical Perspective

While Post-Modernist critiques of photography are based on social concerns, the majority of them can scarcely be said to be methodologically rigorous. That is, like most avant-garde movements, their cultural shock value is grounded more in imaginative rhetoric than in the careful analysis of social movements, patterns of signification, or audi-

ence values. Thus Jan Zita Grover can characterize photography as "a collective rite practiced by isolated individuals" (Zita Grover 1986:48), but only by ignoring the evidence that 69 percent of all amateur photographs are made of family members (Wolfman 1984-1985:60), or that amateurs, professionals and collectors are affiliated within a large number associations and societies (Kock, Martin and Novallo, 1989). Or Susan Sontag can characterize the camera as "a ray gun" (Sontag 1977:14), based on one ad for a particularly unsuccessful piece of equipment. Or even so astute an observer as Barthes could describe the photograph as "a message without a code", thus overlooking the history of pictorial conventions in photography; conventions concerning composition, framing, printing technique, lighting, and posing. Barthes also ignores the major changes in photographic imagery brought about by the introduction of inexpensive, reliable color, or the different look of news photos after the invention of portable electronic flash units, or the impact of fast films and high shutter speeds on the rendition of motion.

On the other hand, there have been attempts to construct systematic social histories of photography, notably Robert Taft's Photography and the American Scene (1938), Gisele Freund's Photography and Society (1974), and Michel Braive's The Photograph: A Social History (1966). All three studies resemble, to varying degrees, parallel histories of

radio (MacDonald 1979; Aitken 1985); telegraphy (Vyryan 1933), newspapers (Smith 1979), television (Briggs 1961) and video (Armes 1988) in that they link changes in communicative technology with the forms or genres of popular culture and fine art that they helped create and mold. Taft follows the history of photographic invention in America, demonstrating the connections between the early daguerreotype and the growth of studio portraiture (Taft 1938:46-101), and between the albumen print and the family photo album (ibid.:138-185). Braive details the initial resistance to photography in the French popular press in the years immediately after Daguerre made his first public demonstration, the medium's rising fashionability, and the emergence of genres such as portraiture, reportage, aerial and funeral photography, landscape, and candid snapshots, bearing in mind "the complex relationship between the photographer, his sitter and the final recipient of the photograph" (Braive 1966:27). Freund does much the same but from a critical point of view, commenting on "the artistic decline" of early studios in light of the fact that, "Competition and the desire to sell and buy to one's own advantage are essential features of capitalism" (Freund 1974:83). Much of what she writes is personal and anecdotal, based on her own distinguished career as a photojournalist; by the same token, the generalizability of her observations is limited. And neither Taft, Braive nor Freund address the question of how the

effects of photography on society are altered once the instruments to produce professional or near-professional quality images become common, everyday household possessions. It is in answer to this question that a systematic history of the technology itself needs to be written.

Tracking and Diffusion Research: A Conceptual Model for the Camera

The main argument of this thesis is that questions about the emancipatory or enslaving potential of modern technologies cannot be answered until a clear and systematic account is given of their origins, modes of distribution, and actual uses. For reasons given above, the 35mm camera provides an important case history example of each of these phenomena, especially so because of its widespread domestic ownership. The thesis therefore proposes to revitalize the Rogers and Shoemaker model of the innovation development process as a communication process, acknowledging its limitations, although modifying it for heuristic purposes as needed. Specifically, the thesis will question both the linearity of the S-M-C-R-E model and its implied purposefulness, by bringing up issues of accidental innovation, unrecognized innovation, constrained diffusion of innovation,

unpredicted use of innovation, and the role of feedback within the entire process.

The thesis is also an examination of the relationship of technology to culture. To a large extent, this issue underlies classical Marxist arguments about the relationship of base to superstructure, or of modes of production in relation to the organization of production. The approach taken here will be "culturalist" in the sense of treating technology as a social element that contains its own history of signifying practices, but which also has a complex relationship to signifying practices in society at large. The argument to be made is not simply that, "technology proposes, culture disposes", but that the social organization of technological research and development, the organization of its distribution (especially via advertising and retail sales), and the organization of its use, all partake of the core values of modernized industrialized democracies, which each may in turn reinforce, weaken, or challenge altogether.

Although periodization in historical studies is always and to some extent arbitrary, the years 1896 and 1980 have been chosen because they provide two important benchmarks: the former, the year in which the Eastman Kodak Company recaptured its position as supplier of 35mm film stock to Thomas Alva Edison; the latter as the year in which Nippon Kogaku Ltd., makers of the Nikon line of optical goods, severed their ties with the America distributor E.P.O.I. and

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began direct marketing to the United States. Both dates indicate important changes in the monopolistic structure of the photographic industry in North America, and pinpoint both its creation and transformation into an "information-and-imaging" industry.

Chapter Outline

As far as an outline of this document is concerned, Chapter I will deal with the issue of need by describing the niches in science and social life in modern, mass society fulfilled by photography. Chapter II will describe the origins of the modern photoindustry, and its status at the time of the 35mm camera's invention. Chapter III explores the commercialization of this technology by studying market structures and marketing strategies in the period when the 35mm became popular. Chapter IV provides a historical study of magazine advertising for 35mm still cameras from 1937/38 to 1980. Chapter V discusses the adoption of this technology by several groups including photojournalists, hobbyists, and members of the post-war counter-culture. A summary and conclusions are presented at the end.

Limits to the Study

Finally, as a note of caution, Rogers and Shoemaker list several shortcomings to diffusion research which are relevant to this present study. The five that they list apply here as follows:

1. "One weakness of diffusion research is its dependence upon recall data from respondents as to their date of awareness of adoption of a new idea" (1971:78). In the case of the 35mm camera even much of the written documentation is missing or unavailable. Company documents from the firm of Ihagee Kamerawerk, makers of the first 35mm single lens reflex camera, were either destroyed in the 1945 bombing of Dresden, or secreted by officials of the former D.D.R. (Aguila and Rouah 1987:6); requests for company documents from other firms have been denied to this investigator, or have been answered by means of official profiles. Advertising firms and wholesalers involved with promoting and selling the camera as a commodity have also been largely uncooperative or unresponsive.

2. "Some critics think that the innovations studied have been relatively inconsequential...we know much less today about the way in which restructuring innovations (e.g., a new organizational form) diffuse than about how

functional-technical innovations (e.g., automobile seat-belts or a new food product) spread" (Rogers and Shoemaker 1971:79). To avoid succumbing to triviality, this study will not deal with the vast minutiae of detail available on particular camera makes and models, except to note the individualizing effect this has on camera ownership. Although unsatisfying to the collector, such an approach is necessary if the camera is to be appreciated as a social and cultural artifact about which significant theoretical generalizations can be made. Moreover, the fact that this study is a critical one means that the relation of the camera to basic social and economic structures will always be kept in mind.

3. "Almost all past diffusion research was concerned with optional innovation-decisions, rather than with decisions of a collective or authority nature" (ibid.:79). To correct for this bias, the present study will take cognizance of the particular collectivities that have arisen in contemporary society, especially those artistic and other subcultures for whom a redefinition of photographic aesthetics has been an important project.

4. "It has been erroneously assumed that because individuals were the units of response, individuals also had to be the units of analysis" (ibid.:80). Rogers and Shoemaker

call for more relational analysis of individual decision-making, since the adoption of innovations often takes place in social setting defined by interpersonal dyads, networks, or cliques (ibid.:81-82). The objection will remain unanswered in this project. Because this study is an historical one the normal procedures of individual and small group survey research are not employed; interviews of users were not conducted. Much of the data about usage comes from indirect sources, although some reference is made to surveys. Access to the limited amount of marketing research conducted or commissioned by manufacturers, wholesalers and advertisers has been denied. Admittedly this stands as one important limitation of the current study which will, at best, provide a contextual framework for such research.

5. "Concentration in the United States and Western Europe" (ibid.:82). Language barriers and geographical difficulties of access to information about Japan in particular will limit this study to the United States and Canada. This study makes no claims for applicability to the U.S.S.R. or the former D.D.R., although both have engaged in significant levels of 35mm camera production. Clearly patterns of diffusion within centralized economies can be expected to differ from those of non-socialist nations. On the other hand, since the United States and Canada are advanced industrial nations with active consumer cultures, they provide a

kind of ideal type situation in which to trace the movement of domestic consumer technologies.

CHAPTER I - THE NEED FOR INNOVATION: DEFINITION

In discussing "the generation of innovations", Rogers uses the example of scientists and engineers recognizing fairly simple needs, defining them as research problems, and then setting about rather systematically to create solutions to the obstacles raised. Rogers cites the breeding of hard tomatoes suitable for machine picking as a consciously sought answer to the dilemma of agricultural labor shortages in southern California, and the passing of federal laws requiring automobile safety features (including seatbelts) in response to alarmingly high numbers of fatal traffic accidents (Rogers 1983:135-137). If the need for innovation is defined in this restricted sense, then the origins of the 35mm still camera could be summed up in the story of Oskar Barnack, "a mechanic in the experimental workshop of the optical firm of E. Leitz in Wetzlar, Germany" (Newhall 1982:220). Working in the months just prior to the outbreak of World War One, Barnack crafted a device for testing short rolls of 35mm cine film, thereby creating the prototype Leica. In 1924 E. Leitz decided to market a model based on this prototype, with the addition of modifications intended to make it attractive to both professional and amateur still photographers.

This account, based on a S-R (stimulus-response) concept of innovation, fulfills the initial demands of any

tracer research, yet it does so by isolating one particular technical problem instead of placing it within the larger context of need for new inventions. As Raymond Williams has argued with regard to television, the creation of all media technologies is a convoluted process.

The invention of television was no single event or series of events. It depended on a complex of inventions and developments in electricity, telegraphy, photography and motion pictures, and radio. It can be said to have separated out as a specific technological objective in the period 1875-1890, and then, after a lag, to have developed as a specific technological enterprise from 1920 through to the first public television systems of the 1930s. Yet in each of these stages it depended for parts of its realization on inventions made with other ends in mind (Williams 1974:14-15).

Secondly, Williams points out that "the key question, about technological response to a need, is less a question about the need itself than about its place in an existing social formation" (Williams 1974:10). For Williams that formation is one of an "expanded, mobile and complex society" with "problems of communication and control in expanded military and commercial operations" in which the "centralization of political power led to a need for messages from that centre along other than official lines" (ibid.:20-21). Social life within that formation is structured around what Williams calls "mobile privatisation" because it "is characterized by the two apparently paradoxical yet deeply connected tendencies of modern urban industrial living: on the one hand mobility, on the other hand

the more apparently self-sufficient family home" (ibid.:26). Or in the words of Roy Armes, "the spread of the new media is part of a double overall movement in western society embracing both Europe and the United States: on the one hand, towards greater leisure...on the other, towards a greater demand for consumer durables in the home...Both of these, in turn, depend on the growing affluence of the lower-middle and working classes which constitute the base of the media mass market (Armes 1988: 35-36). Photography fulfills the social needs of mobile privatisation because,

The photograph is in one sense a popular extension of the portrait, for recognition and for record. But in a period of great mobility, with new separations of families and with internal and external migrations, it became more centrally necessary as a form of maintaining, over distance and time, certain personal connections. Moreover, in altering relations to the physical world, the photograph as an object became a form of the photography of objects: moments of isolation and stasis within an experienced rush of change; and then, in its technical extension to motion, a means of observing and analyzing motion itself, in new ways - a dynamic form in which new kinds of recognition were not only possible but necessary (Williams 1974:22).

Williams' contentions clearly contradict the view, variously expressed, that technology contains its own telos or inner-directed drive for perfection, or that invention grows out of pure curiosity and the free exercise of the human intellect. Against the belief in technology as an autonomous, self-sustaining force in modern society, one is

asked to consider inventions "not only because they greatly affect economic development, but also simply because they are forms of economic activity" (Schmookler 1966:209). As Armes puts it bluntly, "the impulse behind (technological) development is neither humanitarian, nor scientific, nor artistic - it is a search for even greater profits within the capitalist system" (Armes 1988:36). Support for this view is given by Schmookler's demonstration that there exists a positive statistical correlation between numbers of patents issued for various industries and rates of both capital investment and consumer demand for their goods (ibid.:204-209).

One should be careful however not to substitute a simplistic economic determinism for the equally simplistic concept of technological autonomy. Williams' own definition of the term "formation" stands as a caution against this tendency. What Williams means by this term are "forms of organization and self-organization which seem much closer to cultural production" (Williams 1981:57), including artistic movements and schools for whom profitability is not a primary aim. Since such formations are bound together by common ideological, aesthetic, or intellectual interests, there is no reason not to include movements in technological style, tradition, or orientation (Bijker 1987:172) in this category. Bijker argues that because "it is important not to make any a priori distinction among

different types of social group", especially among those involved in scientific or applied research, it is useful to consider such activity as taking place within a "technological frame" that includes "current theories, goals, problem-solving strategies, and practices of use" (ibid.:171). Thus answers to the needs created by a social formation are often sought inside the technological frame of an earlier era. Conversely, and as in the example of the artistic avant garde, an existing or evolving technological frame may anticipate needs unarticulated by mainstream society. It is for this reason that the concept of need must be understood in the broadest terms possible, and within a history not just of technology but of social life itself. In terms of the 35mm still photographic camera, that history would have to include the following elements:

1. Scientific and Epistemological Factors

The scientific revolution of the fifteenth century has been described as essentially a revolution in the production and use of optical instruments (Ronchi 1957:47). The principle of pinhole images had been known to Chinese and Arabic cultures, but it was not until the Italian Renaissance that glass lenses were used in the camera obscura, a sketching device used by artists (N.Rosenblum 1984:192-193; Schwartz 1985:109-131). The status of the camera at this period is indicated by its inclusion in Giovanni della

Porta's Magie naturalis (1558), as a source of illusions, a curiosity, and a "philosophical toy". Although the ability of lenses to correct eyesight was recognized by Venetian glassblowers and other tradespeople, their use was resisted for three centuries by the upper strata of society. The reason for this was theological prejudice against the imposition of any artificial device between the human senses and the natural world, a prejudice heightened by Galileo's heretical use of the telescope (Ronchi 1970:173-230). Indeed, the history of the lens is also a history of challenges to the medieval world view, as all its major investigators were involved in the overthrow of religion by science. Kepler, who supported the reliability of the telescope by providing a mathematical basis for optical theory, also provided support for the heliocentric theories of Copernicus. Rene Descartes examined the anatomy of the human eye and optic nerve, while substituting rationalist doubt in place of religious faith as a way of knowing the world. Isaac Newton described several optical phenomena and invented the reflector telescope before going on to describe an essentially mechanistic cosmology, one driven by gravity and inertia rather than angels and saints. Popularization of both the telescope and microscope revealed a hitherto unexplored, because unpredicted, macrocosm and microcosm beyond the range of normal human visual perception. With the fall of a theological view of the

world--with the replacement of astrology by astronomy, alchemy by chemistry, natural history by biology, mystical hermeneutics by analytic taxonomy--optical devices were used to provide precise, accurate and reproducible images of new scientific observations. Located at the center of the scientific method, a model of Descartes' call for knowledge that was "clear and distinct", lenses or "objectives" sparked a long search for methods to fix these images.

Throughout the eighteenth century a number of chemists in various parts of Europe experimented with combinations of silver and other metal salts. The stumbling block was in finding a method to arrest their light sensitivity in a controllable way. In 1835 the British scientist Henry Fox Talbot succeeded in stabilizing exposed silver salts by washing them with potassium iodide. Four years later his compatriot, the astronomer William Herschel, substituted the sodium thiosulfate that is still in use as a photographic fixer (Newhall 1982:20-21).

Although scientists were among the first to hail the new invention, they also felt themselves hampered in utilizing it until the end of the nineteenth century, when cameras became light and compact. Reflecting on the usefulness of the first portable plate cameras an early observer enthused that, "It is therefore as plain as its own daylight that, in its ordinary applications, photography

vastly multiplies the winnings of a trained observer; it does all that an accomplished sketcher can do, and does it with unimpeachable accuracy, with a swiftness all but instantaneous" (Iles 1900:294). Enlargements and lantern slides facilitated taxonomic comparisons among flora, fauna, and geological structures; topographic surveys had become easier; cameras mounted in balloons and kites were used by meteorologists (ibid.:295-298). Small cameras gave physiologists the power "to follow day by day, even hour by hour, the development of a bacillus, a mollusc, or a chick" (ibid.:299) or to study nocturnal or shy creatures. Physicians began to employ photography as a diagnostic tool; anthropologists came to prize it as a method for representing "every surviving relic of savage and barbaric life"; "A large group of constructors - engineers, architects, ship-builders - derive help from the photographs taken day by day, which explain in the clearest manner the erection of a bridge, a steel office building, or an armoured cruiser" (ibid.:301-304). The small dry plate cameras also came into extensive use in astronomy, for recording the luminescence and spectra of heavenly bodies in all parts of the sky; "The first photograph of a nebula, that of Orion, was taken by Dr. Henry Draper on September 30, 1880" (ibid.:341). And Roentgen's discovery of x-rays in 1895 was the direct outcome of a small camera dryplate being exposed to an otherwise invisible form of radiation

(ibid.:356-357). In significant ways then, the need for a small high quality camera capable of producing multiple or sequential exposures for scientific purposes had already been established in the years prior to the First World War. The fact that the 35mm camera has taken over most of the functions listed above is attested to by a 1975 ad for Nikon cameras which depicts a marine biologist, astronaut, and microbiologist as users of this equipment (Figure I-A).

2. Needs Arising from the Visual and Graphic Arts

While the scientist Henry Fox Talbot had stabilized photochemical images as early as 1835, credit for the invention of photography is usually ascribed to Louis Daguerre, a Paris scene designer searching for ways to record images for use in a light-and-sound projection theatre known as the Diorama. In 1827 Daguerre had made the acquaintance of Joseph Nicephore Niepce, an inventor interested in engraving and lithography. Their partnership, formalized by contract two years later, led to a successful direct positive process in which, unlike Talbot's method, no intermediary negative was required. Of the two partners Daguerre was better placed socially and geographically, and in any case Niepce's death cleared the way for Daguerre to lay sole claim for himself when he demonstrated the process to the French Academy of Sciences on January 7, 1839 (Newhall 1982: 13-25). The advantages

of photography to artists, designers, and those involved with the reproduction of graphic images was immediate. The official announcement of Daguerre's invention included the following comments:

M.Daguerre has at length succeeded in discovering a process to fix the different objects reflected in a camera obscura, and also, to describe, in four or five minutes, by the power of light, drawings, in which objects preserve their mathematical delineation in their most minute details, and in which the effects of linear perspective, and the diminution of shades arising from aerial perspective, are produced with a degree of nicety quite unprecedented...Draughtsmen and painters, even the most skillful, will find a constant subject of observation in this most perfect reproduction of nature (Newhall 1971:2).

Fox Talbot, Daguerre's rival, had also boasted that "one advantage of the Photographic Art will be, that it will enable us to introduce into our pictures a multitude of minute details which will add to the truth and reality of the representation" (Coke 1972:7). And Edgar Allen Poe expressed his enthusiasm for the new process: "In truth the daguerreotype plate is infinitely more accurate in its representation than any painting by human hands...the closest scrutiny of the photographic drawing discloses only a more absolute truth, more perfect identity of aspect with the thing represented" (ibid.:11).

But behind these comments lies that fundamental change in the aims and formal structure of Western art that began in the revitalized towns of Europe during the thirteenth

and fourteenth centuries. It is during this most urbanized and bourgeois portion of the waning Middle Ages that the growth of commerce and a market economy made their influence felt in an art turning away from religious iconography and toward the possibilities of the material world and all its individual details.

The urban and financial conditions of life which force man out of his static world of custom and tradition into a more dynamic reality, into a world of constantly changing persons and situations, also explain why man now acquires a new interest in the things of his immediate environment. For this environment is now the real scene of his life; it is within this environment that he has to prove his worth, but, to do so, he must know its every detail. And thus every detail of daily life becomes an object of observation and description; not only human beings but also the home and the furniture in the home, costumes and tools, becomes themes of artistic interest in themselves (Hauser 1951:I: 263-4).

Among the chief techniques for producing an art aimed at verisimilitude was linear perspective, first introduced by the Italian artists Giotto and Alberti, and quickly adopted by painters, sculptors, architects, and town planners because it combined a rediscovery of Greek and Roman naturalism with rigorous quantitative methods. The illusion of spatial depth created by linear perspective is based on formalized, measurable relationships between the position of the viewer and the image, the establishment of an eye point and horizon line, and the geometric conver-

gence of lines within the frame. All these relationships are easily codified and hence lend themselves to publication. The impact of this rationalized means of viewing the world and rendering realistic images of it would be difficult to underestimate, as linear perspective was also quickly applied to the field of cartography, where it made possible the Mercator and other projections. Artists were quick to adopt the camera obscura as a sketching device, as its lens acted as a machine for the automatic production of linear perspective (McLuhan 1968).

This new European taste for realism was also manifest in the aesthetic theory of secular institutions such as the eighteenth century French Academy of the Fine Arts. The system of les beaux arts was based on a few central theories, the most important of which was the doctrine of mimesis. Aristotle had written that "Imitation is natural to man from childhood, one of his advantages over the lower animal being this, that he is the most imitative creatures in the world, and learns at first by imitation". The Renaissance interest in imitatio is captured in Leonardo da Vinci's comment, "That painting is most praiseworthy which conforms most to the object portrayed". In his 1747 essay Les beaux arts reduits a un meme principe, which introduced the academic system, the Abbe Batteux argued that as the proper role of music was to imitate the sounds of nature, and that of the theatre was to represent human actions, so

too were the visual arts to closely examine the concrete, non-metaphysical aspects of reality. This idea was taken up almost unquestioningly by Montesquieu, Diderot, and the writers of the *Encyclopedie*, and remained practically unchallenged until the expressionist theories of Romanticism challenged NeoClassicism (Abrams 1952:5-27; Beardsley 1966:62-64; Osborne 1970:74-78). Yet even Romantic artists such as John Ruskin, J.M.W. Turner, and members of the Pre-Raphaelite Brotherhood made use of the camera, much as they were often reluctant to admit to relying on a mechanical instrument (Scharf 1968:89-108). No such hesitation is evident in the schools of Naturalism and Realism that succeeded Romanticism, and among active users of photography one can number Zola, Courbet, and Delacroix (Scharf 1968:119-138). Moreover, the small camera, which could be used to take views from uncommon angles and to freeze or slow down motion, clearly influenced early Modernist painters beginning with Degas. Impressionists, Cubists, Surrealists, and Futurists all made use of the portable camera in their explorations of light, motion, and vision (Scharf 1968:181-195, 198-209, 249-273, 290-293).

3. Needs Arising from Industrialization

The idea of sequential image-making incorporated into the 35mm camera employs the basic principle of the assembly line, with its rectangular shape adapted to continuous

production, fixed conveyances, and end result [exposed but undeveloped negatives or slides] in a form suitable for further mass processing [developing and printing or mounting]. Although the assembly line itself can be traced back to the opening years of the nineteenth century, the close examination of its workings by means of scientific observation did not occur until one hundred years later. The first pioneer in this field was the industrial efficiency expert Frederick Winslow Taylor, and his proteges Frank M. and Lillian M. Gilbreth. Taylor began by timing workers' movements with a stop watch, thereby breaking down the labor process into a series of discreet motions. Writing and lecturing around the year 1900, Taylor used fairly conventional photographs to illustrate what he called a "military organization" of systematized factory processes, and to argue for an analytic approach to the problems of mass production. The Gilbreths went one step further and attached small lights to workers' hands, recording the tracings photographically (Gidieon 1969:96-105, 114-117; Sekula 1983:235-249; Kern 1983:115-116). These early time-and-motion studies soon became internationally known, and in fact the Carl Zeiss optical company introduced them into its Jena factory as early as 1921 (James 1986:152). Thus the industrial process itself, from whose principles the 35mm camera was derived, also created its own need for an instrument capable of examining and recording work from

various angles and perspectives, sequentially and on a repetitive basis. The need for making and storing industrial records and documents photographically is, even today, also fulfilled by this type of camera (Design Engineering, July 1955: 5-19).

4. Social and Political Factors

The rise of the middle class and its democratic sentiments stimulated demands for access to social privileges and pleasures that had formerly been restricted to the aristocracy. Among these was the practice of portraiture.

The development of the photographic portrait corresponds to an important phase in the social development of Western Europe: the rise of the middle classes when for the first time, fairly large segments of the population attained political and economic power. To meet their demand for goods, nearly everything had to be produced in greater quantities. The portrait was no exception: by having one's portrait done an individual of the ascending classes could visually affirm his new social status both to himself and to the world at large. To meet the increased demand for portraits, the art became more and more mechanized. The photographic portrait was the final stage in this trend toward mechanization (Freund 1980:9).

Within a few months of the announcement of Daguerre's invention, photographic portrait studios began to replace those that had been operated by miniaturists and painters. The daguerreotype was especially popular in the expanding hinterlands of America, where small local economies could enrich an itinerant photographer while being unable to support a full-time easel painter (Newhall 1976:33-37).

But the pictorial and emotional formality of the nineteenth century portrait, coincident with a tripod-based camera requiring long exposures and rigid poses, gave way in the 1880s to the informality of "snapshot" shooting. This occurred not just as photographic technology entered the domestic sphere of consumption, but as the institution of the family was transformed.

From its beginnings the snapshot has had two basic characteristics: a constant focus on family life and an informal, causal style that was consistent with the new freedom within the family and derived from the mobility of the hand-held camera. The Victorian portrait had made the photograph readily available to each family, but while the Victorian portrait concentrated on the individual within the family the snapshot now saw the family as an integral unit (Halpern 1974:66).

Insofar as the snapshot was and is a document of family life in order to record the personal appearances, possessions, experiences and accomplishments of that family, it is the inheritor of a bourgeois domestic sensibility whose origins can be found in seventeenth century Dutch painting, with its interest in detail, texture, and scenes of intimacy (Rybczynski 1986:66-75). Because of the clumsiness of their equipment, professional photographic studios were generally unable to take advantage of that sensibility, and derived most of their incomes from photographing the family on formal occasions such as weddings and confirmations. Even if the studios had decided to extend their practice, and had been able to photograph the family in other than its most public appearances, two significant

changes in home life immediately after World War Two would have blocked their paths. The first was influx into the home of stylishly designed durable goods of considerable sophistication, from power tools, barbecues and kitchen appliances to television sets and portable record players. The camera could act as a kind of meta-machine for making pictorial records of these goods at the moment of their acquisition if not use. A Kodak pre-Christmas advertising campaign of 1962 expressed this idea when it began to giftwrap camera outfits with the label, "Open Me First!". Secondly, the establishment of suburbia as a distinctive domestic space away from the downtown core encouraged a sense or ideal of self-sufficiency and independence from personal services now sold at a distance and only at appointed hours. Innovations such as the home permanent, power lawn mower, snow blower and powdered cake mix represented a middle ground or modern compromise between the do-it-yourself spirit and genteel convenience. The compact camera logically fit into such a pattern, especially once colour film became widely available.

Suburbia also represents a complete shift in the concept of the home from that of a locus of production to one of consumption, although the two roles can blur and merge. This can be seen in the trend to do-it-yourself maintenance projects in the areas of automotive and furniture repair, house painting, carpentry and plumbing. By

1956 do-it-yourself had become "the No.1 American hobby, with some sixty million people engaged in it" (Roland 1968:273). Although initially prompted by "the shortage of skilled workmen and climbing labor costs" (ibid.:272), this do-it-yourself phenomena did not represent a return to pre-industrial traditions of artisanal craftsmanship. Rather, in the form of kits, ready-to-install appliances, and self-assembly units, "it has developed rather, in a spontaneous, haphazard way, as a mechanism of distribution of goods and of "canned" services in the home" (ibid.:280). Such projects were closer in spirit to hobbyism, in that "they afford people a better chance for that taste competence which lets them stand on their own feet and strengthens their feeling of individual identity within their group" (ibid.:281) and within an impersonal mass society. A camera of moderate sophistication and cost, with the possibility of many add-on accessories and gadgets, was suitable for this purpose. A camera yielding a large selection of choices for final printing and presentation was compatible with the desire for "taste competence".

A. Information Needs

One of the essential needs of industrial society is for decentralized information gathering and centralized information processing and storage. These functions, as well as mass dissemination, are fulfilled by the mass

media, especially so since the advent of telegraphy and photography (Postman 1985:64-80). Without summarizing the history of news gathering in the modern era, it is especially clear that with the globalization of armed conflict during the First World War, and especially with the attenuation of America's isolationist attitudes, the demand for images of previously unknown locales, situations, and government leaders became evident. It is this period that sees the birth of the picture magazine. Henry Luce's prospectus for LIFE magazine expresses this spirit:

To see life; to see the world; to eye-witness great events; to watch the faces of the poor and the gestures of the proud; to see strange things - machines, armies, multitudes, shadows in the jungle and on the moon; to see man's work - his paintings, towers and discoveries; to see things thousands of miles away, things hidden behind walls and within rooms, things dangerous to come to; the women that men love and many children; to see and take pleasure in seeing; to see and be amazed; to see and be instructed (Luce in Scherman 1973:3).

Picture magazines such as LIFE, LOOK, and others in their genre were inspired by the pioneering efforts of German publishers in the decade following the end of the First World War. Radio broadcasting had become common by that time period, and the nearly instantaneous nature of its news reporting put competitive pressure on newspapers editors. The most enterprising of them responded by expanding their Sunday supplements and including illustrated sections, or by issuing separate monthly or bimonthly news magazines. The news or news-and-feature journals extended

the lifespan of events by providing behind-the-scenes or in-depth coverage of items that were already familiar to the mass audience. Spurred on by the need to make old news interesting, and by advances in advertising, general interest news magazines experimented with typography, lay-out, and graphic design. The collaborative effort involved in this mode of production, reminiscent of the cinema, was responsible for creating the photo-essay, a form in which text and images are printed together as one narrative form. Moreover, the candid look favored in photoessays stood in direct contradiction to the overt propaganda that had been put out by both sides during the war, from official government agencies such as America's Committee on Public Information or Germany's Ufa (Kracauer 1947:35-39). Small, inconspicuous "detective cameras" had been used to take candid street views from the 1880s onward, but these cameras were generally incapable of allowing for more than four exposures. The 35mm camera allowed photojournalists to take more exposures, to reload their cameras easily, and to keep their activities unobtrusive (Newhall 1982:218-225).

Thus the demand for accurate, repeatable, sequential photographic imagery taken from a variety of angles and perspectives, with a relatively inconspicuous and easily transportable camera, was a well-established social need that emerged with particular force in the years fol-

lowing the First World War. Why that need was specifically met with a 35mm camera is due to the monopolistic structure of the international photographic industry at that same period, a subject that will be examined in the following chapter.

CHAPTER II - RESEARCH AND DEVELOPMENT

Rogers sees four distinct phases in the development of new industries based upon significant technological advances:

1. Innovation, a period of very high uncertainty in which trial-and-error problem solving leads to the innovation, with makeshift production in a small facility.
2. Imitation, when there is decreasing uncertainty as many new firms enter the industry and develop their own variants of the basic innovation, which is gradually improved through R&D and by closer attention to marketing.
3. Technological competition, where R&D (research and development) laboratories improve the innovation through process changes, while smaller firms find it difficult to enter the industry and competition eliminates existing firms that cannot succeed in making important improvements on the basic innovation.
4. Standardization, where the ideal product has been found and R&D activities concentrate on improving production and on prolonging the product life cycle, and where technological competition has shifted to price competition (Rogers 1983: 142).

The applicability of Rogers' model to the photographic industry at large, and especially to the 35mm camera in particular, can be tested by examining its economic history in some detail. In his study of the photographic industry, Images and Enterprise (1975), Reese V. Jenkins divides its growth into five distinct eras. The first, lasting from 1839 to 1855, is characterized by the daguerreotype as produced by individual operators. The second, lasting from 1855 to 1880, sees the rise of collodion processes and the

limited-liability corporations that arose to supply them. In the third period, from 1880 to 1895, collodion is replaced by gelatin plates, whose manufacture is regionally centralized and accompanied by monopolistic practices. This is followed in 1895 by the perfection of roll film technology and an extensive horizontal and vertical integration of the industry as exemplified by the Eastman Kodak Company. Finally, both roll film technology and monopolistic integration underlie the invention of cinematography in 1909 (Jenkins 1975:3-4).

The Role of the Patent System

Since neither Roger's model nor Jenkins' history of the history of the photo industry are comprehensible without some reference to the patent system, a brief excursus into its relationship to technological development is in order. As many observers have noted, the patent system is a major anomaly in the working philosophy of free enterprise capitalism.

The place of the patent system in market economies has always been controversial and ambiguous. Patents are, after all, an institutionalized - if temporary - monopoly in an economic system where monopoly is said to restrict production, raise prices and reduce welfare. The patent system is said by some to make the rate of diffusion of best practice technology

socially suboptimal (Pavitt in Bertin and Wyatt 1988:xi).

Letters of patent began as aristocratic privileges, first issued in fifteenth century Venice and sixteenth century Saxony for the purpose of encouraging invention. As such, they had a legal status similar to the granting of exclusive charters to practice a profession or trade, to deal in specific goods, or to collect certain taxes. Consequently patents were resented by guilds because they allowed individual members to advance economically at the expense of their co-workers. After years of dispute and even violent resistance, Britain passed the Statute of Monopolies of 1623, which provided model patent legislation for the United States, France, and other countries (Penrose 1951:2-10). By the first third of the nineteenth century most European powers had established formal patent systems, but with the internationalization of commerce and growth of a "free trade" attitude consistent with political liberalism, England and Germany moved toward repealing their patent laws. Holland actually did so and the Germans also pressured the Swiss toward abolition, at least for certain categories of industrial processes. But the ultimate triumph of the patent system is a significant indicator of the outgrowth of monopoly capitalism from its mercantilist beginnings (Penrose 1951:12-18), just as the decline of the patent system and its replacement by confidential "know-how" agreements signals a new era in the international pooling of sophisti-

cated technology with low-wage production costs (Nunoi and Sengen in Stumpf 1988:153-155).

Bennett (1943) makes the point that certain distinctive features of the American patent system also make it among the most accessible of any nation, thereby encouraging the commercial development of invention. More advantages are given to American inventors than any others for five sets of reasons: (1) patents are granted to true inventors rather than to those with new but undemonstrable ideas, (2) patent approval procedures mitigate against frivolous "prior claim" actions, (3) patent specifications need not be published prior to the issuance of the patent, (4) there are no taxes on patents, and (5) granting of a patent does not require the development of the invention protected (Bennett 1943: 73-78). On the whole then, the American patent system has promoted the development of practical, well thought out inventions, and provided significant economic incentives to inventors.

From Daguerreotype to Collodion Dry Plate

The origins of the photographic industry lie with Louis Daguerre himself. Under an arrangement made with the French government and the Academy of Sciences, Daguerre agreed to

forsake his patent rights and allow for free publication of the process, in return for a life-long pension (Newhall 1982:13-25). Daguerre was careful not to enter into this agreement until his agents had secured patents for him in Britain (Gernsheim and Gernsheim 1968:434-150). This was a shrewd move because Daguerre's rival Fox Talbot had entered into a fairly acrimonious campaign to discredit the French invention and its claims to priority over his own (N.Rosenblum 1984:27-29).

Despite his official renunciation of proprietary interests in photography in France, Daguerre quickly licensed his brother-in-law Alphonse Giroux to build and sell cameras affixed with a seal bearing the inventor's signature. Presumably, Daguerre collected a percentage of profits from this enterprise (Lothrop 1982:1). Within a year of Daguerre's demonstration his process spread to the United States and most of Europe, with the sole exception of Britain where it was restricted by patent protection. In addition to the independent Daguerreian portrait studios that quickly became fashionable, the industry's economic life grew up around the supply houses that provided the silvered plates and chemicals necessary, sometimes along with cameras, lenses, posing stands, frames, and preservers (Jenkins 1975:13-30). Daguerreotype cases, which hold the image and provide a shade under which it can be viewed, are examples of the first mass-produced objects made of plastics, along

with "buttons, combs, pierced and fret work, inlaid work, pens, and penholders" (Bijker 1987:161). Experiments with plastics led to the making of nitrocellulose, a pulp and paper byproduct from which explosives were made. Dissolved in organic solvents, nitrocellulose was also used to produce a syrupy substance called "collodion", useful for water-proofing fabrics and plastering bandages (ibid.:160-161).

In 1851 Frederick Scott Archer of Britain impregnated collodion with silver salts, thereby obtaining three major advantages over older methods. Collodion proved to be much more photosensitive than the daguerreotype and required far shorter exposure times. Secondly, collodion was suitable for both direct positive and negative-to-print purposes, allowing for multiple copies to be made. Herein lay its third advantage, namely that it circumvented Fox Talbot's patent restrictions on negative-to-print procedures. Collodion's major disadvantage was that it required preparation and processing immediately before and after exposure. Photographers using collodion were forced to equip themselves with portable darkrooms (Gernsheim 1986:16; Newhall 1982:58-71, 123-126). But collodion's ability to provide multiple prints also allowed them and others to establish divergent branches of the photographic industry, namely independent paper making and commercial photofinishing (Jenkins 1979:37-42, 45-63). The technological disruption of the daguerreotype trade also prompted a structural change

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in business management so that there was "a gradual withdrawal from the manufacturing sectors of the business and an increased emphasis on the jobbing of apparatus and materials produced by smaller, outside firms that carried the risk in the event of economic depression" (ibid.:47). This splitting of the industry into manufacturing and wholesale components was an important precursor to the emergence of a separate retail segment.

From Dry Plate to Gelatin

The dry plate, more than any other invention except celluloid, gave technical shape to photography as we know it today. Coating emulsion onto a transparent glass support allowed enlargement of the negative, and this permitted the use of hand-held and folding bellows types of cameras, beginning in the 1860s. This portability enabled photographers to range further afield and, together with the invention of telegraphy and the half-tone printing plate, gave birth to modern photojournalism (Postman 1985:70-80; E. Newhall 1982:249-267) and freelance commercial photography (Nye:31-45). The improved light sensitivity eventually achieved with gelatin necessitated short exposure times and thus the introduction of timed shutter mechanisms. Aside

from drawing several watch manufacturers into the photo trade--Seikosha, Wittnauer, Bulova, Ricoh--this helped create the "snapshot", the candid photograph which captures an unguarded instant in time (Newhall 1982:124-129).

The dry plate also transformed both the science of photography and the photography of science. Dry plate negatives could only be processed under conditions of total darkness. Unable to inspect the progress of development, photographers now needed methods for predicting optimum times for various combinations of plates and chemistry. In 1890 two British scientists, Ferdinand Hurter and Charles Driffeld, published the results of their nearly fifteen years research in this area, thereby founding the science of photographic sensitometry. Also known as "densitometry", this systematized study allows not only for the standardized, predictable calculation of exposures and developing times, but for the precise manufacture of films, papers, and photochemicals as well (Newhall 1952:124). Around the same time that Hurter and Driffeld began their investigations, German scientists discovered that the addition of aniline dyes to gelatin extended its responsiveness to various wavelengths of light. As plates increased in sensitivity from "orthochromatic" to truly "panchromatic", photographers soon learned to place filters over the lens in order to manipulate the rendition of colour. The processing requirements of dry plate negatives also allowed for the marketing

of proprietary, brand-name printing papers, and enlarging apparatus (Newhall 1952: 126).

Among their other applications for scientific research, dry plates also came into extensive use in astronomy, for recording the luminescence of heavenly bodies in various areas of the spectrum. Selective optical sensitization with appropriate dyes allowed studies of gases in the sun's corona in 1889, and of infra-red radiation in 1887 (Iles 1900:330). "The first photograph of a nebula, that of Orion, was taken by Dr. Henry Draper on September 30, 1880" (ibid.:341). These experiments were a direct influence on the photographic motion studies carried out by Etienne Marey, a French physiologist who tried various devices to record and analyze phenomena such as the movement of the blood stream, the swim strokes of aquatic creatures, and the patterns of air currents. Marey had tinkered with smoke-blackened revolving cylinders and had even harnessed doves to tracing devices, but in 1873 "an astronomer showed the Academie des Sciences four successive phases of the sun on a single (photographic) plate, while another scientist had invented an "astronomical revolver" to trace the transit of Venus photographically (Giedion 1969:21). Part of the inspiration for this device may have come from the rotating mechanism of the Gatling machine gun, used during the American Civil War (Ellis 1975:21-45). Marey adapted the principle of the revolver to produce what he called

"chronophotographs" of athletes, birds, and objects painted with white strips so as to trace out their motions (Giedion 1969:21-24).

At approximately the same time Eadweard Muybridge, a noted Californian landscape photographer, had been hired to help settle a bet on whether or not a horse had all four legs off the ground at any time during its gallop. For decades, artists such as Gericault, Meissonier and Degas had painted the gallop according to a highly stylized pictorial convention, one in which the legs were either splayed out and away from the body, or only two feet were elevated. In 1873 Muybridge set up a row of cameras along a racetrack, all equipped with high-speed, electromagnetically activated shutters released by the movement of the horse. Although Muybridge recorded an accurate observation unavailable to the human eye, several painters dismissed the results as "not only disgraceful but of a false and impossible appearance" (Scharf 205-227). Not only did the photographs of Marey and Muybridge form important precedents for the industrial efficiency studies of Taylor and the Gilbreths, but as will be seen they were of direct influence on Edison's perfection of the motion picture apparatus.

Economic Implications of Gelatin

The change from collodion to gelatin also marks a fundamental transformation in the organization of the photo industry, from one in which a multitude of individual operators served their local markets, to publically-owned corporations with large manufacturing plants and regional, if not nation-wide consumers. The dry plate concept meant that the majority of amateurs disinclined to chemical procedures could now consider photography as a hobby. The gelatin dry plates introduced in the 1870s were also appealing to manufacturers because they could be readily shipped, stored, and processed at leisure (Jenkins 1975:4ff; Mees 1961:12-18; Newhall 1982:123-4,126,217; N.Rosenblum 245,442-3). Centrally produced and processed after exposure, they could be dispersed over increasingly wider market territories. Moreover the dry plate's properties invited mass production, unlike the operator-made-and-processed nature of collodion.

A typical pattern of economic development in this area is the case of Alfred Hugh Harman (b.1841), a professional photographer who would have been familiar with collodion, but who decided to enter the dry plate business in 1879. British amateurs had pioneered in the search for a dry photographic process, experimenting with materials as varied as "tannin, albumen, gelatin, sugar, milk, honey, glycerine, magnesium nitrate, orange juice, beer and resin",

and in 1861 a Major Charles Russell introduced a commercial tannin process too slow for anything but landscape photography (Taft 209, 210). Working in his basement in a village outside London, Harman perfected a secret recipe for the hand-coating of plates with light-sensitive emulsion. Harman's "Britannia Dry Plate" was successful enough so that, "Within three years of starting, Harman enlarged his premises and took on more staff. Within four, he was building a new, specially-designed factory...By 1891, Harman's factory was claiming to be the largest manufacturer of photographic plates in the world. It was making four kinds of camera plates and six kinds of paper" (Ilford Company History 1979-1989:8-9). The same year Harman formally established the Britannia Works Company, which he sold the following year to a publically-held corporation after an attempt by George Eastman to buy Harman out. In 1902 the company changed its name to Ilford, Ltd., and Eastman again sought control. Ilford eventually became absorbed into the CIEA-Geigy dye and pharmaceutical cartel.

Germany: Cartelization of the Photo Industry

The German and Belgian companies that were to merge as the giant AGFA-Gevaert group in 1964 also originated

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within this general pattern, a pattern intensified by Germany's industrial history. Unlike the United States, Britain or even France, the German Reich's emergence into nationhood was based on a Zollverein or customs union given to tariff protectionism. This heritage reasserted itself in times of financial depression, and Bismarck employed it as a nation-building practice (Barkin 38-41). A highly centralized banking system favoring industrial expansion promoted stock companies in the areas of mining, steel, and heavy machinery throughout the second half of the nineteenth century (Stolper, Hauser and Borchardt 26-29). The German government, aware of the nation's limited supply of natural resources and determined to create European monopolies on strategic materials such as potash, pig-iron, coke and high-grade coal and steel, made the compulsory cartelization of many industries a foundation of its trading policies, although it administered them on a "hands-off" basis (Stolper et al. 46-49, 104-05). Photo manufacturers received two forms of subsidies: "a 2 1/2% levy for all photographic firms, on home sales only, to provide a pool from which payments were made to the weaker manufacturers who could not compete with the stronger", and a subsidy "between 15% to 50%, to underquote foreign competitors, (which) was only applicable in respect of those countries whose foreign exchange was needed by the German State" (NPD, December 1946:76; NYT June 5, 10:1, 1926). The German public educa-

tion system also differed from its French and especially British counter-parts in promoting advanced scientific and technical training. Moreover, Germany's rich deposits of high-quality anthracite coal had encouraged the thriving pharmaceutical and dyestuff industries which employed these chemical engineers and organic chemists. Germany's patent system, one of the oldest in Europe, also rewarded technological innovation and supported the establishment of trade monopolies based on scientific expertise (Penrose 2-18).

In 1867 two chemists, Paul Mendelsohn-Eartholdy and C.A. Martins, founded the "Actien-Gesellschaft fur Anilin-Fabrikation" in a suburb outside of Berlin. Spurred on perhaps by Hermann Vogel's work at the Berlin Hochschule with optical sensitizing dyes (published in 1873), one of their own researchers discovered the suitability of parahenylene diamine for the fine-grain negative development required by dry plate processing. In 1888 AGFA established a separate photography department, and within three years its Momme Andresen also invented Rodinal, the world's first "universal" proprietary film developer, still in popular use today. AGFA's success in this area led to entry into dry plate manufacturing in 1893, and sheet film production a few years later. This expansion allowed the company ready technical and financial access to roll and cine film markets as those opened up in the early nineteen hundreds. In 1906 AGFA bought out Farbenfabriken Bayer, a photographic paper

maker and chemicals manufacturer. In 1925 AGFA and all other large chemical firms in Germany were temporarily amalgamated into the huge and infamous cartel I.G. Farben, a move which, along with the purchase of a photofinishing equipment manufacturer, solidified the company's vertically integrated control over all phases of the industry.

The Gevaert side of this conglomerate was named after its founder, an Antwerp portrait photographer who also constructed emulsion-coating machinery. In 1894 L.Gevaert Cie. began mass producing dry plates; nine years later it used this expertise to embark on paper manufacturing. By 1920 the firm's expansion required conversion into Gevaert Photo-Producten N.V., which also put it in a position to market roll, sheet, cine, and X-ray film by the decade's end. Between the two of them AGFA and Gevaert dominated the European market in sensitized goods, mostly as a result of improvements and innovations in film, paper, and photographic chemistry (AGFA-Gevaert Company History 1989:6-9).

America: Eastman And Industry Integration

The American model, exemplified by the telegraph and telephone, did not see the professionalization of the process of invention until several of the crucial discoveries

had been made. George Eastman [1854 - 1932], the model for Edwin Robinson's poem "Richard Cory", began as a bank clerk and amateur photographer who entered the dry plate business as it was just beginning to come to fruition. After personal experiences with the noxious fumes and irremediable stains associated with collodion, Eastman began reading the British photography journals in which dry plate formulas were first given. Experimenting on his own, Eastman achieved results that brought him to the attention of professionals in Rochester, and eventually to a contractual relationship with E. and H.T. Anthony and Company, a firm with a strong financial foundation originating in the daguerreotype business. In 1879 and 1880 Eastman secured the patent rights on a mechanical method for coating plates in England and America respectively (Taft 378-383).

Then, as throughout his career, Eastman's timing was fortuitous. Although many practitioners had complained of its long exposures and inordinate costliness, the Photographers' Association of America held an official trial of the new process in 1881, to which Eastman did not submit samples although three of his many rivals did. This trial revealed the serious defects of Eastman's competitors (Taft 368-372). Like the others, Eastman used gelatin as a binder for his emulsion, which had the advantage of boosting film sensitivity to light. The early plates were subsequently prone to accidental fogging from pinholes in plate holders,

camera bellows, or improper darkroom safelights. "In addition, difficulties of manufacture - unevenness in coating, dust spots, large variations in sensitivity and uniformity of size - were encountered in the early years of production, so that it was not until after 1883 that operators were beginning to regard the dry plate as firmly established" (Taft 373).

Nevertheless Eastman quickly made a name for himself in terms of quality control and reliability, and his association with Anthony gave him a decided advantage in the marketing of the plates that were increasingly favored by amateurs and professionals. Demonstrations of the stop-motion effects and candid portraiture made possible by the high-speed emulsion, and the creation of small and lightweight plate cameras gave birth, in effect, to the mass amateur market that put Eastman's products into demand. In 1883 business expanded to the point where Eastman felt justified in building one of the first of the electrically powered factories (Taft 383). That same year, feeling the effects of competition, Eastman became instrumental in founding the Dry Plate Manufacturer's Association "with the explicit purpose of trying to stabilize dry plate prices" (Jenkins 1975:98). He also began to think about ways to handle supporting materials far less rigid than glass, prompted by his 1884 invention of a paper coating machine. By 1887 Eastman was also making bromide ("developing out")

printing papers, enlargers, and other darkroom equipment; providing enlarging and printing services for dry plate users; and hiring his own retail sales staff in the United States and Britain (Jenkins 1975:70-73,83,105,109). Finally the Eastman Dry Plate and Film Company entered into litigation with Anthony over patent rights, thus severing their relationship and bringing Eastman into full independence (Taft 391). Eastman's rapid metamorphosis from advanced amateur photographer into large-scale manufacturer was clearly due to his astute understanding of the relation between technological innovation and the monopolistic controls afforded by the patent system.

The Origin of Rollfilm

The crucial invention for Eastman however--the crucial invention in fact for the future of photography, the cinema, sound recording, video and computers--was the coating of gelatin onto a flexible backing. Marey, amongst others, had used paper film "as a means of obtaining long, continuous sequences" of images (Jenkins 1975:265), and several other scientists worked in the 1880s with paper negatives which, once developed, were treated with oil in order to make them transparent enough for printing. A decade

earlier, Leon Warnerke (1837-1900) had constructed a roller slide system for holding stripping film. Although it was widely publicized from 1875 onward, Warnerke could not boost the light sensitivity of the film nor overcome the inconvenience of an emulsion which, once exposed, had to be removed from its paper backing and transferred to a glass plate for enlargement (Jenkins 1975:100-101; N.Rosenblum 447).

In 1883 Eastman entered into partnership with a mechanical engineer, William Walker [1846-1917], for the purpose of perfecting a film-holding and film-making system. This collaboration proved especially fruitful and by the following year they were ready to patent two of their own paper stripping films, a roll film and plate film holders, and paper coating machinery (Jenkins 1975:85-105). The commercial success of these inventions led to the incorporation of the Eastman Dry Plate and Film Company with its own sales staff and retail stores, and to the opening of European branches which Walker went on to direct. They also led to the first of a series of personal and legal disputes over patent rights, partly embittered by the intense price-cutting wars taking place in the gelatin plate and paper sectors. These disputes fostered in Eastman a drive for buying up rivals for the sake of their machinery, their personnel, and their technical secrets. In 1886, for example, Eastman began to offer printing and enlarging services to amateurs. Later, flushed with the commercial success of his amateur

cameras, he would take over Velox paper and paper-making equipment [1899], Wratten & Wainwright for their filters and lenses [1912], and a number of the small optical and photographic firms flourishing in the Rochester area around the turn of the century (Mees 12-18, 37-42; Jenkins 1975:85-97, 128, 188ff.). Eastman also began hiring research talent, both as part of a patent protection program and as an adoption of technological innovation as official company policy. In 1890 he set up his own material testing facility, primarily because film-making and processing are dependent on chemical purity. This facility, the core of the Eastman research lab that opened in 1913, was largely staffed by chemistry and engineering students from M.I.T., Columbia University, and the University of Rochester. One of these graduates was to be instrumental in Eastman's perfection of a film based on celluloid instead of glass (Mees 43-58; Jenkins 1975:118-119).

While the cellulose nitrates had been discovered by German chemists in the 1840s, celluloid as a distinct substance was invented by the American John Hyatt in 1869, and it quickly found commercial application because of it is easily molded. As with many other inventions, a number of experimenters made contending claims for priority in perfecting the use of celluloid for a film base. The first of these was Hannibal Goodwin, a clergyman who applied for a patent on a "Photographic Pellicle and Method for Producing

Same" in 1887; the patent was not granted until eleven years later and was assigned to the Ansco Camera Company of New York State. In 1888 John Carbutt of Philadelphia began trials of sheet celluloid, and that same year Wallace Gould Levinson applied for a patent, eventually granted, for similar work. The following year an Eastman research chemist named Harry M. Reichenbach applied for a patent for a method of producing transparent sheets of celluloid suitable for coating with photographic emulsion; Eastman patented machinery for doing so three years later. This multiplicity of claimed inventors led to a series of legal battles between Eastman and Goodwin, in which Goodwin's estate was the winner; and between Eastman and Reichenbach, in which the latter left to work for rival firms (Theisen 1967:118).

The financial stakes in these disputes were extremely high, as can be seen in the enormous sales of Eastman's first amateur "detective" camera, the famous Kodak Number 2, the unique and onomatopoeic name especially coined for its resemblance to the sound of the shutter release (Sekula 1984:101). Eastman had begun marketing the camera in 1888, when it was based on stripping film and his and Walker's holder. His famous slogan, "You press the button and we do the rest!" held true because the Eastman processing facilities took care of the laborious tasks of stripping the film and preparing it for enlarging. As part of a boldly successful marketing strategy Eastman also offered the camera

pre-loaded with a 100-exposure roll that was processed in Rochester and replaced for a total price of \$25.00 (Newhall 1982:129). At the same time the slogan reflected the lengths to which Eastman had undertaken a horizontal and vertical integration of the photo industry to the extent that every aspect of the manufacture and operation of the box camera was under his control: film and film-making, camera manufacturing, and all aspects of film developing and photofinishing. The only exception was the lens for the Kodak, supplied under a mutual benefit agreement by Bausch & Lomb, a Rochester optical company.

Edison and the Movie Apparatus

Meanwhile, in another area of innovation, Thomas Alva Edison [1847-1931] was turning his attention to the idea of "an instrument which does for the eye what the phonograph does for the ear, which is the recording and reproduction of things in motion, and in such form as to be both cheap, practical and convenient". He had filed a caveat [a notice of intention to apply] with the Patent Office to this effect in 1888 (Josephson 1959:385-6). Two years earlier Eadweard Muybridge had visited Edison and shown him photographic studies of athletes and animals, most of them produced in a research lab at the University of Pennsylvania (Josephson

384; Clark 1977:172-173). Edison at this time was preoccupied with perfecting the phonograph, along with an ore-extraction process, the creation of the Edison General Electric Company, and his trip to the International Exposition in Paris. Moreover his ambitions were for an apparatus that would combine motion pictures with sound. While in France he met Etienne Marey, whose own motion studies were more advanced than those of Muybridge in the sense of using an apparatus that recorded the images on rotating glass plates. A visit to the French physiologist's laboratory convinced Edison that "...Marey had the right idea", and inspired the American inventor to make tentative designs during his return trip (Clark 175).

While Edison had been distracted from personally starting work on his Kinetoscope, he had already drawn on his New Jersey staff for preliminary explorations. In 1887 one of his assistants, W.K.L. Dickson, began work, behind closed doors, on the moving cylinder machine described in Edison's caveat. Dickson's efforts were directed toward an apparatus for small, even microscopic 1/16th inch plates. Although this approach was quickly discarded, it did lead Dickson and Edison away from glass plates in favor of the sheets made by John Carbutt. Unlike his patron, Dickson's interests lay in a screen projection system, and upon Edison's return from Europe he apparently demonstrated a sound synchronized "kinetophonograph". Edison, drawn instead to

the less complicated, peep-box "kinetoscope", nevertheless realized the advantages of celluloid. Upon learning of George Eastman's roll film cameras, Edison sent Dickson to Rochester to special-order long strips of this light but tough material. "When Edison was shown these long strips, according to Dickson, his smile was 'seraphic'. He exclaimed, "That's it - we've got it - now work like hell!!" (Josephson 387; Clark 173-174).

Standardization of the 35mm Format

Oddly enough, it was at this point that predictive powers of both Edison and Eastman failed them. Despite Dickson's ambitions, Edison steered away from a film projection system. Preoccupied with the ore-crushing scheme that would drive to near bankruptcy throughout the 1890s, and comfortably familiar with the "phonographic parlors" from which he was already collecting royalties, Edison's personal belief was that only a peep-show device would be commercially viable, rather than a projection-and-screen system. Concentrating his efforts on the "Kinetoscope", a cabinet showing moving film strips, Edison even failed to patent this device until two years after its introduction at the Chicago World's Fair. Edison also delayed securing his

claims to the camera, or "kinetograph", he and Dickson had built. Yet the first trials with these devices brought Edison to call for larger apparatus and in 1890 his assistants constructed a motion picture camera capable of exposing celluloid film of 1 3/8th inch width. Allowing for the space taken up by the perforations needed for an intermittent claw transportation mechanism, the image width was 35mm (Josephson 385-389).

For his part, Eastman concentrated on his line of amateur cameras and also failed to see the potential in Edison's ideas. In 1891 Eastman lost exclusive rights to supply Edison with film to a photomanufacturing rival, the Blair Company, which was nevertheless committed by Edison's equipment to the 35mm format (Jenkins 1975:267). Eastman's exclusivity was not restored until 1908 (Clark 178). By that time Eastman's annual cine film sales were worth more than \$1.4 million annually and accounted for 16 percent of the firm's yearly sales.

Standardization of the 35mm film format emerged out of the particular structure of the early film industry, with its separation of production and distribution/exhibition components. Although not personally interested in film as means of popular entertainment, Edison set up the world's first and for a few years only film production studio in 1893, nicknamed the "Black Maria". The first productions were simple studies of motion, and were shown under licencing

agreements in kinetoscope parlors beginning in New York City in 1894 (Clark 176). By 1909 there were some eight thousand of them throughout the United States (Josephson 400). None were contractually bound to showing only Edison's productions, and this loophole did not go unnoticed. But the limitations of these "peep show" arrangements were soon obvious to owners such as the Lantham brothers of New York. Briefly joined by Edison's former assistant Dickson they created the Panoptikon screen projection system (Jenkins 1975:272). With declining attendance in kinetoscope parlors and the advent of several projection systems in the United States, Britain and Europe, Edison finally moved to patent a "vitascope" in 1896, but not before competitors under the names of Biograph, Vitagraph, Essanay, Kalem and Armat (Josephson 410) either took advantage of Edison's tardiness or defied his patents altogether. Edison's chief rival, the Lumiere brothers of Paris, were unhampered because Edison delayed in securing European protection. In 1894, with a strong background in the dry plate business, Lumiere Freres patented their "kinora", identical in most every way to the Edison projector they had copied, retaining the 35mm film width but slightly modifying the sprocket hole system (Jenkins 1975:272). Edison finally took his patent claims to the United States Supreme Court, which ruled in his favor in 1907. By that time however the combination of ease of imitating Edison's machine and the early establishment of a

widespread, profitable, and non-exclusive distribution system for films made it unnecessary for competitors to create or utilize alternative film formats. When Edison combined with many of his rivals to form the Motion Picture Patents Corporation in 1908, the possibility of developing such formats commercially was all but eliminated (Josephson 401). Moreover, because Edison had failed in perfecting a synchronized sound system, there were no language barriers to surmount in the area of film exhibition. With the possibilities of a truly international entertainment commodity now on their hands, film producers, film exchange owners, and film theatre operators saw little reason to resist standardization of the film gauge.

Like Edison, Eastman had also been slow to exploit the new technology. In the early months of 1896 Kodak was asked to supply 35mm cine stock to a British studio, but refused on the grounds of economic impracticability. By April however the company had reassessed the situation and entered the market despite rivalry from British, Swiss, and other American companies (Barnes 191). Although initially rejected as too thin for cinematography, Eastman's 35mm film products quickly routed their competitors. Eastman's financial strength in still photography, his high standards of quality control, and enormous technical resources and emulsion-coating experience allowed Kodak to enter into negotiations with Edison's managerial staff in 1907, for the pur-

pose of pooling patents and regulating the motion picture industry. "...on 1 January 1909, formal agreements between Eastman Kodak, the Motion Picture Patents Company, George Kleine (Chicago), American Mutascope and Biograph, and the Edison Manufacturing Company were concluded" (Jenkins 1975 :285). Although many film theatre owners attempted to fight this industry domination by importing French-made film stock, Eastman fought back with the attempted introduction of an inflammable acetate safety film in 1908. Three years later Eastman renegotiated with the cartel for permission to supply the independents. These negotiations put Kodak in a protected position as the Motion Picture Patents Company fought a series of losing anti-trust battles (Jenkins 1975 :287-292). With the growing popularity of film as a mass medium, Eastman took and held a commanding lead over other makers of basic cine materials. Thus by the time of the First World War, the burgeoning international film industry was committed to leaving the 35mm standard largely unchallenged.

Photography and the Professionalization of Invention

The history of photography, especially in its transition from gelatin dry plate to flexible roll and cine film, coincides with the growth of monopolistic concentrations in

many areas of mass communication. Moving from largely amateur innovations to competitive imitation and final standardization, inventions such as the telegraph and telephone were soon taken out of the hands of their original discoverer and developed by financiers and businessmen into rationalized industries. From the point of view of the process of diffusion of inventions, the period 1880 to 1920 marks a critical change, namely the transition from lone amateur invention to highly capitalized and professionalized research efforts. During this period large companies such as Kodak were not yet subject to anti-trust action. Consequently, fierce economic competition was conducted on the basis of monopolistic patent control over technological innovation, rather than via the intense marketing efforts that began in the 1920s.

The professionalization of invention began to gather momentum in the United States in 1862, with the passage of the Morrill Act which provided financial support for colleges of agriculture and the mechanical arts (Noble 1977: 24). This legislation was partly in recognition of America's long-standing shortage of skilled labor, there never having been a European system of advancement in skill from apprentice to journeyman and master. Despite resistance on the part of academic humanists and "pure" scientists, university-level schools of applied or industrial science and engineering emerged throughout the 1870s and 1880s, the same

period in which professional engineering associations were also formed (Noble 24-36). These associations lobbied for standards of professional training and performance, and for the establishment of standard weights, measures, and materials; their memberships were largely comprised of corporate employees (ibid.:71-75). It was from this pool of formally educated technologists that industrial research laboratories drew upon as soon as they were established, beginning with Edison's GE Laboratory in 1900. Graduates of MIT, Yale, Johns Hopkins, Columbia, and many state universities were drawn into the AT&T laboratory [founded in 1907], the Westinghouse research department [founded in 1903], and the Eastman Kodak Industrial Research Laboratory [founded in 1912] (Noble 96). These facilities represented an important turning away from the Romantic concept of invention as the result of a spontaneous flash of inspiration, and a newer belief in a rationalized, systematized process of investigation. Nevertheless, they were well behind their European counterparts as the experience of the First World War would show.

The Photographic Industry and World War One: Optics

The end of the First World War found the photographic

industry economically strengthened, despite the widescale diversion of nitrates from film production and into the making of high explosives. The gains, on the whole, were technological in nature, as both sides realized the strategic importance of high quality optics, and photographic documentation to modern warfare. Superior fire control and range finding equipment was of decisive importance to Germany in the Battle of Jutland [31 May 1916], the war's major naval engagement. Gun sights, periscopes, binoculars and bomb sights came into wide use as combat expanded on land, sea, and into the air. Shipping embargoes stimulated research into the development of substitute materials. The war also cemented the relationship between corporate research and government policy, which tended to eliminate those firms too weak to compete for ordnance contracts.

Eastman Kodak's research lab had grown, by the time of U.S. entry into the war, to a staff of over 40 employees supported by a major technical library and an annual budget of some \$127,000 (Mees 50). The American armed forces drew on this expertise by contracting out work to Eastman in the areas of training for aerial combat, the improvement of naval fuel, anti-submarine camouflage, and the supply of organic chemicals (ibid.:55-57,281-285). This involvement in the war effort may have helped soften the government's antitrust attitudes, so that Eastman was allowed to settle out of court, and fairly much on its own terms, when faced

with Justice Department demands for divestiture in 1921 (Jenkins 1975:321-322).

In Germany, the Carl Zeiss Company had already established both internal and international dominance in the making of microscopes, telescopes, altimeters, spectrometers, range finders and other strategic, high-quality optical instrumentation. It had done so by mastering the twenty or so laborious operations needed to produce, test, and assemble high-grade optical components (Zschommler 1984), whereas countries such as the United States had evolved glass industries based on the large scale, mechanized and unskilled production of plate and pressed glass products (Davis 1949). Zeiss' major optical breakthrough had come in 1896, with the commercial production of a camera lens free of astigmatic distortion. This was followed up in 1902 by the Tessar lens, a now classical optical instrument corrective of other distortions (Meinwald 31). The company soon forged close links with the German military establishment and "even before the (first) war, more than one-half of all Zeiss production went to the German Army and Navy" (Borkin and Welsch 1943:279). Following the pattern set by other cartels, Zeiss entered into a series of contractual relationships with foreign companies in order to safeguard its world-wide monopoly. In 1904, for example, Zeiss expedited the merging of Bausch & Lomb with the Fauth Instrument Company, the latter an optical defense contractor for the

U.S. Navy. Three years later Zeiss appointed Bausch & Lomb as its exclusive agent in the U.S. while buying up 20 per cent of B & L's stock. This arrangement was terminated during the war and Zeiss patents were impounded by the Alien Property Custodian, but its effect had been to retard the American development of optical glass to the point where "the Navy issued appeals to the public to contribute field-glasses and other usable optical devices. The Alien Property Custodian later uncovered sizable stores of telescopes, binoculars, and other optical instruments, which had been placed in warehouses by German interests" (Borkin and Welsh 281).

The reparations extracted from Germany after World War One were taken partly in the form of merchandise, a situation that soon enriched compensated industries such as those engaged in photographic manufacturing (NPD August 1945:21). Consequently by 1921 another secret Zeiss-Bausch & Lomb agreement had been signed so as to give the German firm control over all world markets in optics, reserving the United States to B & L in return for a royalty on all sales of military equipment regardless of Zeiss' participation in their development. This contract gave Zeiss access to all B & L laboratories, technical papers, and military sales records. Moreover, it gave Zeiss leverage such that it could influence B & L to refuse major ordnance orders from England and France during the German rearmament that became

obvious by 1935. The arrangement was only broken by anti-trust action taken against B & L by the U.S. Department of Justice in 1940. Incidentally, Bausch & Lomb's response to the indictment was to unsuccessfully threaten a slow-down of optical supplies to the Navy's cruiser program (Dorkin and Welsh 281-288; Reimann 250-255). Zeiss' behavior abroad was also in keeping with its efforts to integrate the entire German photographic industry into one enormous cartel, and branch plants were established in Austria, Hungary, Latvia, and even France. In 1926 the Zeiss Ikon company was formed to coordinate the prices and manufacturing practices of C.P. Goerz, an optical concern, and Ica, Ernemann, and Contessa-Nettel, Europe's largest camera manufacturers (NYT Sept. 20, 35:4; Aug. 30, 19:2, 1926). Two years later it acquired another optical supplier, along with the Goerz Photochemical company (Meinwald 31-32; Borkin and Welsh 274-275).

The Photographic Industry and the First World War: Chemicals

The war also accelerated changing trends in the international chemical industry, particularly in Germany. Before the war organic dyes of the type also associated with photochemicals were among that nation's leading export products. From many standpoints this was disadvantageous as these dyes

are difficult and expensive to produce, become rapidly obsolete, and engender worldwide price competition. German dye manufacturers entered into formal trade associations in the opening years of the twentieth century (Hayes 7-15; Haber 124-165, 247-278). AGFA for example joined with BASF and Bayer in 1904 to share profits and regulate costs and markets. In 1917 all the major German dye makers--who by then controlled some 90 per cent of the world market--formed an I.G. (Interessengemeinschaft) to eliminate domestic rivalry. Yet overproduction during wartime and the Weimar recession and reparations burdens strained the industry's financial strength and elicited its reorganization. In December of 1925 AGFA, Bayer, BASF and other members of the old I.G. reformed and merged into one of the world's largest cartels, I.G. Farbenindustrie, "encompassing one core firm and more than fifty semi-autonomous dependents", and housing the world's then-largest patent library (Hayes 16). Although AGFA was not the only member of the cartel involved with photography, the company's name went on all film, paper, chemicals and camera products made by any affiliate of I.G. Farben (Haber 285). By the time the Second World War broke out, I.G. Farben was supplying Nazi Germany with some 90 percent of its foreign exchange and the bulk of its war preparations materiel (Higham 152).

In the United States the cartel began to operate in 1929 under the name of American I.G. Chemical Corporation,

with direct ties to Standard Oil of New Jersey, the Ford Motor Company, the National City Bank, Winthrop Chemical, and the Bayer Company. In 1939 it changed its name to General Aniline and Film (GAF) which then controlled Ansco Photographic (an old Eastman competitor) and the Ozalid blueprint works. Using AGFA, Ansco and Ozalid as covers, GAF was able to provide industrial and military espionage to German intelligence. Despite some measure of public outcry, the Roosevelt administration never took serious action against GAF, not even pursuing three antitrust actions initiated in 1941 (Higham 151-173). GAF's interests were protected by Standard Oil with which it had made a secret agreement in November of 1929, similar to that made between Zeiss and Bausch and Lomb. In return for the promise of new patents on synthetic oil and chemical products (some of which never materialized), Standard Oil paid thirty million dollars and pledged itself to a mutual-benefit agreement dividing up the world market. Under the terms of the arrangement, Standard Oil was enjoined from undertaking any synthetic chemical production (Reimann 42-53). Although this seriously frustrated the growing American military demand for synthetic rubber and special aviation fuels, both these and other chemical products were supplied to the Nazis throughout the war via Standard Oil's Latin American subsidiaries (Higham 53-82). The research restraints on Standard Oil and the blockade of German organic chemicals provided

opportunities for Eastman and other industrial laboratories to intensify their own work in the field of chemical engineering. As will be discussed below, the hostility generated toward the German photographic industry during the Second World War was also a factor in the commercialization of photographic equipment before, during, and after the cessation of hostilities.

Birth of the Japanese Photographic Industry

The war's effects on the Japanese photographic industry were indirect and not fully seen until several years after the armistice. Wartime interference with the import trade allowed the Japanese industrial base to expand so that both horsepower expenditures and the factory labor force doubled during the conflict (Yamasaki and Ogawa 1929: 339). Isolation also prompted technological innovation, much of it initially done by a national scientific laboratory. Officially founded in 1917, the Institute of Physical and Chemical Research (Rikagaku Kenkyujo) received both imperial and business support. In 1936 it began marketing photographic paper through its commercial offshoot, Riken Kankoshi, later known as the Ricoh Company, a manufacturer of 35mm cameras. This expertise underlay Japan's post-war leadership in the

making of celluloid (Asahi 1939:81). Shipping embargoes also allowed Japan to compete in the supply of glass, where Germany and Belgium had previously been dominant. The production of both sheet and plate glass are highly profitable ventures, and the entry of the Asahi Company [parent to Asahi Pentax] into the market gave it the experience and capital necessary for further technological refinement (Carus and McNichols 1944: 204-205). During the war Japan was not sufficiently advanced in optics to supply its own armed forces with binoculars, but by 1918 enough engineering skill had been accumulated so as to enable Japan to compete in the light machinery products associated with photography, especially watches and medical, surgical, and scientific instruments (Yamasaki and Ogawa:271, 343).

The post-war period saw a marked expansion of the domestic, Japanese amateur photography market, one which continued into the first years of the Second World War (see Graph II-A, based on Shinohara 1967:250). Photography had been introduced perhaps as early as 1840, and was adopted as a Europeanism (Braive 1966:22). The first studios were established in the 1860s, in Yokohama, Tokyo, Osaka, and Nagasaki, and the military set up its own photographic units shortly thereafter. The European cultural influence came in around this time as well, by way of Felix Beato [d.1903] and his rival the Baron von Stillfried. Beato "began the tradition of coloring photographs by hand, employing Japanese

artisans who had formerly colored ukiyo-e prints...(he) also defined the genre of the carefully composed photograph of Japanese occupational types...and it is to him that we owe the oldest surviving photographs of the Japanese landscape" (Worswick in Itasaka 1983:185). At first the trade was entirely dependent upon foreign suppliers, and the leading importer of the 1870s was Rokuemon Sugiura, founder of Konishi Honten. In 1882 the company began experimenting with its own camera production, and in 1903 it marketed a hand-held instrument called the "Sakura". Meanwhile, the Rokuosha company was founded in 1902 for the purpose of producing photosensitive goods, including cine film. Its brand, also called "Sakura" ("cherry"), came out in 1929. Seven years later the two firms merged into a single joint stock company under the title of Konishiroku K.K., renamed Konishiroku Photo Industry in 1943 and more commonly known as "Konica". By 1940, Konishiroku was already engaged in the making of color film.

The European influence also extended into photo engineering as well. From 1928 to 1931, German expertise was called on in the coupling of imported lenses and shutter mechanisms to Japanese camera bodies; this expertise would later enable the Japanese to produce scores of imitation German camera bodies. Increased confidence in this area led to the formation of another joint stock company, Chiyoda Kogaku Seiko K.K. in 1937; in 1962 this firm reverted to its

previous name of Minolta. On the other hand, military and other requirements for binoculars and microscopes led to the founding of the Takachiho Manufactory [parent of Olympus Optical] in 1919. A joint venture between the Imperial Navy and a Mitsubishi subsidiary was named Nippon Kogaku K.K. [later the maker of Nikon cameras] in 1917. By the late 1930s the Japanese photographic industry had expanded to the point where the Fuji Film Company, an outgrowth of Dainippon Celluloid, had begun to make the nation an exporter of photosensitive goods to the Far Eastern market, and especially to the enormous number of Chinese amateur snapshooters (NYT Oct. 7, II, 2, 7:6, 1923; O.E. March 1957: 135-147; Dec. 1963:687-695; Nov. 1966:674-680; Jan. 1968:50-57; Feb. 1970:38-53). Consequently, by the time of the Korean War, when Japanese optical goods first made their mark on the American market, Japanese producers had years of significant experience with camera manufacturing and 35mm film production.

In the era that the 35mm still photographic camera was invented, the international photographic industry had already undergone three of Rogers' stages of technological development, moving from small-scale innovation to organized and highly capitalized research. An important degree of standardization had also been reached by the universal adoption of the 35mm cine format. By the 1920s then, busi-

ness competition would shift ground and move toward marketing strategies and pricing competition; technological innovations would arise largely in support of those policies. The development and commercialization of the 35mm still photographic camera will be examined in the following chapter.

CHAPTER III - DEVELOPMENT AND COMMERCIALIZATION

Rogers' model of diffusion of innovation makes a distinction between the stages of development and commercialization by defining the former as "the process of putting a new idea in a form that is expected to meet the needs of an audience of potential adopters" whereas "commercialization is the production, manufacturing, packaging, marketing, and distribution of a product that embodies an innovation" (Rogers 1983:140,143). In the case of the 35mm still camera this distinction is of limited validity since, as will be seen, the two activities are closely interwoven. Moreover, in a capitalist society distribution of innovation takes place chiefly through the marketplace. But as one empirical study confirms (Duncan 1981), the marketplace for cameras does not fit the model proposed by classical economics, i.e. that of rational consumers making informed decisions based on close product and price comparisons. Wide price differences for models of seemingly equal quality, plus the above-average technical sophistication needed to assess the product, mean that the market is skewed by factors other than those envisioned by the model of "perfect" competition. As will be seen, factors such as design, aesthetics, national origin, and advertising and promotion, all play important roles in the commercialization of the camera.

Marketing Strategies: Eastman Kodak

The pattern of commercialization of the 35mm camera was set at a time when industrial hegemony could no longer be secured by the protection of the patent process. Although patents permitted the growth of monopolies and the professionalization of research, they also resulted in costly and protracted law suits often not settled until the invention in dispute had been rendered obsolete. Moreover, the patent system required detailed disclosure, including working diagrams, of techniques that companies might often preferred to keep secret. Thirdly, the monopolies created through patented innovation were subject to antitrust action, especially in the United States of America. The Eastman Kodak Company, a prime subject for litigation, was denounced as a "camera trust" by the Justice Department in 1913, and was forced to divest itself of several subsidiaries (NYT Jan. 10, 3:5; June 10, 8:2; July 16, 9:4, 1913). The following year it also lost a long-standing action in the Court of Appeals for control over celluloid patents (NYT Mar. 11, 22:1; Mar. 12, 5:2; Mar. 17, 2:3; Mar. 27, 1:2; Mar. 28, 6:5, 1914). The company briefly considered setting up manufacturing facilities in Canada to avoid

Sherman Act prosecution (NYT, Jan 9, 3:6, 1914) which it knew it would face throughout 1914 (NYT May 8, 6:7; Nov 9, 11:5, 1914). It simultaneously dealt also with a "fair trade" suit brought by retail dealers who alleged that Kodak black-listed some of them (NYT Apr. 28, 17:5; May 28, 24:3; June 24, 13:2; June 26, 17:8, 1914); an anti-trust suit brought by the Hall Camera Company (NYT July 15, 10:1, 1914); and a suit by the Celluloid Company for patent infringement (NYT Mar. 29, 5:4).

Eastman's response was grounded in the company's experience of the "Paper War" of 1893-95, during which gelatin paper makers undercut each others' prices in order to gain control of this new market. Eastman refused to engage in price-cutting and maintained its profit margin by introducing lesser quality, lower price papers (Jenkins 1975: 91). Just as the Ford Motor Company eventually moved to give customers a selection of colors aside from black, Eastman discovered that minor variations of one product drew and sustained market interest and prompted the idea of customer choice. These small innovations and improvements also discouraged imitation (ibid.:184). As can be seen from Graphs III-A and III-B, Kodak's policy has been to issue new product lines on a regular basis, and to replace older lines within a brief period of time. Excluded from the graphs are the even smaller distinctions in product line made by Kodak, as for example the numerous model

1 differences achieved by fitting identical camera bodies with various lenses, viewfinders and shutters (McKeown and McKeown 1981).

A second approach to marketing taken by Kodak has been through making its own sales promotions. The company created special Boy Scout and Girl Scout models in 1929, by inscribing the appropriate insignias on otherwise standard cameras (ibid.:79); during May of 1930 it literally gave away 550,000 "Fiftieth Anniversary" cameras and rolls of film to children who were twelve years old; and in 1933 it adapted one of its export Brownie cameras for a World's Fair commemorative, a technique it would repeat for the fairs of 1939 and 1964 (ibid.: 1981:79,80,82,107,145). With a growing market in photographic memorabilia, manufacturers such as Hasselblad, Franke & Heidecke (makers of the Rolleiflex), and E. Leitz have followed suit by offering gold-plated commemorative or anniversary models (Schneider 1985:66-68).

Thirdly, the Eastman Kodak Company was among the first to consider design factors from the consumers' point of view. The company had already begun this in 1900, when Frank Brownell--according to Eastman "the greatest camera designer that ever lived" (Jenkins 1975:184)--produced the first Brownie. With a simple operating mechanism, a \$1.00 retail price tag, and a name taken from popular childrens' literature of the period, this camera was expressly made

for and marketed to youngsters (McKeown and McKeown 39-44). More importantly, Kodak soon began to replace its older generation of camera designers like Brownell and William Walker. These men had essentially been mechanical engineers or mechanics, and they saw cameras in terms of ease of manufacture and operation. In 1927 Eastman hired Walter Dorwin Teague (1884-1960), a former free-lance artist who was amongst the first to establish an independent studio for industrial design. Like his contemporaries Raymond Loewy, Henry Dreyfuss, and Norman Bel Geddes, Teague believed in applying his aesthetic skills and interests in efforts to raise the general standard of public taste. Known for his work for Vogue, and inspired by his first-hand experience of early Modernist design in Europe, Teague was contacted by Kodak through the Metropolitan Museum of Art in New York. Teague was commissioned at first to design an updated version of the Brownie; he went on to design many more, and to build the Eastman Kodak store on Fifth Avenue (Meikle 1979:43-48). Teague's interest in classicism and his early Modernist and Art Deco influences are evident in the Beau Brownie of 1930, many of the Kodak Six-20 cameras, the Six-16 and Six-20 Brownie Juniors, the Jiffy line, and the Bantams (McKeown and McKeown 81,84-85,89-90,98-99). His greatest triumph however was the Kodak Baby Brownie camera of 1934, "the first Kodak camera to be made of molded plastic" (ibid.:94). The use of

bakelite for camera bodies made them lighter and signaled the end of small bellows cameras, but the molding process itself facilitated production in that it offered an alternative to the metal cutting and finishing procedures commonly used until that time. Moreover the stylized Art Deco streamlines on these cameras had decorative value for consumers and were simultaneously useful in the molding process (ibid.:94, 103-105). It is difficult to ascertain the full details of Teague's work for Eastman Kodak but it is worth noting that in 1928 the company began issuing several lines of camera with satin-lined cases and bodies with matching bright colors. It also created the "Kodak Petite" in 1929, complete with lipstick, hand mirror, and compact; the "Coquette", issued the following year, did not include the mirror and sold for \$13 (ibid.:77-78). Teague's work for Kodak and other clients was included in the landmark 1934 Museum of Modern Art show entitled "Machine Art", an exhibition which gave formal recognition to the distinction between artisanal, handicraft traditions of design, and the emerging industrial aesthetic (Meikle 1979:180).

Structure of the Photographic Marketplace and the Emergence of the 35mm Still Camera

Eastman Kodak's marketing strategies of the period immediately after the First World War are indicative of the photographic industry's general situation at that time. The growth of patent monopolies in America and of oligopolistic cartels in Europe and Japan meant that production became organized in a two-tier system. The main tier, financially speaking, contained those industry giants whose economic hegemony was based upon mass production for the mass market. Although Eastman Kodak had had a pivotal role in establishing that market by drawing non-professionals into photography, its dominance was continually challenged by other large corporations; the German manufacturers set their sights on Kodak as soon as the post-war recovery would allow (NYT Aug. 30, 19:2, 1926). The second tier consisted of those small specialty manufacturers whose operations more closely resembled enlarged machine shops than true factories. Working with more precision to provide a primarily professional clientele with higher-priced goods, these smaller concerns still competed on the basis of technological innovation. It seems logical then that it is from this second tier that the 35mm still camera first emerges.

The idea of adapting cine film for still photography occurred in several locales at once, and it should not be too surprising that it first arose amongst firms involved with the motion picture trade. Arguments about absolute priority in this area of invention are difficult to settle by means of accurate historical documentation, and have in any case little more than antiquarian interest. From available sources it appears that the significant first efforts were made in France, Switzerland, and the United States of America; it is difficult to ascertain the amount of direct communication, if any, among those involved. The Sept camera, a combination of 35mm motion picture camera, projector, still camera and enlarger, was introduced by the Societe Francaise of Paris in 1922 (Schneider 1982:16-18). The Simplex, made by a movie camera maker called the Multi-Speed Shutter Company of Long Island (later Simplex Photo Products), came out in 1914; it used the now standard image size of 24x36mm (Schneider 1985:47-49). The Herbert and Huesgen Company, founded by two photographic wholesalers in 1908, imported motion picture cameras as part of its business; in 1913 the two salesmen took out a patent on a camera called the Tourist Multiple which took a 50-foot, 750 exposure magazine of short ends left over from motion picture film (MOD Nov. 1960:98-101, 148). In Germany, both the Ernst Leitz GmbH of Wetzlar [makers of the Leica] and the Ihagee Kamerawerk of Dresden [makers of the first 35mm

I reflex camera] had experience with cinema equipment. Other specialty manufacturers were also quick to see the possibilities of using cine film for still photographs. In 1920 a Philadelphia photographer known only as "Mr. Wilson" custom-built a still camera for himself to take long rolls of movie film. Wilson did so because he was asked to provide small portraits of individual school students, to be attached to their permanent records. Not only do Wilson's efforts mark the beginning of school photography, but they prodded the Dunkers Company of Missouri to manufacture a similar camera for other school photographers. This gave impetus in turn to the photofinishing equipment industry to develop continuous, motorized means of processing and printing (Renfro 1979:34-40).

Introduction of the 35mm Still Camera

The first period of successful development and commercialization of the 35mm still camera can be dated from the introduction of the first Leica in 1924 until the outbreak of World War Two. More is known about the creation of this camera than any of its early competitors, and the example of the Leica illustrates a close, even interdependent

relationship between development of an invention and its commercialization.

The Ernst Leitz optical manufacturing company had begun in 1869, when its founder took over an older firm in which he had previously been a partner. By the turn of the century E. Leitz had established an international reputation for itself on the basis of its microscopes, which were sold "in New York, Berlin, Leningrad, Japan and China" (Keller 1986). As part of a rapid expansion the company added a patent library and photographic laboratory, both in the 1880s. Its shop floor was largely staffed by mechanics recruited from the Swiss and German precision watch-making industries, or from rival workshops. The later was true of Oskar Barnack, who left Zeiss and joined Leitz in 1911. Two years later the Wetzlar company branched out into the field of motion picture projection. Barnack, an avid nature photographer handicapped by asthma, sought to reduce the weight of his equipment by cutting down gelatin plates. When these yielded unsatisfactory enlargements, Barnack began to experiment with the 35mm cine film with which he was familiar. Finding the 18x24mm format still too small, he doubled its width to 24x36mm, and fit one of two prototype cameras with a cine lens. As with the Tourist Multiple, the intervention of the First World War canceled any further development of this idea. With the restoration of peace, and with Germany's preeminence in optical goods

unchallenged, Barnack presented his prototypes to the management of a firm whose products were already well established (Keller 1986).

The first Barnack cameras were put together in the Leitz microscope assembly department and experimental workshop in 1923, and were immediately distributed to sales agents in Germany, the United States, Europe and Asia. Favorable reports, mostly by customers engaged in medical research, prompted the Leitz management to add the "Liliput-Kamera" to its expanding line of scientific instruments, and E. Leitz created a separate facility for the production of its cameras in 1926. This was one year after they had been introduced at the annual Leipzig Trade Fair. Special lens designs for the small camera were calculated and a lens testing and assembly area was also added. The in-house advertising bureau of E. Leitz, with a staff of two, was unprepared for a marketing campaign based on the new camera. The bureau's experience consisted primarily of writing catalogue inserts and instruction manuals for scientific instruments. The first Leicas, designated A and B, were initially advertised as "ein neuer kamera-typ", a "revolution in der Photographie", "klein, leicht, handlich", "die ideale Reisekamera", and "das kleine Photo-Wunder". By 1925, this early advertising had become conducted on a systematic and sophisticated basis. Leitz had ads designed by professional artists, including a full-

color effort by a Professor Ludwig Hohlwein of Munich. Other ads featured humorous cartoons comparing the cumbersome nature of large format equipment with the Leica's ease of operation, with captions such as

Ein allzugroßer Apparat
wirkt oftmals storend in der Tat.
Ob Mensch, ob Pferd, ob Auto rennt,
Nie ohne Leica geht der Gent.

Leica advertising was placed in mass circulation publications such as Die Woche and Die Dame, as well as in the photographic specialty journals Photofreund and Die Linse (Ruttinger 1986:47). Cameras were sold to leading photography retail dealers on a basis which encouraged a "loan-out" policy for favorite customers, from whom word-of-mouth publicity was received (Keller 1986).

Between the years 1927 to 1928 Leica sales increased tenfold, from one thousand to ten thousand units, and the camera had become Leitz's most profitable product. Further evidence of Leitz's commercialization strategy become apparent with the introduction of the Leica C ("Leica I") in 1930, the first Leica capable of accepting interchangeable lenses; four lenses were immediately announced with the camera. The Leica's 39mm screw thread lens mount would soon be adopted by other firms who manufactured "imitation" Leicas, but with the principle of lens interchangeability and the addition of a built-in coupled focusing rangefinder in model D ("Leica II") of 1932, the camera was now advertised as "Die klassische Universal Kleinkamera... welt-

bekannten...a camera which introduced a revolutionary change and opened a new era in the photographic world" (Ruttinger 54-62). A sculptor known as Zugel had originated the idea of interchangeable lens couplings; Leitz not only bought out his patent, but also hired professional artists to oversee the aesthetic appearance of the camera and its accessories (Keller 1986). By 1935 the E. Leitz catalogue listed over one hundred and sixty items including filters, tripod heads, stereo attachments, cases, and enlarging and copying equipment. Leitz began publication of users' guides, as well as a special magazine called simply "Die Leica" [later "Leica-Fotografie"] (Lager 1980 :339-361). Leitz also established a special "Leica School", a series of lectures on the use of the new camera. In the United States, Willard Morgan [husband of the dance photographer Barbara Morgan] acted as sales manager for Leitz and published an English-version Leica Manual in 1929. Morgan's brother Gilbert took charge of marketing on the West Coast and introduced the camera to film stars and other members of the motion picture industry (Keller 1986). Thus the Leica's development, refinement, and commercialization were deliberate and coordinated activities involving considerable amounts of communication between manufacturer, retailers and consumers. Marketing a new invention during the depression of the nineteen thirties was fraught

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with financial hazards of a considerable magnitude, and E. Leitz took numerous steps to protect itself from failure.

Early Competition

The Leica's immediate competition came from two sources, Zeiss Ikon and, to a lesser extent, Ihagee. Zeiss first came out with a small roll film camera in 1930, but it entered the 35mm field in 1932 with its Contax I, a rangefinder model that was "a system camera from the beginning, with a huge variety of lenses and accessories that allowed for any possible contingency, and any conceivable whim of the professional or advanced amateur user" (Meinwald 14). Modifications and improvements to the rangefinder and the addition of an uncoupled exposure meter gave rise, in 1936, to the Contax II and III, both produced continuously until 1942. At the same time Zeiss introduced a lower-price line of similar cameras, the Super Nettel [1934-37], Super Nettel II [1936-1938], Tenax I [1939-41] and Tenax II [1938-41], and Nettax [1936-38] (Meinwald 12-15,21). These were distributed by the Ercona Company of Long Island, initially an importer of Dresden porcelain and china. Like Leitz, Zeiss also paid attention to design for consumer appeal. Its chief designer, Hubert Nerwin

[d.1983], added Futurist "speed streaks" or bright metal bands around camera bodies that were now made of black leather or satin chrome (Brown 1986:4-8), and test-marketed ivory and red-finished models as well (Barringer 1987:10). Zeiss was also involved in the production of a book entitled Tag und Macht mit der Kleincamera, published in 1936 to compete with volumes on the Leica (Brown 1983).

Ihagee also attempted to compete on the basis of 127-size roll film, producing a single reflex version in 1933 called the Exakta VP ("Vest Pocket"). This camera was made in twenty-two different versions and was in production until 1939; its accessories included close-up and microscope attachments, flash attachments, filters, enlargers, and thirty-nine lenses. In 1936 Ihagee adapted most of the features of the VP for use in the Kine Exakta, claimed to be the world's first 35mm single lens reflex camera. This camera was produced in four versions until 1940, when Ihagee was confiscated by the Nazis (Aguila and Rouah 1987:7-51). Although Ihagee invited other optical firms to supply lenses for the Exakta, it did design and build special accessories for medical and technical photography.

Of note also are the first Japanese 35mm rangefinder cameras made by Seiki Kogaku Kenkyujo, and known as the Kwanon. The firm was founded in 1933 by two businessmen and two mechanical engineers, and initially operated very much in the "Handwerk" mode. Although Leitz had a sales

presence in Japan, it did not take out patents there until 1934, which gave the Kwanon group time to make a few prototype imitations. Apparently none were marketed although they were advertised. As the Leica and Contax patents came into force, Kwanon relied on Nippon Kogaku for the design and production of its lenses, lens mounts, and range-finders. Acting as a de facto subsidiary of the larger firm, Kwanon produced five models of 35mm cameras before and during the Second World War, under the trademark "Canon". Although only three thousand cameras were made during this period, this early experience would help lay the basis for the intense Japanese competition in the post-war era (Dechert 1985:17-45).

Kodak: 35mm Entries and Alternatives

The Eastman Kodak Company's response to these developments was twofold. First, Eastman purchased the German firm of Nagel Kamerawerk in 1932, retaining its management for the purpose of designing high-quality but low-cost rivals to the Leica and Contax. Made in Stuttgart by the renamed Kodak A.G., the Retina line of cameras employed an older, drop-bed bellows design that did not accept any supplementary lenses or other accessories. Most Retinas

were used for European distribution, and the models that were imported before the war were priced at approximately half that of the Leica. In 1941 Eastman introduced its own top-of-the-line 35mm camera, the Kodak Ektra, a Leica-style rangefinder with six interchangeable lenses and an interchangeable film back. Approximately two thousand of these cameras were sold, with a price range of over two hundred to over five hundred dollars, depending on the lens. The Ektra was discontinued once Leitz and Zeiss returned as competitors in 1948 (McKeown and McKeown:91-92,113,171).

Kodak's other move was addressed to the popular market and entailed the introduction of an alternative miniature film size, the short-lived 828, or Bantam format, precursor to the later 126 cartridge. This ploy was in keeping with Kodak's attempts to dominate both the film and camera markets by constantly introducing new film sizes, a policy it reinitiated in 1932 after a hiatus of sixteen years. The move was partly prompted by Kodak's own success in creating 120 roll film for its 1901 Brownie; European manufacturers soon made rival cameras to accept this size. Kodak's Bantam line of cameras was designed around 35mm-wide film but with a larger frame of 28x40mm instead of 24x36mm. The cameras themselves clearly showed Teague's stylistic influence yet were of the fixed lens type, and the line was essentially discontinued in 1948, with the exception of the Flash Bantam [1947-53] and a final Bantam RF [1953-57]

(McKeown and McKeown 97-99, 118, 125). Kodak also ran two parallel lines of its Pony line of cameras, one for 828 and the other for 35mm. These lines ran from 1949 to 1961, and sales records for both led Kodak to abandon its alternative format (McKeown and McKeown 121-122, 131). Nevertheless, Kodak repeated this market strategy, with far more success, when it introduced its 126 cartridge Instamatics in 1963.

American Pre-War Domestic Market

Although sales figures for the pre-war American domestic market are unavailable, the Consumers' Union Reports of 1937 to 1942 are useful indicators of the situation. In 1937 Germany accounted for 89 percent of the world trade in still photographic cameras (see Graph III-C); of the eighteen miniature [35mm and 828] cameras reviewed in the July issue of Reports from that year, thirteen were of German origin (CR July 1937:17-22). Highest rating was given to the Contax and Leica, both then selling for \$180.00 with standard lenses. In an updated review of August 1938, seven out of eighteen cameras were German, not including one Agfa model (CR August 1939:6-7).

Three other points emerge from the Reports of this period. First, the amateur market seems at that time to

have included large format (4"x5") press and view cameras, which were reviewed along with roll film cameras in the June 1937 issue. The reports noted in fact "the apparent trend away from the 35mm. miniature cameras to those making larger negatives". Several reasons were given for this movement, namely realization

- 1) that a "candid" camera is not necessarily synonymous with a 35mm camera;
- 2) that the cost of enlargements more than equals the money saved in negative costs with a 35mm. camera;
- 3) that the casual snapshotter using a 35mm. roll is not likely to get more than an occasional picture worth enlarging;
- 4) that every flaw in a small negative is so magnified in enlargement as to give the amateur who does his own developing a great deal of trouble;
- 5) that with most 35mm. cameras it is necessary to take 36 pictures - too many for most snapshotters - before the film can be removed for development. (CR Aug. 1938:6).

In its review of November 1941, the magazine dealt with fifty-four cameras, only fifteen of which took 828 or 35mm film.

Secondly, despite this resistance American photographic firms began to enter the miniature camera field at this time. Consumers' Reports of August 1939 gives top ranking to cameras of domestic origin such as the Argus, Mercury, Perfex and Kodak 35, and to American makers of 127 and 120 film cameras. These companies began to edge out their German competitors in the lower price ranges of five to sixty or seventy dollars. In the November 1941 review of

this field only the Zeiss Nettar A is listed, and it is specifically listed as of German origin.

Thirdly, the growing hostility between the United States and Germany is evident from 1937 onward. An editorial on the back cover of the July CR of that year, entitled "Portrait of a Menace", alerts the reader to the abolishment of labor unions in Germany under the Nazi regime. An insert in the camera review section of that same issue, "How Does the German Worker Live?", quotes a report from the publisher of the Chicago Daily News: "The status of the German worker, once a free, highly intelligent, well paid and self-respecting member of society, is that of a miserably paid wage serf of the government". The magazine also notes that researching working conditions was difficult because unions had been abolished. "Nor could we direct letters to former trade-union officers who are now in concentration camps, if they are yet alive". Although the American government did raise duties in April of 1939, this tariff accomplished apparently little other than to prompt a rapid if temporary 83 per cent increase in imports of German cameras in the first quarter of that fiscal year (NYT June 21, 34:6, 1939).

These issues aside, it is clear that the 35mm camera was still considered a novelty in the pre-war period. An early exhibition of photographs made with Leicas, and held in the lobby of the RCA Building, drew the admiration of

the New York Times (April 25, 17:3, 1935). The Times also noted a general interest on the part of amateurs in the use of "miniature" cameras, although this category included "any camera taking pictures ranging in size from the dimensions of a postage stamp up to and including pictures 2 1/4 by 3 1/4 inches".

When the "miniature" camera first began to attract attention in this country five or six years ago it was thought of as a highly complex and costly mechanism, suitable for use only by experts. But the photographic principles which it embodied were soon found to be applicable to the manufacture of less expensive models, with the result that miniature camera advantages have gradually been extended to hobbyists of limited means (NYT Dec 8, XI, 14:2, 1935).

Wartime: Restrictions and Shortages

Further development and commercialization of the 35mm camera on the American market were severely restricted by preparations for and engagement in the wartime effort. Government regulation of the photographic industry in wartime had had an important set of precedents in the Roosevelt administration's National Recovery Administration (N.R.A.), which operated from 1933 to 1936. Among the over five hundred compulsory fair-practice codes it enforced were those adopted by the National Photographers Association with regard to the working conditions of studio em-

ployees (NYT Aug.24, 6:6, 1933), and those signed by Eastman Kodak and other major photo-industry employers (NYT July 29, 3:7, 1933). Although the N.R.A. was declared unconstitutional by the Supreme Court, many of its codes were reformulated under the Wages and Hours Act of 1938. By that same year forty-two state governments had also passed fair-trade laws, which equalized maximum discounts from manufacturers and wholesalers, and set minimum retail prices. Ansco was first in offering its dealers protection from price wars, and by 1938 Eastman Kodak established similar contracts (NYT Feb.13, II,10:5; Mar. 2, 28:4, 1938).

With the outbreak of hostilities between the United States and the Axis powers, the federal government used its regulatory powers in two other areas of photographic activity. First, amateur photographers were initially "urged" to avoid taking pictures containing any subject matter of a military nature (NYT Mar. 13, 10:3, 1942). Soon they were required by the Office of Censorship to submit all pictures taken outside of the United States to customs officials for examination. Exposed but undeveloped film was also to be seized for developing and review (NYT May 27, 6:1, 1942). [Germany, for its part, banned amateur photography altogether (NYT Mar 10, 9:6, 1943)]. The Port of New York Authority began to confiscate pictures taken of tunnels and bridges within New York City limits (NYT July 24, 13:4,

1942). Secondly, and of greater significance, was the War Production Board's restriction of sales of photographic film (NYT May 15, 21:2, 1943; Jan 2, 23:1, 1945), photographic equipment (NYT Mar 15, 33:2, 1945), and wholesale product prices (NYT Mar 27, 31:2, 1945).

With the formal entry of the United States into armed conflict, amateur camera users were initially assured that "there will be no horn of plenty in 1942, but neither will there be a famine" in terms of supplies. Industry spokesmen predicted a 50 per cent reduction in commercial camera manufacturing, significant shortages of accessories, and "a general all-around reduction and standardization in film sizes and the number of film emulsions, plus smaller inventories on the retailers' shelves". Also predicted was a decline in sales of the more expensive camera models, and greater demand for the low-ticket box cameras (NYT Jan 11, X,11:3, 1942).

By November of that year Consumer Reports noted that while "business on the photographic market is booming...the shelves of all the stores visited by CR looked little more crowded than Mother Hubbard's cupboard". Delivery of new cameras to retailers had been all but halted, exposure meters were unavailable at any price, and consumers were warned against unscrupulous practices such as second-hand cameras being sold as new. Retail stores had already adopted rationing schemes for film, flashbulbs,

and photographic paper. Consumers seeking gifts for amateur photographers were advised to purchase rolls of film, gadget bags, photo albums, or photographic magazine subscriptions. Amateurs were cautioned that, "this is no time to embark on photography as a hobby" (CR November 1942: 290). Consumer Reports did not review camera equipment again until November of 1946. The Eastman Kodak Company discontinued many of its lines and issued only one model during the war, namely a matchbox spy camera for the Office of Secret Services (McKeown and McKeown 115). Kodak abdicated whatever lead it may have had in the high-quality 35mm market when it discontinued the Ektra. It also lost ground in innovative camera design when it withdrew the Super Kodak Six-20, a model introduced in 1938 with features such as an automatic, coupled light meter and striking "clamshell" cover (ibid.:105).

The Post-War Period: 1945 to 1952

The immediate post-war period is marked by considerable confusion as the market readjusted to peacetime conditions. Nationalist sentiments and hostilities aroused during the war vied with demands for high-quality 35mm equipment such as had been originally supplied by the

Germans. Key firms such as Leitz, Franke & Heidecke, and Plaubel had been left virtually untouched by Allied bombing, and were not liquidated by Allied governments of occupation. On the contrary, they were immediately put back into operation under American supervision. This policy led to vociferous objections. The Scientific Instrument Manufacturers Association of Great Britain lobbied for a total ban on German optical and photographic production, arguing that "Germany knows very well that a country which could keep these industries in a healthy condition has the means to be aggressive or to fight aggression" (NYT June 6, 7:3, 1945). In the United States, National Photographic Dealer ran a series of articles on the topic, "What Should Be Done With Germany's Camera Industry?" The editor of this trade journal, Augustus Wolfman, applauded the decision of the Potsdam Conference to extract reparations in the form of industrial equipment rather than merchandise because after World War One, "The Germans built up their industries and soon their tentacles were reaching around the throats of American industry. We know now that the Germans offered us cameras and other merchandise with one hand, while the other held a dagger to sink into the flesh of our democracy." American retail dealers were urged to stock up on American-made goods and, "brag about their quality, their precision, design, etc., to your customers. Be proud of selling American-made photo equipment and your

customers will be proud to own and use it" (NPD August 1945:21). Dealers writing into the magazine urged an end to "the myth of the Super Race and the Super Camera" and pursuit of three alternatives: "(1) building [a] bigger American camera industry; (2) discouraging German imports; (3) permitting imports from other foreign countries" (NPD August 1945:42,72). Notwithstanding these feelings, "the first shipment of manufactured goods to leave Germany" after the war consisted of two hundred Leica cameras which arrived at LaGuardia airport on November 8, 1946 (NYT Nov 8, 40:7, 1946). This incident is doubly ironic because the New York office of E. Leitz had been confiscated by the Alien Property Custodian during the war, and sold to the tobacco firm of Dunhill International. By 1952 Leitz refused to deal with Dunhill, reestablished an American distributorship under Henry Mann, and "assured an ample supply of Leica cameras of German manufacture" to the United States (NYT Oct 6, 36:1, 1952). Meanwhile, upgraded Contax cameras were made available in America at the end of 1949 (NYT Jan 1, II, 11:3, 1950). Rollei twin-lens reflex cameras, popular before the war, were shipped again on a regular basis in March of 1947 (CR May 1947:146). In fact, although the United States had represented only 5 percent of Rollei's pre-war market, it now absorbed 25 to 30 per-

cent of its post-war production (NYT Oct 2, II, 13:5, 1949).

By 1950, West Germany alone still held 59 percent of the world export market in still photographic cameras, and expected to regain a larger portion (see Graph III-C). Sales of German cameras by the U.S. Post Exchange, to the thousands of servicemen stationed in Europe, had been so successful as to draw protests by French and American manufacturers (NYT 14:6,8, 1953). Yet the inhibiting factor of significance remained the fragmentation of the German optical industry along new geopolitical lines. The two firms most affected were Ihagee and Zeiss, as what survived of the Ihagee factories was located in the Russian zone of occupation. Legal action on the part of the owners to recover the trademarks "Ihagee" and "Exakta" from the Russians was not successful until 1966, by which time the company was poised to contract out its manufacturing to Japanese factories (Aguila and Rouah:9,92). In the meantime, U.S. customs regulations forced Ihagee and Zeiss to label their cameras "Made in Soviet-Occupied Germany", a move which seen to "increase market opportunities here for Japan's high-precision camera products," according to the American importer of Canon cameras (NYT Apr. 3, 31:5, 1953). As Ihagee was the only East German concern not to have been absorbed into the Peoples' Precision Machinery Cooperative ("Mechanik"), this requirement was seen to increase "'political sales resistance'" and to cut deeply

into the \$5,000,000 annual photo-optical trade the communist regime had carried on with the United States (NYT Mar 29, 19:1, 1953).

The post-war history of Zeiss is that of a photographic firm initially set in competition with itself. In April of 1945 the U.S. Army entered Jena and occupied it until July, when the city was incorporated into the Russian sector. The Army's Signal Corps made use of this lacuna to undertake Operation Paperclip, which transferred some two thousand Zeiss lenses, technical files, and "several hundred German scientists from practically all disciplines and technical areas" to Fort Monmouth, New Jersey (Kaprelian 1977:6-10). Strongly protested by the Russian government, this action was claimed to have "put the United States years ahead in the field of optics" (NYT Feb. 19, 4:4, 1948). The Zeiss facilities in the eastern sector were also dismantled. "More than 90% of all plant equipment and over 300 employees were transported to the Soviet Union," while the rest was absorbed by the Volkseigener Betrieb [People's Owned Enterprise, abbreviated as V.E.B. and otherwise known as V.V.B.Optik] (Gubas 1984b). The Russians' original intention seems to have been to manufacture an imitation Contax, under the trade name "Kiev". Although tools and dies were taken from the Zeiss Ikon factory in Dresden, most of them were soon returned to Jena "without one camera having left the assembly line" (Gubas 1984a).

and parts for the Kiev, beginning in 1947 (Sherman 1979:4-5). By that time the West German branch of the original conglomerate, now known as Carl Zeiss, was established in Oberkochen. Legal wrangling over proprietary rights to the Zeiss name and logo was not settled in American courts until 1972, but despite this handicap the western Zeiss re-established its manufacturing in Berlin, Coburg and Stuttgart, and became profitable by 1953. Aside from the obvious competitive advantages of a free market atmosphere, Carl Zeiss was able to outdistance its Zeiss Ikon rival by early and sustained commitment to research and development (Gubas 1984b).

Nonetheless, the chief reason for Germany's continued supremacy appears to have been inaction on the part of American manufacturers. Consumer Reports complained that "the postwar avalanche of cameras has thus far been only a trickle. But in the trickle there have been cameras of many kinds and at a wide range of prices. Nothing has yet appeared on the American market, however, to take the place which, before the war, was occupied by the Leica, the Contax, the Rolleiflex, and other outstanding examples of foreign camera- and lens-makers' skills" (CR November 1946: 283). In its first review of cameras after the war, Consumer Reports analyzed and rated thirteen brands, six of which were box cameras, two twin lens reflex cameras, and five 35mm and 828 cameras. None were of foreign manufac-

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five 35mm and 828 cameras. None were of foreign manufacture (CR November 1946:283-286). By May of 1947 however, Consumer Reports gave favorable attention to Rolleiflex cameras, underscoring the idea that, "The new Rolleis again give emphasis to the fact that no American manufacturer has produced a twin-lens reflex camera approaching the Rolleis in versatility or convenience" (CR May 1947:146-147); they were reviewed favorably again in November of 1951 (CR Nov 1951:510-514). The principal photographic product of domestic origin to excite CR reviewers during this period was the Polaroid Land camera, and it was greeted with caution (CR Jan 1949:12-13). The demand for German cameras was so high that a black market was created, and equipment smuggling became a concern of American customs authorities (NYT July 13, 13:1, 1950).

The photographic marketplace was also in a chaotic situation. The major effect of fair-trade laws was to move competition from the retail to the wholesale level. The Eastman Kodak company reduced its camera prices from 5 to 11 percent in September of 1949. This was followed closely with similar announcements on the parts of Bell and Howell and Ansco (NYT Sept. 30, 37:1; Oct. 9, II 14:7; Nov. 17, 46:2, 1949; June 24, 43:2, 1952; July 29, 36:6, 1952; July 30, 33:5, 1952.). Declining sales also led Ansco to lay off some eight hundred workers in its Binghamton factory (NYT May 29, III, 2:3, 1949). The market was also per-

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turbed by significant selling off of government war surplus photographic equipment. On one day alone, the War Assets Administration disposed of \$500,000 worth of used photographic goods (NYT Mar. 22, 22:4, 1945; Apr. 14, 34:1, 1947). These sales were of such a magnitude as to draw an official protest by the American Legion, which claimed that ordinary veterans had effectively been denied access to a \$2,000,000 sale of cameras and flood lamps held in Boston (NYT Apr. 7, 21:2, 1946). Prices of high-quality German goods were kept elevated by both American occupation forces and a demand for these cameras on the part of the neutral countries Switzerland and Sweden. These factors combined to raise prices anywhere from 12 to 25 percent (NYT May 25, II, 25:4; July 18, 28:8, 1947). And, although Eastman had already introduced Kodachrome slide film in 1935, the company's tight monopoly on photofinishing meant that color photography was an uncertainty in terms of consumer demand. When Eastman, under pressure from the Department of Justice, finally signed a consent decree, retailers and photofinishers could not predict the effects on prices and market dynamics (NYT Dec 22, 1:2; Dec 26, II:15:2, 1954).

The post-war photographic marketplace in the United States witnessed a hardening of the pre-war two-tier situation, in which American manufacturers aimed their efforts at the low end of the market, and German twin-lens reflex and expensive 35mm rangefinder cameras dominated the mar-

ket's upper levels. Market share distribution was also disproportionate. In 1950 the Eastman Kodak company estimated that, "approximately half the families in the United States - about twenty-six million - take still pictures," and that of these 90 percent used simple box or folding-type cameras (NYT Sept 24, II, 15:3, 1950). This market share represented over \$150,000,000 in annual retail sales (NYT June 19, II, 11:4, 1949). That American manufacturers concentrated on this population is indicated by a Consumers Union "Report on Inexpensive Cameras - All Priced At Less Than \$16" of 1952. This report listed and examined twenty-two box cameras, all of American manufacture (CR April 1952:164-170). On the upper end of the range, National Photo Dealer discovered that 35mm cameras were beginning to compete forcefully with twin-lens reflex equipment. A market survey of 1948 counted twice as many 35mm camera models available as those of the twin-lens type, and discovered that 35mm cameras represented one-third of all camera models then available (NYT Jan 30, II, 23:2, 1949).

Re-Emergence of the Japanese Camera Industry

The most remarkable aspect of photoindustry development in the post-war period was the international success

of Japanese optical goods. The seeds for this success were already sown in the final years of World War Two when, despite the disruptions of the war, military grade equipment was being manufactured by Minolta, Fuji, Asahi Optical and Nippon Kogaku. The later was partly owned by the Imperial Navy and expanded during the war to include "nineteen factories and 23,000 employees" (Rotoloni 1981:6). An official order of July 7, 1940 diverted all camera production toward military use. Aerial bombing destroyed many of these facilities, especially those of Asahi Optical, which had been a major supplier of lenses to Minolta and Konishiroku. In terms of physical plant the major survivor was Nippon Kogaku, although the post-war abolition of the Navy and temporary dissolution of the Mitsubishi cartel reduced the company to one factory with 1400 workers (ibid.). Canon also relocated its facilities in 1944, and thereby avoided the brunt of aerial bombing (Dechert 42).

Responsibility for Japan's post-war economic recovery was directly placed in the hand of the American government of occupation under General Douglas MacArthur. The most immediate difficulties were shortages of food and fuel, and the deficit that was one aftermath of a militarized economy. To help generate hard currency for imported foodstuffs, the government of occupation ordered the production of various commodities, including cameras, for sale to American military personnel, for their personal use. By

tion. Sales taxes kept these cameras beyond the reach of most Japanese consumers, and consequently manufacturers turned to the production of subminiature cameras--those taking formats smaller than 35mm--for domestic civilian consumption (Condax et al. 1985:7). By 1948 Japan had recovered only 54.6 percent of its prewar level of manufacturing (Kyokai 1961 :18), but already Asahi Optical had reorganized to produce binoculars and telescopes; Chinon Industries began to make lens barrels and mounts for Olympus, Ricoh, and Yashica; the Canon Company was ready to engage in the foreign trade [permitted to the Japanese in August of 1947 (Dechert 1985:42)]; and a Leica-Contax hybrid, designated the Nikon I, was actively marketed.

Inasmuch as the growth of the photographic industry is part of "the miracle" of post-war Japanese recovery, it must be seen within the context of that phenomenon. While numerous theories have been proposed to account for the unprecedented 9.5% average rate of growth between 1949 and 1973, several factors are consistently reiterated. First, key elements of pre-war economic activity remained, notably a high savings and investment rate [nearly 30% of the GNP throughout the 1950s and 1960s] (Rapp and Feldman in Barnds 1979:86-87); a long history of experience with export trade, especially with the United States (Neumann 1963:222-223); a labor force organized mainly on a factory-per-factory, rather than trade union basis; a nationalistic

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impetus toward rapid modernization of production (OE Feb. 1957:73-76; June 1957:291-293); and a pattern of centrally planned, "sponsored capitalism" under the auspices of the large, family-owned cartels known as zaibatsu ("money cliques"). Secondly, many of the reforms undertaken by the Supreme Command for the Allied Powers (S.C.A.P.) were effective in helping Japan replace obsolete manufacturing and marketing techniques, but ineffective in diminishing the ability of zaibatsu to direct the economy. Following the aims of the Potsdam Conference, General Douglas MacArthur's first priority was to dismantle the Japanese war machine. Directives issued in September and November of 1945 ordered the conversion of armaments and aeronautical industries (U.S. Dep't of State, 1946:41), and over sixteen thousand machine tools were sent out of the country as part of a war reparations program (Schaller 1985:38). In order to generate hard currency to pay for imported foodstuffs, emphasis was put on consumer goods for international trade.

Industrial Policy: Zaibatsu

One of the great ironies of the American occupation was that, despite all intentions to the contrary, it rein-

stated or reinforced many of the pre-war features and institutions of the Japanese economy, especially the propensity for centralized planning. This is clearly seen in the adoption of policies initially aimed at dissolving the zaibatsu which, at the time of surrender, had concentrated "nearly three fourths of Japan's industrial, commercial, and financial resources" in the hands of ten families (Schaller 39; Kawai 148). The reforming of Japan's economic structure had been among the aims listed in the Potsdam Declaration, and Washington was guided by the philosophy of Roosevelt's New Deal. Yet power over the implementation of these plans was put into the hands of Douglas MacArthur, a political conservative who, in any case, was far more concerned with constitutional and electoral matters. Some measure of MacArthur's priorities is indicated by the fact that, until the beginning of 1946, only one S.C.A.P. official was in charge of policies regarding the zaibatsu. This negligence allowed the cartels to execute only such policies as were convenient, and to withhold company records and other information (Schaller 28-29). This fact is also significant because on November 6, 1945, S.C.A.P. headquarters had issued an order for the partial dissolution of the zaibatsu, at least on their upper tiers of organization. A Holding Company Liquidation Commission was created in February of 1946, for the purpose of dispersing family-held shares. In January of 1946, MacArthur had also

demanded a purge of government and military officials connected with the war effort. The next year the purge was extended to include teachers and corporate executives. Responsibility for the administration of this measure was also put into the hands of Japanese officials, who applied it on a highly selective basis (U.S. Department of State 42-43; Schaller 43-44). The net effect of these reforms was to shake the top branches while leaving the roots and trunk intact. The interlocking directorships, price fixing agreements, financial resources and political influence of the zaibatsu remained unaltered. Although direct control was taken out of family hands, the structures of the Mitsubishi, Yasuda, Mitsui and Sumitomo trusts were never disbanded.

The reasons for this state of affairs are complex, and include MacArthur's personal inclinations as well as his presidential aspirations. MacArthur maintained a wartime-style control over the press in Japan and was eager to feed it news about his democratization of "the warrior race", news which could not be dramatized by publishing company reports and balance sheets (Schaller 22). Prominent, conservative Japanese politicians mounted a successful public relations program to absolve the zaibatsu from charges of war-mongering and profiteering. They also offered a compromise program of voluntary surrender of ownership. Although this amounted to little other than window dress-

ing, it served to widen the gaps between MacArthur and the State Department in Washington (Schaller 20-50). Zaibatsu were also promoted as preferable competitors when compared with the low wage, sweatshop enterprises (Kawai 153) and as stable entities in a period of short-lived coalition governments. As time went on, and the costs of occupying Japan exceeded two billion dollars (Lockwood 100), the Truman administration sought ways to rid itself of policy and administrative responsibilities. Moreover, by 1949 the political atmosphere in Southeast Asia had swung considerably, as the Communists established a People's Republic in China. An activist, largely pro-Communist labor movement in Japan had already attempted to mount a general strike in February of 1947. The anti-communist, anti-trade union politics of the zaibatsu made them natural allies with increasingly vocal segments of the American State Department, and MacArthur's purge apparatus was soon turned against leftist leaders (Schaller 44-46). All these factors, to which the Korean War was soon added, reduced the Occupation's reform movement to one of political, rather than economic, decentralization.

Industrial Policy: Banking

The chief implication of limited reform, for the camera trade, was a renewal of old patterns of financial support. Nippon Kogaku, spared the dissolution of the Mitsubishi group, could draw on the resources of that conglomerate's commercial bank, as did the independent Ricoh Company Ltd. Canon Inc. and Fuji Photo had, and continue to enjoy, a similarly strong tie to the Mitsui banks, while Olympus Optical received financing from both Sumitomo and Mitsui establishments. These zaibatsu banks are among the ten wealthiest in Japan (Bankers' Almanac 1989). Other large financial institutions, especially life insurance companies, continued as principal stockholders for Canon, Fuji, Minolta, Olympus, and Ricoh. These firms, in turn, had intimate ties with the zaibatsu. Financial support of this magnitude enabled these companies to survive through the period of Occupation, the Korean War inflation, and the oil shock of later decades (OE Feb. 1955:72-73; June 1955:292-344; Jan. 1959:10-12).

The close ties between major camera makers and large financial institutions also received guidance, and often supervision, from two government agencies, the Ministry of International Trade and Industry (M.I.T.I.) and the Ministry of Finance (M.O.F.). M.I.T.I. is a fairly direct descendent of the pre-war Ministry of Commerce and Indus-

try, which had functioned as a ministry of munitions and economic general staff at the time of the Pacific War. Although established as a civilian agency in 1949, and ostensibly committed to consultation with business leaders, M.I.T.I. maintained the government's position as a coordinator of industrial policy. Under the heading of "administrative guidance", M.I.T.I. soon imposed production quotas by allocating foreign currency returns on exported products. Armed with monetary and regulatory powers, M.I.T.I. was able to steer production away from raw materials processing, and toward the sorts of value-added consumer goods typical of technologically intensive industries. Since M.I.T.I. also set tariff rates for imported goods, it was able to extend added incentives to specific Japanese manufacturers (Rapp and Feldman 86-98; C.Johnson 157-197).

Given Japan's investment-intensive economy, the government also held tight control over development through the Ministry of Finance. By setting interest rates, and by providing generous depreciation allowances on new equipment, the M.O.F. reinforced M.I.T.I.'s plans while also safeguarding Japan's balance of payments. The M.O.F. was able to ration credit through the central Bank of Japan, which in turn provided "window guidance" through the major banks. The significance of this arrangement is indicated by the fact that the large banks "provided about a third of the new industrial funds in the mid-1950s, 45% in 1965, and

over 50% in 1971, while the stock market's share declined from around 15% to 5% over the same period" (Rapp and Feldman 96).

Through M.I.T.I. and M.O.F. the government of Japan is able to formulate and implement an overall industrial strategy, while leaving room for individual companies to compete within their areas of expertise. This has provided Japanese photographic manufacturers with incentives to reinvest in research and development programs, while affording them financial and other safeguards. The larger manufacturers were able, for example, to combine into a temporary cartel in order to deal with the recession that lasted from 1964 to 1966. The cartel, created in June of 1965, enforced a 30 percent production cutback on all its members, a move that enabled them to reduce excess inventories (OE, Nov.1966 :674). This cartelization was supervised by M.I.T.I., which took similar measures with regard to other depressed industries (OE April 1956:165-168; March 1965:131-134).

Industrial Policy: Small Businesses

On the other end of the economic scale, the Japanese government took steps to regulate small businesses, defined

as those manufacturing enterprises with fewer than 300 employees, and capitalized at less than 10 million yen. During the Great Pacific War measures such as the National General Mobilization Law (1938), the Industrial Association Law (1942) and the Commerce and Industry Association Law (1943) attempted forced consolidation in many areas of the manufacturing sector, including machine tools, where efficiency was a constant problem because the cottage industry pattern was so deeply entrenched. Following the cessation of hostilities in August of 1945, the smaller enterprises also found themselves cut off from raw materials diverted to larger industries, and burdened by taxes levied for the purpose of supporting the revival of heavy industry. Anti-inflationary measures, first passed by S.C.A.P. and then later by the Bank of Japan, also took their toll. Nevertheless, surveys conducted in 1957 indicated that the small companies still accounted for 51.52 percent of the value of Japan's manufactured goods and 99.6 percent of the total number of the nation's factories. Their survival had been encouraged by the Smaller Enterprise Agency, organized in 1948 to facilitate access to loans, and to provide better management and production techniques. At the same time, the government turned a blind eye to working conditions in these enterprises, partly because they employed uneducated workers, whereas heavy industry recruited its work force directly from junior high schools. Typically, the smaller

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businesses were characterized by low wages and long working hours. The hourly rates paid by these factories were estimated to be less than half of what workers received from large firms; they were also said to be "about one-eighth of America's, one-third of Britain's, and half of West Germany's or France's" (Kyokai 1961:10). Steps to remedy this state of affairs was not taken until April of 1958, when the Diet passed the Smaller Enterprise Organization Law to curb these abuses (Kyokai 1-20).

The role of the smaller enterprises in the photographic trade is illustrated by economic survey figures published in 1961. At that time, businesses falling under the category of "professional, scientific and controlling instruments, photographic and optical goods, watches and clocks", comprised slightly less than 1 percent of all Japanese businesses, 1.5 percent of its total labor force, and 0.8 percent of the total annual sales value of all manufactured goods. Yet within this category, businesses with less than 300 employees accounted for 99.0 percent of all factories, 64.4 percent of the labor force, and 52.4 percent of sales value. This can be compared with figures for the "primary metal industries", which in total employed almost four times the number of workers, but whose small enterprises constituted only 16.0 percent of that industry's total annual sales figures (Kyokai 155; OE Nov.-1957:566-569).

Two important types of Japanese photographic companies fall under the category of "small business enterprises". The first type produced camera accessories such as tripods, filters, gadget bags, electronic flashes, slide trays, and so on. Among the most successful in this category is Tamron Co. Ltd., founded in November of 1950 as an optical supplier for cameras and binoculars. With the development, in 1957, of a lens mounting system adaptable to some twenty makes of 35mm cameras, Tamron could sell lenses while avoiding competition for cameras themselves. Other companies such as Samigon, Sigma and Tokina, benefitted from the low production costs and high markup associated with accessories.

The second type of small business enterprise consisted of small-scale camera manufacturers whose names have now passed into a twilight of obscurity, as they were unable to survive the economic turmoil following the Korean War. Aside from antiquarian interest, the bulk of these companies remain unimportant except for the numerous innovations they pioneered, and which were adopted by their more successful rivals. Among these are Zunow Optical Industries which, in 1958, brought to market the first 35mm reflex camera with pre-set, automatic aperture control, a feature soon copied by others (Condax et al. 55); the Beauty Camera Company, whose Beauty Super-L of 1958 combined a camera with an extended range selenium exposure meter (Sugiyama et

al. 145); the prototype Eltina of the Ehira Optical works, a camera which employed a prism-type reflex finder as well as a metal, sliding-blade shutter (Sugiyama et al. 160); and the Auto Terra series produced by Teraoka Seikosho Co, with built-in spring-driven motor winding (ibid.:234). Some small manufacturers are perhaps noteworthy because they explored dead ends, i.e. ambitious but inelegant and often unworkable solutions to problems whose failures were noted by other designers. These include the Graphic 35 Jet, made by Kowa Co., whose automatic film winding and shutter cocking mechanisms were powered by CO₂ cartridges; the Rich-Ray Trading Co.'s Richlet, which featured a spare film chamber built into the camera body; the Aires Viscount of 1959, incorporating a semi-automatic metering system; and the numerous attempts to market a 35mm of twin-lens design (Sugiyama et al. 139,140,164,230,231,269).

Japanese Marketing Strategy

As items of international trade, Japanese optical goods suffered from a reputation for shoddiness, the very opposite of the German "super race, super camera" stereotype. Several factors contributed to this situation, all of which the Japanese strove to correct. First, to satisfy

an impoverished domestic market, many Japanese camera manufacturers brought out subminiature cameras taking film formats smaller than 35mm. Except for those which used 16mm cine film, many of these devices used unique and rare sizes such as 8, 9.5 and 17.5mm film loaded in a bewildering variety of non-standard cassettes. These were not distributed or processed locally. Secondly, many of these subminiature cameras, already toy-like in appearance, had Anglicized names such as "Petal", "Inexpensive", "Tone", "Cute", "Beauty", "Swallow", "Snappy" (sic), "Snoopy", "Cyclops", "Petty", "Pet" and even "Zany" (White 1990:103-122). While some of these may have had poetic and even lyrical meanings for the Japanese themselves, they did not, by their very nature, carry the same sense of authority as the Carl Zeiss or E. Leitz trademarks. Thirdly, the expiration of early Leica patents left the field open for imitations of what had been an obvious success. Japanese manufacturers produced scores of Contax and Leica copies, from the crude Leotax to sophisticated and even advanced Canon and Nikon rangefinders (Sugiyama et al. 43-248). Because these copies accepted the German lenses, photographers could economize by mounting the superior optics on to Japanese camera bodies. The proliferation of imitations pressured Leitz into introducing a line of cameras with a bayonet lens mount, beginning with the M3 in 1954. Nevertheless, Japanese camera design was commonly perceived as

imitative and simplistic. Finally, Japanese cameras were initially sold in the United States on a limited-distribution basis, partly because productive capacity was low, and partly because American wholesalers were reluctant to carry goods with tarnished or unknown reputations.

Japanese cameras surmounted these obstacles partly through deliberate strategy, and partly as a result of political and economic forces over which manufacturers had little direct control. Aside from continuing its formerly successful strategies for industrial development under the aegis of the zaibatsu, M.I.T.I. was instrumental in founding the Japanese Camera Industry Association (J.C.I.A.), and Japanese Camera Inspection Institute (J.C.I.I.), both in 1954. The latter functioned as a quality-control facility for the entire industry, and J.C.I.I. stickers were issued only to those pieces of equipment deemed suitable for export (Condax et al. 7). In 1955 Kinji Moriyama, an industrialist and member of the Diet, directed the newly founded Japanese Camera Information and Service Center (J.C.I.S.C.), a subdivision of the Japan Light Machinery Information Center, both located in New York City and staffed by representatives of Japanese companies, service personnel, and public relations officials. The Center coordinated its promotional efforts with those of the Japan Trade Center, which had been set up in New York City the year previously. The first American showing of post-war

amateur Japanese photography was co-sponsored by J.C.I.C.S. and the Japan Trade Center (NYT, Dec.4, II:19:1, 1955), and J.C.I.C.S. also hosted an annual Japan Camera Show, with free admission, beginning in 1953 (NYT, Dec.3, II, 34:4, 1972).

Secondly, the Japanese government hired foreign industrial designers to advise manufacturers on international trends and preferences in the area of advertising, packaging and fashion. While traditional handicrafts were formally organized in 1959, more emphasis was put on increasing the aesthetic appeal of manufactured goods. Before the war only two educational institutions--the Tokyo School of Art and the Tokyo Higher Industrial Art School--graduated less than forty certified designers between them. By the mid-sixties, programs in Chiba, Kyoto and other Tokyo universities were certifying almost one thousand industrial designers annually. In 1956, the first Japanese industrial awards were given to the Canon Camera Company. By then most optical manufacturers had adopted a policy of consulting with Japanese camera clubs about design on a regular basis. Concurrently, the role of advertising in modern economic life was recognized and graphic design was organized under the Japan Advertising Artists Club, founded in 1950, and affiliated with the Alliance Graphique Internationale (QE May 1960:251-253; May 1965, 268-269;

June 1965:364-6.; Dec.1959, 708-09; Dechert:133; NYT Oct.9, II:24:6; Dec.4, II:19:1, 1955).

Thirdly, Japanese firms secured international representation for their products by relying, initially, on established wholesalers. They were forced to do so mainly because the domestic wholesale dealers system had been dismantled by the government during the Great Pacific War (Kyokai 17). In 1950 the Canon Company's American distribution was in the hands of the C.R. Skinner Manufacturing Company of San Francisco, a small firm with little commercial success. Canon then signed on with the Jardine Matheson Company, a British company, with equally disappointing results. In January of 1952, Canon began its own export unit, organized a network of authorized American dealers, and quickly moved to create the "Canon Circle", a camera club sponsored by Canon Sales Inc., with headquarters in New York (Dechert 78-79). In 1955 the manufacturer went to direct sales via the Canon Camera Company Inc., which sold its camera, 8mm film apparatus, and tape recorders, but by 1962 it entered into an agreement with the Bell and Howell Company for American distribution. In 1957, Canon also began European distribution (Dechert 132-133), followed by Canon Latin America ten years later (Dechert 172).

Nikon was first represented by another San Francisco concern, the Overseas Finance and Trading Company Inc. (NYT

March 18, II:14:7, 1951). But Nikon's commercial potential was quickly realized elsewhere, and sole distribution was taken over in March of 1954 by Nikon Inc., founded by Joseph Ehrenreich [1908 - 1973]. Ehrenreich, co-owner of the Penn Camera store in New York, quit to found E.P.O.I. (Ehrenreich Photo-Optical Inc.), which soon obtained exclusive American distribution of Bronica, Fujica, Mamiya, Durst, Merz, and Metz photographic products. Some of these companies had first attempted direct sales to the United States (OE, March 1957:142), but quickly negotiated contracts with E.P.O.I. Ehrenreich himself made frequent trips to confer with plant managers and designers in Japan, and occasionally rejected models he deemed unsuitable for the American market. E.P.O.I. hired major New York advertising agencies to conduct sales campaigns for its products, organized world-wide photographic competitions, and introduced The Nikon School, a traveling all-day seminar on photography featuring Nikon products (Rotoloni:31; NYT July 20, II, 27:4, 1969; NYT June 11, 69:4, 1970; NYT Feb. 9, 38:2, 1973; POP April 1973:72).

Other Japanese firms followed similar patterns. Asahi Optical cameras were first sold through Honeywell Inc., and Minolta by the FR Corporation. By 1962 however, a separate Asahi Optical company began sales operations in Europe, followed in 1967 by offices in Germany and Brazil (Ashai Optical Company History). Canadian distribution of Nikon

was handled by the Anglophoto Corporation of Toronto; Pentax was sold by McQueen Photo of Vancouver; Olympus cameras are still sold through W.C. Carson, also of Toronto; and Canon was also sold by the Canadian branch of Bell & Howell. In 1956, Olympus Optical signed on with the Brockway Camera Company of New York, but soon switched to direct distribution (OE, March 1957:141). By 1980 the Nikon company felt confident enough in its own marketing abilities to buy out E.P.O.I. and to establish Nikon Inc. This signaled the end of an era of Japanese dependence upon American and other foreign wholesalers for the servicing of overseas markets. Now, even these profits would be returned to Japanese manufacturers.

The Korean War and Its Aftermath

All these efforts might have been far less effective, except for the intervention of the Korean War. The war had several ramifications for Japan's economy in general, and for the photographic industry in particular. With the outbreak of hostilities in June of 1950, and especially with the entry of Chinese troops into combat later that year, strategists now argued that a strong Japan was a priority for the United States' foreign policy. Plans to

reduce Japan to an agrarian nation were quickly put aside. The shift in popular American political sympathies towards this once-hated oriental power can be clearly seen in the rehabilitation of Japan's image in the American mass media, chiefly in LIFE magazine. Henry Luce, LIFE's publisher and the son of American missionaries in China, had editorialized against Japan since the annexation of Manchuria. A fervid anti-communist as well, Luce had thrown the support of TIME, LIFE and Fortune magazines behind Chang Kai-shek, and urged support for him during the Japanese invasion of the Chinese mainland.

LIFE began its coverage of the Korean War on July 10, 1950 (Volume 29, #2) with a story and photographs by David Douglas Duncan. As American troops became more involved, the magazine also sent over the photographers Howard Sochurek, Carl Mydans and Larry Burrows. By the time of its August 28 issue, which featured a cover story on Douglas MacArthur, LIFE was describing Japan as a "Bulwark In The Far East", although "a grievously sick country...it is a defensible outpost facing a hostile mainland, just as Great Britain faced a hostile European mainland in World War II" (Volume 29, #9:84). Illustrations accompanying this text include a schematized aerial photograph showing Japan's proximity to Korea, Siberia and Manchuria; U.S. jets flying in formation over a Shinto shrine; Japanese workers making parasols; and American G.I.'s swimming in a former aircraft

facility. The captions and additional text emphasize Japan's transformation under the American influence, in areas ranging from the democratization of government to the introduction of milkshakes and dating. "Five years ago this month," the article begins, "Japan was still the enemy homeland, a place to be bombed and defeated." Now, "Japan is a land with too many people, too little food...To survive, Japan must regain the export markets it lost in World War II" (ibid.:84-89).

As the Korean conflict continued, the United States' armed forces became a driving force in the Japanese economy. "U.S. military procurements were almost two-thirds of total exports by 1953" (Rapp and Feldman 93). Among the procured materials were cameras, for which the Occupation Forces had previously provided over 80 percent of the Japanese market in 1949. As U.N. peacekeeping troops joined the Americans stationed in Japan, their demands added to the profitability of the photographic market. Although there were only forty camera manufacturers in 1950, there were sixty in 1951, and eighty in 1953. Yet military procurement for optical goods reached the saturation point within a year of the conflict's outbreak, and the bulk of sales were to domestic consumers who were benefiting from the war economy (OE Sept.1955:441-445). Contemporary observers noted that camera clubs had increased five-fold since the beginning of World War Two,

that Japan supported twelve consumer magazines devoted to nothing but photography, and that one-third of the population was expected to own cameras by the end of the decade (NYT, Nov.28, 27:8, 1953; Aug. 29, II, 12:4, 1954). In actual fact, more than fifty percent of Japanese households owned cameras by 1965 (Rapp and Feldman 102). As a result of this activity net exports, including those to the military, declined "from 45% in 1952 to 27% in 1953 and further down to 23% in 1954". But during those same years production almost doubled from year to year, from around 110,000 cameras in 1950, to over one million units in 1955 (OE, Dec. 1963:687; see Graph III-D). It was not until 1955, following Japan's formal admission into the General Agreement on Tariffs and Trade (G.A.T.T.), that the government of Japan began to favor the camera trade as a strategic export industry, one relatively independent from the import of foreign raw materials. By this time however, the Korean Truce had halted Japan's brief economic boom. In the recession that followed many small manufacturers went bankrupt, leaving the field open to the larger companies.

Introduction of Japanese Cameras to America

The Korean War had two other effects upon the Japanese camera industry. First, military procurement procedures forced Japanese manufacturers to standardize on the Leica's 24x36mm frame format, instead of clinging to the older Nippon frame of 24x32 (Rotoloni 23; Sugiyama et al. 185). Adaptation to the larger size required a redesign of the shutter mechanism. This change, seemingly insignificant, made Japanese cameras far more competitive on the U.S. market because they were now compatible with Kodachrome color slide mounts.

Secondly, because they were geographically cut off from Leica and other camera suppliers and repair shops, American photojournalists covering the war were forced to try Japanese equipment. Credit for discovering the high quality of Nikon lenses is usually given to David Douglas Duncan of LIFE, although there are several versions to the story. According to one source, Duncan was already in Japan prior to the war, shooting a story on antiquities, when a local photographer persuaded him to try Nikon optics on his Leica cameras. When Duncan became LIFE's star reporter in Korea (LIFE July 24, 1950:16) he took Nikon rangefinders cameras into combat with him, along with some Leicas (Moeller 369-70). "When the home office of LIFE began receiving his prints, they telegraphed to ask him if

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he was using a 4"x5" camera, as the quality was remarkable" (Sugiyama et al. 201). Impressed by Duncan's results, LIFE ordered customized Nikon S cameras for its staff (Rotoloni 29), and LOOK soon followed. Aside from quality, economy was also a consideration in covering a war fought under extreme weather conditions. The Associated Press supplied "bag-loads of cheap Minolta cameras" to its photographers, who used them for a few weeks until mud, dust, mold and metal fatigue rendered them inoperable (Moeller 369).

News of the quality of Japanese optics reached the United States through several channels. In his regular photography column in New York Times, Jacob Deschin reported the results of comparative tests between Nikon and Leica products.

Mitch Bogdanovitch, of Eastern Optical Company, the lens expert, put the Nikkors through a series of rigid tests and found that the average quality was much higher than that of the German lenses. "The lenses are highly accurate and efficient," he reports, "and by comparison with German lenses more uniform in quality"...Frank Scherschel, chief of LIFE's photographic laboratories, said the (Nikkor) f/1.4 was sharper than the (Zeiss) Sonnar f/1.5.

Deschin's article also included a report from camera repairman Martin Forbischer, who praised the Nikon's design as "a combination of what I feel are the better components of the Leica and the Contax". Deschin also informed his reader that Nikon equipment would sell "for about two-thirds the price of (its) German counterparts" (NYT, Dec. 10, II:17:2 :1958). The Times also carried reports from

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the Swedish government's testing lab, which noted that the Japanese had been able to manufacture sophisticated types of optical glass, "without flaws and bubbles which the Germans so far have not yet been able to eliminate" (NYT Feb.11, III:1:2 :1951). The subhead in a later article read simply, "German Monopoly Broken", referring to Japan's progress in selling binoculars and 35mm cameras to the United States, the world's largest market (NYT, Oct.3, 36:3, 39:5, 1955).

Deschin's original article drew an immediate, defensive response from Carl Zeiss Inc., the American importer of Zeiss cameras and lenses. In a statement issued to refute the report, the distributor protested that, "It is...improbable that the Zeiss lenses compared in these tests were new, whereas the Nikkors were new lenses. It is also probable that the tested lenses were fraudulent copies of the Zeiss which appeared after the war. These were made abroad by people not connected with the Zeiss factory...Fair comparative tests must naturally be made under equal conditions" (NYT, Dec.17, II:17:4, 1950). Nevertheless, an article on Japanese optics in the June 1951 issue of Modern Photography warned German manufacturers of the seriousness of their Japanese competition.

End of German Economic Hegemony in Optical Goods

These warnings would be proven accurate within a few years. Before the Second World War, Germany held 89 percent of the world export market in cameras. In 1950, West Germany alone still held 59 percent, while its nearest competitor, the United Kingdom, had less than a fifth of that amount. Japan's share, a negligible 4 percent at that time, more than doubled within the following five years, and nearly doubled again in the next two. By 1958, Japan commanded 21 percent of the world's market, and Germany little more than half. "In 1962, Japan replaced West Germany as the world's biggest camera manufacturing nation and has never relegated that position even since" (OE, Nov.1966 :674).

At least four factors account for Germany's decline. First, German manufacturing had been seriously disrupted and fragmented by the war and national partition; Ihagee and Carl Zeiss were the chief losers in this regard. Zeiss in particular was tied up in legal actions from 1954 to 1968 stemming from trademark disputes between the West German and Jena branches (NYT, Sept.12, 61:4, 1967).

Secondly, labor costs in Japan were approximately half of the West German rates, even for skilled workers. Since labor represents nearly two-third of camera manufacturing costs, Germans found themselves at a decided disadvantage.

In response to this situation, Rollei Kamerawerke shifted many of its operations to Singapore where, in the 1970s, workers received approximately one-sixth of their German counterparts. Agfa soon followed, and after 1970 Exakta cameras were being made by Cosina and Petri. Carl Zeiss, on the other hand, closed down its Voigtlander camera factory entirely, despite stiff union opposition. Zeiss also discontinued its own camera operations, except for the Contarex, a professional model of 35mm camera that was replaced, in 1975, with the FX-1, a camera accepting Zeiss lenses, but manufactured by Yashica. In announcing its plant closures, Zeiss cited both labor costs and the upward revaluation of the Deutschemarle (NYT, July 29:57:3, Aug.29:31:1, 1970; Aug.26,53:3, 59:3, 1971). In 1972 Zeiss entered into contractual relationships with Pentax. Leitz turned to partnership with the Minolta Company to produce the CL series of rangefinder cameras, beginning in 1975 (Sugiyama et al. 191).

Thirdly, German cameras were not marketed as aggressively as those of their competitors, as can be seen from the accompanying graphs (III-E and III-F). These graphs refer solely to different ads for 35mm cameras appearing in the magazine Popular Photography, and of one full page minimum length. As a measure of advertising activity, these graphs do not count repetitions of the same ad across several issues. Rather, each unit counted represents an

advertisement that differs significantly, in either image or text used, from any others used that year. The rationale for this type of measurement is that the use of various ads, rather than repetition, constitutes a better indicator of intensity in marketing activity. Popular Photography was chosen as a sampling source because it is the oldest, continually publishing magazine in the United States, and because it addresses an audience of advanced amateur, semi-professional and professional photographers, i.e. those who would be expected to follow market developments most closely. Advertisements produced for individual stores, such as Willoughby's in New York City, were not counted because they were seldom placed after 1955.

As can be seen, in the years just before America's entry into the Second World War, two German firms - Zeiss and Leitz - accounted for three-quarters of all the ads placed in Popular Photography. During the war, ads for other than domestic products were eliminated, but by 1955 one Japanese company--Canon--had placed almost as many new ads as its four German competitors. In 1955, Canon, Nikon and Ricoh together created more ads than Leitz, Zeiss, Ihagee, Agfa, Praktica and Voigtlander. Ten years later, the eleven top Japanese camera firms had four times as much new advertising representation as all five of their German counterparts. Keeping in mind that advertising in the United States is primarily paid for by wholesalers and

distributors, it is worth noting that Japanese manufacturers have chosen to have a much more direct relationship with their American advertising agencies (NYT, May 12, III:10:5, 1957).

Product Development: Innovation and Diversification

Finally, among the chief factors in Japan's success was its increasing leadership in product innovation, along with the ability of photographic manufacturers to diversify their activities. Almost every one of the largest Japanese camera makers can lay claim to a "first" in technological development. Asahi Optical pioneered the manufacture of 35mm reflex cameras in Japan, and in 1954 it introduced an instant-return mirror, thereby eliminating the problem of image blackout. The firm also found ways to brighten the reflex camera viewing screen, to increase focusing accuracy, to improve lens coatings, to reduce camera weight, to incorporate a metering system within the camera body, and to provide fully automatic exposure using an electronic exposure control mechanism (Keppler 1979:3-28). Nikon produced the first 35mm camera with an interchangeable metering system, the first 35mm electric motor drive, and

the first fish-eye lens, perspective control lens, and Polaroid back for 35mm cameras (MOD, July 1966:22). Both Canon and Yashica introduced automatic exposure control mechanisms using electronic technology (NYT, Nov.4, II:36:2). Japanese companies soon entered into subcontractor agreements with Kodak, Bell & Howell, and other American manufacturers, based on these new developments (NYT, Nov.26, II:29:2, 1967). Moreover, and unlike the Germans, the Japanese were quick to incorporate even minor innovations into new cameras, allowing them to trumpet each model as a special event. Between the end of the war and 1980, Asahi Optical, Fuji Photo Film, Nikon, Miranda and Petri had each brought some twenty new 35mm models to market; Yashica, Ricoh and Mamiya made over thirty each; and Canon, Minolta and Olympus produced approximately seventy new models each. The Germans, for their part, produced far less variety in the same time period. Between the end of the war and the company's demise in 1978, only ten Exakta models came out of East Germany, and only seven came out of the West. Carl Zeiss made eighteen post-war versions of its Contaflex, while Leitz continued its M series of rangefinders--M2 to M5--and finally introduced its line of reflex cameras in 1964.

Japanese companies also diversified themselves, using the technologies derived from the photo-optical trade. Aside from telescopes, binoculars and medical optics, the

Asahi Optical Company is involved with automated drafting systems; platemaking, dye molding, and plotter systems; and video, computer, and laser systems. In the 1960s, the Nikon Company began to branch out into work with semiconductors, lasers, computer-assisted measuring and surveying devices, dental materials, and laser disks. Much of this research is based on the lens-coating technology first perfected by Carl Zeiss, but left unexploited by the German firm. Since the 1950s, the Ricoh Company has been active in the field of office machinery and electronics, and was the first to transmit facsimile messages via satellite, in 1973. Tamron and Canon have expanded into the area of video equipment, and Canon also markets a line of calculators, fax machines, and electronic typewriters. "Since 1975, less than 50% of the total of the sales volumes of 11 major camera companies has been related to sales from the photographic business" (Condax et al. 10). By the end of the 1980s, Japanese camera and manufacturers were well placed to take the lead in the transition from still photography to electronic "information and imaging systems".

CHAPTER FOUR - ADVERTISING

Although neither Rogers (1983) nor Rogers and Shoemaker (1971) deal with the topic, it is clear that media advertising plays an important, perhaps even crucial role in the diffusion of technology in modern capitalist societies. To all appearances at least, this would seem to be the implicit attitude of American photographic manufacturers themselves, who spend between 2.2 and 2.3 percent of their annual receipts on advertising. This is a figure that represents over forty million dollars spent on television advertising alone in 1974, the last years for which reliable numbers are available from the U.S. Department of Commerce (Statistical Abstracts of the United States).

Several factors contribute to this importance. First, on the level of disseminating factual information, media advertising as a form of publicity lends itself to the announcement of new products, and has been used as such since the end of the nineteenth century (Fox 1984:38). Inasmuch as radio, television and print media are perceived as natural sources of news, manufacturers find it convenient to coordinate their product announcements with regular coverage (Miller in Gitlin 1986:183-228). This orchestration of advertising and news has led, in actual fact, to controversies over "pseudo-events" and professional ethics among news reporters (Boorstin 1961).

Secondly, even when recognized by the general public, new commodities, and especially technologically intensive ones, often appear as overly complex, confusing, and disruptive of social patterns or personal habits. Donald A. Norman, a cognitive psychologist working with problems in industrial design, argues that the use of all objects requires some combination of what he calls "knowledge in the head" and "knowledge in the world". While the former is grounded in memory and experience, the later is based on how easily objects communicate their functions to the user, via cues, diagrams, instructions, constraints, feedback, and even the signaling of proper ways to hold them (Norman 1988:54-104). Although Norman does not use 35mm cameras as an illustration, it is clear that for the most part their operating functions are less than obvious, even to experienced photographers. The instruction book for the Nikon F4 camera, first introduced in 1989, is some two hundred pages in length. Although this is somewhat extraordinary, one must remember that when the first Leica was introduced, E. Leitz considered it advisable to run a series of workshops to explain their product. It is through advertising that manufacturers may attempt to alert consumers to new features and benefits of technological innovation.

More importantly, patterns for using new communicative technologies are imposed upon existing structures of social life which they may challenge and disrupt. On a simple

level this is seen in the area of day-to-day etiquette, where the quicker pace or strong presence of media usage is experienced as rude or impolite by former standards. Amy Vanderbilt's book on etiquette, for example, deals with "proper" manners with regard to radio, television, the telegraph and telephone, phonographs and photography, and reading newspapers over another's shoulder (Vanderbilt 1952:1034,166,261,314 ,355,360,438-39,535,559,644,682, 823,831,841, etc.,etc.). Vanderbilt deals with questions such as how television is to be treated while entertaining at home, how loudly portable radios may be played while in public conveyances, and the fact that, "No one, even in peacetime, may take aboard a camera or a pet," on a naval vessel (Vanderbilt 1952:784). Vanderbilt's advice may be seen as unusually quaint or precious, at least to those of us who will never worry about whether or not the servants are entitled to their own radio (Vanderbilt 1952:506). Yet older rules of etiquette may be codified by law, and as early as 1903 it was felt necessary to pass legislation to protect the privacy of individual citizens against the ambushes of indiscriminate "Kodakers" (Kern 1983:187-190).

Finally, because new commodities are marketed at a rapid, pace, they inevitably have different meanings for various groups of users and consumers, whether they belong to emerging subcultures, or simply to younger generations. For example, the jukebox and drive-in movie theatre, both

considered socially disruptive in the 1920s, now elicit pangs of nostalgia (Fass 1977:300-306). Media technologies seen as functional and utilitarian by one generation may also be viewed more hedonically by another, just as devices that appear novel and sophisticated to older people can be taken as part of the given environment by growing children. Critics such as Meyrowitz (1985:226-267), Winn (1985) and others (Englehardt in Gitlin 68-110) have warned that television has actually taken over many of the basic socializing functions traditionally performed by parents. Whether true or not, the possibility that youth will abuse new media technologies, or perhaps even ignore them altogether, are concerns that manufacturers must take into account. Indeed, with regard to special products such as color television, video display terminals and color dark-room chemicals, questions of physical safety and environmental impact still arise. Confusion over the proper use of domestic consumer items is so widespread as to form a large part of the body of what Brunvard calls "urban legends" (1986:161-166), and consisting of contemporary folktales that relate, for the example, the gruesome results of using a microwave oven to dry off the family pet. Advertising has been employed as one attempted method for alleviating these fears. With regard to photography, some members of the public still hesitate to have prints made from slides, for fear that the original slide will be

destroyed in the process. Insofar as new media technologies appear as foreign, over-priced or potentially dangerous, their adoption will be hampered. Advertising presents manufacturers with one method for attempting to "manage" these fears.

Photographic Advertising: Discursive Functions

To study the relationship between advertising and the photographic industry, one might refer back to Rogers' four phases of product development: innovation, imitation, competition and standardization. One would expect that in the initial stages of innovation, advertising would have a flavor or character similar to press releases or news announcements. In the following, imitative stage, advertising could be expected to emphasize refinements of the original invention. As large firms move to edge out their competitors, one would predict increasing brand name emphasis, with particular accent on any given firm's contribution to the evolution of that technology. And in the fourth stage, where products are minimally differentiated, one would postulate the use of advertising to increase brand name identification and a competitive pricing structure.

These predictions are based on the observation that modern advertising agencies function not only to create copy and buy media space, but also sensitize themselves to both the manufacturers' status with regard to technological development, and to the market conditions for their products. In this second capacity, many advertising agencies have expanded their services into the areas of product testing and consumer motivation research (Leiss, Kline and Jhally 1986:116-119; cf. Dichter 1964). As such, advertising agencies attempt to attune themselves not only to the explicit, utilitarian aspects of commodities, but also to their symbolic, communicative, emotionally associative ramifications. Advertising of commodities may be shaped in terms of appeal to socioeconomic status, gender-specific use, aesthetic value, and implications for cultural identity. Advertising may be looked upon as an institution that deals with the assignment of meaning to marketed goods, an institution which, in terms of capital investment and public accessibility, is a major force in industrial society. Advertising is more than just an entertaining conduit of information from producers to consumers. It may be regarded, as Leiss, Kline and Jhally put it, as "privileged form of discourse" about commodities and their meanings; discursive because, like language, it is constantly productive in its attempts to define or redefine the nature of socially assigned meanings of commodities,

and of itself as a practice; and privileged because few barriers keep it from pervading both public and private spheres of life, and even blurring the traditional lines between them.

Methodological Issues

The analysis of photographic advertising involves a number of methodological difficulties, regardless of what importance one finally assigns to it. To begin with, the competitive nature of advertising means that it is essentially a dispersive activity. In order to maintain product individuation, the use of visual or verbal materials by one advertiser cannot normally be copied by any other. On the contrary, since manufacturers and agencies would be expected to emphasize the dissimilarity amongst themselves, one would not anticipate regularities of any large degree of magnitude. At the same time, since advertising in this case centers around a product whose major features were quickly standardized, advertisers have a constrained realm of characteristics to describe. Since cameras will only do so much, there is no infinity of factual claims, or persuasive hyperbole, for advertisers to use. Indeed, in studying photographic advertising, one is left with the subjec-

tive sense of a rather small deck of cards, constantly reshuffled to give the impression of variety.

Secondly, the selection of a suitable data base for study is not uncomplicated. As noted earlier, advertising for cameras has appeared in various mass media, including radio, television, and printed publications. For the sake of historical perspective, television must be eliminated, since the 35mm camera's existence predates this medium's popularity by three decades. Since radio is an exclusively auditory medium, it does not lend itself to the fruitful analysis of a visual technology. Newspaper advertising tends to be of a local nature, purchased by retailers who compete on the basis of price rather than product. Magazine advertising is purchased by national wholesalers and distributors, often in close conjunction with the manufacturer. The difficulty here is one of range, given the large number and diverse nature of periodicals that carry consumer advertising to the general public. Yet it is doubtful that this public reads these ads for anything other than brand name identification, or that it turns to these magazines for purchasing decisions with regard to complex media technologies. For these reasons, and for the sake of a simplified data base with which to work, this study will examine only those ads for 35mm cameras that have appeared in the photographic specialty press, and specifically in Popular Photography, the longest continual-

ly publishing photographic magazine in the United States [May 1936 to the present], with a maximum average annual circulation of 883,000 copies. Other specialty magazines such as Modern Photography [1937 to 1939], Camera 35 [1957 to 1983], and 35mm Photography [1972 to 1981] have had lower maximum circulation rates [650,400; 110,000; and 155,000 respectively], and in any case have carried virtually identical advertising (Ulrich's Guide to Periodicals 1989).

Finally, the construction of adequate analytical categories is also problematic. As Leiss, Kline and Jhally point out, critical media studies have developed along two directions: content analysis, and semiotics. The former is a procedure that lends itself to quantification inasmuch as it treats advertising as a set of identifiable themes, or as the representation of recognizable ideas or items. Typically, content analysis is useful in studying stereotypes, as in studies that count, for example, how frequently members of visible minorities are depicted as criminals on t.v. (Leiss et al. 149-174). As Krippendorf (1980:9-12,99-108) and others have shown, the strength as well as the weakness of content analysis lies in the basic assumptions of empiricism, namely that these themes or regularities exist "out there", and are not the result of selective perception on the part of the investigator. The recent popularity of semiotic analysis is partly due to its groun-

ding in a hermeneutic tradition, one which draws on structural linguistics, psychoanalysis and Marxian thought, to argue that themes are already embedded in broader, often unconscious systems of meaning. In this tradition, the investigator does not face the data as a naive, innocent observer, but rather as an informed member of the culture in which meaning is fashioned. In this view, the symbolic dimensions of photography can be gleaned from sources such as dreams, biographical and art critical texts, autobiographies of photographers, films such as Antonioni's Blow-Up (1966), and advertising. Yet the semiotic approach rests on assumptions that parallel those of empiricism, even as they dispute it. The belief that identical regularities exist within the minds of all participants in a culture, that the same symbols will mean the same things to all of them, begs the question of how any investigator can separate the "out there" appearance of these representations from his or her own "in here" experience of them. This may lead to its own form of reductionism, as for example the "vulgar" Marxist, who interprets all behavior in terms of economic factors, or the simplistic Freudian for whom all human relationships do nothing more than replay the conflicts of childhood.

Because both content and semiotic analysis are useful despite both their inherent circularities, Leiss, Kline and Jhally have suggested a synthesis of both, one which en-

tails a sensitivity to how dominant themes in advertising may shift in meaning over time, given historical changes in the products themselves as well as the audience using them (175-236). The discussion that follows is largely based on their approach, with modifications as indicated.

35mm Camera Advertisements: Quantity

To begin with, the readiest observation to be made about advertising for 35mm cameras has to do with quantity. For the sake of consistency in measurement, this study only includes ads of one full page minimum in length. Sampling was done beginning with Popular Photography's first twelve months of publication, and at five year intervals after 1945; because the Second World War perturbed camera manufacturing and distribution, the May 1937-April 1938 issues also serve as a starting point for purposes of historical comparison. Advertisements were counted only if they differed significantly, in text or visuals, from one another. The term "significantly", although somewhat subjective, means that two ads, no matter how alike, could be distinguished on the basis of either written text or accompanying illustration. Thus, although 1975 ads for the Canon F-1 repeated the concept of testimonials from profes-

sional users, each one featured a different photographer, text and images, and each is counted as a separate advertisement. Repetitions of the same advertisement, no matter how often, were not measured, nor were separate measurements made of advertisements that ran for more than one page, as in the "Nikon Image" magazine-within-a-magazine inserts of the 1970s. Advertisements by retail stores were excluded, again for reasons of consistency, since these were infrequent after the end of the Korean War.

As Graph IV-A shows, these criteria give a set of baseline numbers of different photographic ads for the years 1937/38 to 1980, one which suggests that the period of most intense advertising activity for 35mm cameras took place between 1960 and 1975. Interestingly, the rate of greatest increase took place between the post-war years 1945 to 1960, when advertising more than doubled in quantity every five-year interval. This rate can be correlated with the entry of the Japanese manufacturers into the marketplace, from three in 1950 to eleven at the end of the decade. Japanese producers alone account for almost two-thirds of the figure for 1955. On either end of the graph, the small number of advertisements in 1945 is clearly due to the war and its attendant shortages, while the rapid decline between 1975 and 1980 requires explanation that will be given in a following chapter.

The reader will also note a decrease in the number of advertisements citing price anywhere in their text (Graph IV-B). Moreover, this trend occurs almost in direct proportion to the increase in quantity of advertising, and flies in the face of predictions one would make based on Rogers' model. Although nearly every ad published in 1955 mentions the price of the camera, this piece of information appears in less than 10 percent of ads in 1975. Between 1960 and 1965, the change is particularly dramatic. These patterns suggest that the citation of price occurs without regard to external factors, such as more cyclical, recessionary trends in the national economy. Again, this requires a separate explanation, also given below.

Advertising Categories: Texts

Another set of trends can be distinguished if one analyzes advertisements on the basis of the predominant themes of their texts. Fox (1984:63-64,70-77) differentiates "hard sell" from "soft" sell copy. In the first category are those ads based on rational, "reason why", arguments concerning consumer benefits, versus the vague, "impressionistic" or "atmospheric" ads that tie the commodity to some emotional association. Advertisements

dominated by "reason why" arguments would include those that stress price, variety of accessories, availability of service, and so on, as in a 1960 ad for the Beseler Topcon which offered buyers a lens test, shutter calibration chart, and free camera inspection certificates (Illustration IV-1). For purposes of this study, the second category has been given the name of "associative text", and includes all advertisements that displace discussion of the specific camera and link it instead to a wider affective or symbolic context. One clear example of this category is demonstrated by Illustration IV-2, in which the text speaks primarily of changing technologies and women's fashions. Although references to sexuality are prime examples of associative texts, a 1960 ad for the Ricoh Auto 35 (IV-3), and a 1960 ad for the Nikon F (IV-4) follow the same principle.

Although Fox's broad categories are useful, a perusal of photographic advertising suggests the need for three other categories. For heuristic purposes, the additional headings of "features text", "testimonials" and "historical references" have been added. Under the first are those advertisements that list camera features, very much along the lines of mail order catalogues. Subjectively, these texts read as lists, and are fairly unimaginative and unexciting in comparison to others. Although this type of ad is typical of the immediate post-war period (IV-5), it

was also the bane of German camera advertising, as can be seen from a Zeiss ad of 1960 (IV-6). Testimonial ads are self-explanatory, and center around product endorsements by professional photographers, as in the Canon F-1 campaign of 1975 (IV-7). Advertisements coded as "historical references" also need little explanation, as in the accompanying illustration of a Voigtlander ad from 1955 (IV-8).

As a note of caution, the reader is warned that some advertisements contain a large degree of overlap between these headings, and that sorting was done on the basis of only one observer's judgement as to the most suitable or appropriate category. Since this study took several months to complete, it is difficult to estimate how all the vagaries of interest, fatigue, and investment in outcomes have affected the end results. Although the figures discussed below are given to the first decimal point, readers need not take these numbers too literally. Nevertheless, some claims can be made as to the general trends they indicate.

As can be seen from the accompanying graphs (IV-C, IV-D and IV-E), "reason why" texts have consistently been the most dominant and, except for the year 1945, they have never represented less than 50 percent of all advertising texts. As has already been noted, and as will be further discussed, 1945 is an anomaly and does not serve as general indicator. Feature-oriented texts, presumably hold-overs from the era of mail order catalogue shopping (Leiss et al.

61-65), dominate the pre-war years and are prominent again in 1965, immediately after Kodak had introduced its cartridge-loading 126 cameras. With these two exceptions, feature texts have represented a small proportion of all ad copy, disappearing entirely by 1980. Associative texts, unused in 1937/38, became important in the war years. This was at a time when few products were marketed, yet manufacturers sought to maintain the public's good will by demonstrating their contributions to the war effort. While Leitz was promoting its made-in-America lenses (IV-9), the Universal Camera Company made direct and even gruesome references to the war, and to German cameras in particular (IV-10, IV-11). Even if historical references are included as associative in nature, associative texts do not seem prominent until 1975, when they account for over 25 percent of all ad copy. This figure may be inflated due to the inclusion of "Nikon Image" texts, which made extensive use of quotes from professional photographers, including the declaration that, "You must be in love with the camera, like a lady" (IV-12). Historical references and testimonials have been infrequent, except for Canon's F-1 ad campaign of 1975 (IV-7).

Advertising Texts: Verbal Terms and References

The technique of content analysis can also be applied to determine the frequency with which key terms have been repeated. In measuring the most common terms used in camera advertising, several factors must be noted. First, while certain individual words such as "new", "system", "choice" and "versatility" refer to significantly different concepts, terms like "announcing" and "introducing", or "now" and "today" are synonymous and can be counted together. Secondly, measurements were only taken of words that appear in headlines or tag lines, or within the first or last few sentences of text. That is, not all uses of each term were counted. Again, the reader is cautioned that this often entailed the subjective judgement of only one observer working over a prolonged period of time. Thirdly, and as any beginning communications student is well aware, the bulk of advertising copy for virtually any commodity consists of what are commonly but accurately described as "weasel words" (i.e. "easy", "automatic", "feels/looks like") , vague claims (i.e. "revolutionary", "fun", "incredible"), and claims that are generically true for that category of product (i.e. "versatile", "system", "compact"). As such, the reader is cautioned against attaching too much meaning to the frequency of particular terms which are themselves fairly meaningless.

Graph pages IV-F through IV-P illustrate the frequencies with which specific words or verbal references have been used from 1937/38 to 1980. Since more than one term may have been drawn from any individual advertisement, the percentages displayed may add up to more than 100 percent for any given year. The graphs have been arranged by clusters of terms that are similar or almost synonymous. In the first cluster, references to novelty or timeliness appear with low but steady regularity, although the word "new" has had greatest repetition, at least until 1970. This falloff correlates with a decline in use of terms referring to a camera's uniqueness, its description in superlative words such as "best" or "greatest", and phrases employing "now" or "today" and that often suggest that the camera stands at the cutting edge of technological progress (IV-G and IV-H). Taken together, these trends lead one to surmise that during the period 1965 to 1970, standardization may have brought product refinement to a plateau of development. The increase in "reason why" text during this time frame may also indicate that consumers were perceived as more knowledgeable and less apt to be swayed by price differences, or that consumers were thought to want to see themselves in this light.

References to the operating functions of cameras, the aesthetic dimensions of their industrial design, the quality of their optics, their abilities under various lighting

conditions, and their relation to the end products of the photographic process (Graphs IV-H and IV-I) are relatively minor themes, except for the regular but still infrequent reiteration of the word "automatic". Ease of operation, mentioned in nearly a quarter of all advertisements in 1950, is not an important theme in any other year. The surprisingly low number of references to optical quality and "systems of photography" may be accounted for by the fact that many manufacturers advertised their lenses and other accessories as separate items; these ads were not included in the data base as they did not strictly deal with cameras. Since compactness, relative to older film formats, is a characteristic of all 35mm cameras sui generis, it is understandable that it would be touted when the innovation was in its infancy.

Advertising Texts: Product Benefits

While the terms discussed immediately above refer, more or less, to features of the cameras as tangible objects, some advertising copy emphasizes the benefits accruing to the consumer (Graphs IV-J and IV-L). Two of these, "versatility" and "choice" in picture taking, were important chiefly in 1937-38, and this again may have to do with

I the introduction of a new class of photographic instruments. Contrary to what one would expect given Susan Sontag's famous remark that, "the camera is the ideal arm of consciousness in its acquisitive mood...To photograph is to appropriate the thing photographed", (Sontag 1977:3-4) advertising at least has made little suggestion that cameras offer mastery, dominance, or control over either subjects or the photographic process itself. Freedom, like versatility or choice, has never been an important theme. The idea of buying a brand of camera based on its fame or popularity, although never absent from advertising copy, has also appeared in small percentages.

References to user wants, needs, desires and wishes, and to various forms of satisfaction, appear on a seemingly random basis, this despite the fashionability of consumer motivational research (Graph IV-L). The experience of ownership, a strong theme between 1950 and 1960, has had little reiteration before or since. On the other hand, the concept of "professional" or "expert" quality or knowledge has been one of the most commonly used motifs, albeit with inconsistent use over the years. Consumer benefits, such as "self-expression", the making of "creative" works of art using one's own imagination, and other ways of achieving personal growth through photography, all received little use in advertising copy.

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Although it is not uncommon for people to speak of material objects as animate and even gendered [e.g. talking of computers as "he", and boats as "she"], or as analogues for human functions, little advertising copy for cameras has addressed this tendency (Graph IV-N). Except for the years 1960 and 1965, when cameras such as the Miranda, Nikon and Minolta were presented as "the eye of man" or "the mind of man", cameras have rarely been written about as possessing "intelligence" or "genius", or as possessing a "brain", "mind" or "memory" of their own. Similarly, the tactile or other characteristics of cameras have received little emphasis.

Finally, one can group advertising texts by the ways in which they incorporate mentions of social units, from the national to the individual (Graphs IV-O and IV-P). As can be expected, an appeal to patriotic sentiments during the war years, and a comparison of American products to those of the rest of the world, are frequent during 1945. Thereafter, cameras are not identified by country of origin, except for one Rollei ad in 1960 which employed a "made in Germany" tag line.

However, the most consistent trend in advertising copy over the years has been the use of the word "you". Except for the single years 1955 and 1980, "you" has been occurred in a minimum of ten percent of all texts, and in some years it appeared in nearly one third of all ad copy. At the

same time, the family as a social unit is virtually absent from advertising, except during 1960 and 1975. This appeal to the consumer as an individual, particularly strong in 1975, was then matched with the concept that the camera could provide a form of companionship, in ads that read, "Minolta helps you...", or "You and Rollei" (Figure IV-13).

Advertising Images

Since photographic advertising incorporates images as well as text, this study includes a content analysis of subjects depicted in these ads (Graphs IV-Q to Graph IV-T). For purposes of measurement, all subjects were counted even if the ad contained more than one image. The most common illustrations in camera ads are, not surprisingly, of cameras themselves; few ads could be found which did not include a picture of the camera, even if this was not the dominant or largest image. Similarly, except for the year 1945 when distribution was curtailed, lenses and other accessories appear on a regular basis. As a point of interest, not all ads rely solely on photographs for their illustrative material, and many also employ line drawings, diagrams, cartoons, and other graphics (Figure IV-14). An interesting trend that emerged in the 1970s was the use of

special effects illustrations such as multiple-flash images, filters, and unusual lighting effects.

If the people depicted in camera advertising are considered as a demographic population, the number of boys and men has been declining since 1945, often times in direct proportion to the increased representation of cameras (Graph IV-R). The number of girls and women, on the other hand, has remained steady except for a few fluctuations in 1950 and 1970. There seems to be no correlation between these two. The number of children and couples [exclusively heterosexual] has been practically negligible. Incidentally, few non-Caucasians people these ads. The few exceptions involve images of travel to foreign, non-industrialized countries, and a Nikkormat ad depicting inner city poverty. A series of testimonial ads for the Canon F-1, run in 1975 (IV-7), included two black and one oriental professional photographers. Only one woman professional was depicted in this series, and she is part of a husband-and-wife collaboration.

With regard to the other subjects most frequently used, nature - a category that includes animals and landscapes - enjoyed a brief vogue in 1970 and 1975; fine art [paintings, sculpture, musical performances] appeared with some elevation in frequency in 1965; sports [football, race car driving, sailing], machinery [automobiles, rocket ships, airplanes, optical instruments], and travel [land-

marks, foreign landscapes and people] have rarely been staple subjects. Close-ups of hands holding the camera have had intermittent frequencies (Graphs IV-S and IV-T). Nude or semi-nude photographs, although all of women, were also comparatively rare.

Text-Image Relationships

Since advertisements are chiefly combinations of words and images, it is often possible for these two elements to serve overlapping functions. That is, while written material may give factual, explicit information about a camera and its features, the accompanying illustrations may be more associative in nature, or vice versa. Generally speaking most camera ads are a combination of the two, but the proportionate use of each has fluctuated over the years. To map out these changes, and to determine the relative prominence of each element, measurements were taken of all ads, to determine the ratio of space taken up by written copy versus that taken up by images. Again, the reader is cautioned against an overly literal interpretation of the findings presented in Graphs IV-U, IV-V and IV-W, as it could be argued that bold headlines, italicized subheads, and other typographical devices are as much

graphic as textual. Generally speaking however, most camera advertising has used fairly conservative forms of typographic design, making it possible to separate image from text.

As can be seen from the accompanying graphs, and the summary Graph IV-X, most camera advertisements have avoided the extremes of heavy textual or visual emphasis. The great majority of ads have been composed within the range of image-to-text ratios from 30:70 to 70:30, and of these most are balanced at a 50:50 level. Within this range however, there are some distinguishable trends. In 1945, for instance, advertising tended to be text-heavy, again probably because of war-related shortages. Extremely image-heavy ads became more prominent in the period between 1950 and 1965, perhaps due to the introduction of monochrome, and then colour television. Yet despite the increasing use of full-page, four-colour printing within the body of the magazine, the bulk of camera ads have relied on text as much as imagery for their impact.

From Content Analysis to Semiotic Analysis

The content analysis of 35mm camera advertising given above yields few consistent patterns over the course of

time. The major regularities are the steady use of "reason why" copy, and the increasing use of associative texts in 1975 and 1980; fairly frequent reiteration of the term "new" in ad copy, at least until 1970; periodic emphasis, in ad copy, on the words "expert" and "professional"; and with the exception of 1955, an almost constant reference to "you", the individual user, to the exclusion of all other social units except, in 1975, a companionate relationship with the camera. In terms of illustrative material, the majority of camera ads in almost every year emphasized the camera itself. On the average, and with the exceptions of the years 1937/38 and 1945, men and women are depicted with almost equal frequency, although a slight decline in the number of men shown since 1970 has been matched by a slight increase in the number of women. Children and couples are almost entirely absent. Other subjects are depicted with low, almost random frequency. Finally, camera advertising has never been predominantly textual or imagistic. On the whole, most ads employ a mid-range balance between written copy and illustration.

These considerations must be kept in mind if one wishes to interpret 35mm camera advertisements as "signifiers" in a "discourse about commodities", or as one attempts to generalize about the camera as a symbol imbued with ideological meaning. Clearly, the depictions of men and women in advertising, various verbal references, and

associative texts are never emotionally neutral. But generalizations about the nature of their affective, symbolic, or ideological meanings must be tempered by reference to the empirical evidence of the advertisements themselves.

Two examples illustrate the pitfalls of analyzing camera advertisements on the basis of closed systems of interpretation. The first is Susan Sontag's assertion that,

Like a car, a camera is sold as a predatory weapon - one that's as automated as possible, ready to spring. Popular taste expects an easy, an invisible technology. Manufacturers reassure their customers that taking pictures demands no skill or expert knowledge, that the machine is all-knowing, and responds to the slightest pressure of the will. It's as simple as turning the ignition key or pulling the trigger (Sontag 1977:14).

At least as far as advertising in a special interest magazine is concerned, Sontag is contradicted on all points. As discussed above, few ads describe 35mm cameras in terms of easy operation or automated functioning. And if anything, the advertisements studied tend to emphasize the professional calibre of the equipment.

The second example is drawn from the thesis that the camera is an instrument of "the patriarchal male gaze", an argument first advanced by the feminist film critics Laura Mulvey (1975) and E. Ann Kaplan (1982), and extended to still photography by Kate Linker (1984) and Abigail Solomon-Godeau (1988). Based on post-Lacanian psychoanalytic

thinking, the main contention here is not simply that the camera is a symbolic penis, but that its use is a prime example, in the visual sphere, of male domination over women.

Consider, for example, women's subordination to reproduction, to the family, and to the masculine libidinal economy as advanced through advertising and TV. Or consider the deployment of the fashion model as an idealized image for the male gaze, or for woman's narcissistic identification. Cinema studies have attended to the use of stars and stereotypes and to the function, in narrative, of these passive signs of masculine desire. This constitution of identity such that man is viewer, woman viewed, and the viewing process a mode of domination and control has been applied to the tradition of the female nude; art history has turned, although belatedly, to confront the marginalization of women and the definition of creativity as male (Linker 1984:185).

Here again, the empirical evidence to support such a view is slim. The advertisements under study have not been consistent, over their years, in their use of females as subjects for illustration, and in any case the total proportion of ads using females has never been more than one-quarter. If anything, the use of men as subjects has often been considerably higher. Female nudes or semi-nudes have never constituted a mainstay of any camera advertising, at least in the data base examined here. If anything, the ads are conspicuous for being unpeopled. A more supportable argument is that women have been under-represented as users, as in the Canon F-1 campaign mentioned above. Occupationally speaking, photography is clearly a man's world, and the ratio of professional male to female photog-

raphers in the United States is approximately six to one (Slattery and Fosdick 1975). No doubt, the objection can be raised that man are also subject to objectification by the camera. Yet this line of reasoning, if pursued to its conclusion, would open up a Chinese box full of further interpretations, an infinite regression to hermeneutic "first principles", perhaps to something on the order of light=male /darkness=female. While this dichotomy has great mythopoetic resonance, there is little in the advertising studied here to support such a sweeping interpretation. Moreover, even if broad abstractions are valid on the level of "first principles", they say little about the camera per se as an object with any specificity.

Camera Advertising and General Consumer Products

As an alternative to a semiotic analysis based upon a system of fixed signifiers, Leiss, Kline and Jhally have proposed that advertisements be interpreted for what they appear to be on the functional level, namely as communications about commodities. This shifts the focus of interpretation away from rigid schemata of a priori meaning, and toward the history of changing relations between commodities and their users. The discussion that follows with use

their work as a basis for discussion. It should be noted that their observations are in turn based on a study conducted by Leiss and Kline in 1983, which surveyed 15,000 advertisements for a wide of range of consumer products. This data base came from two Canadian general-interest magazines, and covered a time-frame from 1908 to 1980. Only rough comparisons are possible, since their data base is numerically larger and is not drawn from the special-interest press. Moreover, photographic advertising presents a special case inasmuch as it centers on the very instruments used to produce the illustrations for many other products.

Leiss and Kline identify several trends in consumer advertising since the beginning of the century. First, they observe a markedly higher reliance on visual materials, and a decrease in amount of text. In terms of what this present study has termed image-text ratios, Leiss and Kline note that, "After the 1950s the visual frequently stands on its own, undescribed and unexplained" (Leiss, Kline and Jhally 1986:181). To some extent this finding can be correlated for camera advertising, especially in the years between 1950 and 1960. Yet an emphasis on the visual was almost equally strong in 1937/38, and it has been declining since 1965 (Graph IV-X).

Secondly, Leiss and Kline see a steady decrease in the representation of human beings, especially as product

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users, since the 1930s. Here again 35mm camera advertising is anomalous (Graph IV-R) in containing a fairly steady percentage of representation of people, although there is some shift from more men and children in the period 1937/38 to 1945, and slightly more women from 1970 to 1980. Testimonials also figure more prominently in camera advertising than in ads for other products (Leiss et al. 182; Graphs IV-C, D and E). On the other hand, Leiss and Kline also report increased visual representations of the physical or social settings for products. This is also true of camera advertising which, after 1970, featured photographs of nature, sports, travel scenes, and machinery (Graphs IV-S and IV-T). Leiss and Kline correlate the increasing representation of settings with decreasing claims for product utility, a trend which is not paralleled in the large amounts of "reason why" advertising used for cameras (Leiss et al. 175-231).

Camera Advertising and Cultural Meanings

Based on their historical survey, Leiss and Kline group the history of advertising strategies into four main phases (Leiss et al. 234-236). The first phase, from the early part of the century until the late 1920s, is dominat-

ed by information on product utility, delivery mainly by way of written text. In the second phase, during the 1930s and 40s, household products, food and tobacco, and consumer durables other than automobiles were generally advertised in terms of "what the product could mean for consumers - where it fitted within a world view expanded to encompass the whole of society and nature" (Leiss et al. 233). At this time, product image was stressed. In the third phase, the 1950s and 60s, products were advertised in terms of the specific kinds of personal gratifications they made available, such as experiences of pleasure, well-being, comfort, assurance, etc. During the fourth phase, from 1970 onward, advertising has been more geared to lifestyle patterns, and to the social contexts in which consumption takes place. More emphasis is put on "the way (the product) integrates the individual into a consumption tribe" (Leiss et al. 235) or group of like-minded consumers.

The advertising for 35mm still cameras does fit some of the patterns of these phases, although they were not marketed until the period when advertising, according to Leiss and Kline, was moving from a phase of personal use to one of individual gratification. As shown in Graphs IV-L, M and N, the period 1937/38 to 1950 does in fact contain some increasing emphases on the appeal of ownership, on ease of operation and product enjoyment, on personal growth and opportunities for learning, and on the tactile ("the

silky smooth focusing mechanism") and auditory ("listen to the shutter") dimensions of the camera. This correlates with decreasing references to claims for the product as an end in itself (Graphs IV-G and J). In the 1970s there was slightly more emphasis on lifestyle and the contexts for use, as in the creation of art, in travel, and in activities such as sports, where camera use is indicated as appropriate (Graphs IV-M, S and T). The concept of the camera offering itself as a companion, variously expressed, was extremely popular in 1975, but has not appeared before or since (Graph IV-P).

Camera Advertising: Conclusions

The reader who has patiently waded through the data assembled here may justifiably wish to be rewarded with some major generalization about the nature of 35mm camera advertising, and its relation to broader cultural contexts. Unfortunately this study can only offer a few tentative conclusions, since only a handful of patterns can be discerned.

Graph IV-A suggests that the period of maximum market competition, at least in terms of advertising activity, was the period from 1960 to 1975. This is also a time of

proportionate decrease in the mention of price in the ads (Graph IV-B). This, plus the frequent use of "reason why" text, leads to the hypothesis that manufacturers and distributors stabilized the product within a defined price range, and did not compete on the basis of lowering consumer investment costs. Also, as the 35mm camera became an accepted household object, purchase price was an increasingly irrelevant consideration.

Secondly, "reason why" texts have been the rule in 35mm camera advertising, except for the war years. The buyer of good quality photographic equipment has been addressed, on the whole, as an informed consumer familiar with technical terminology, but not content with the mere listing of product features. Although advertisers have resorted to emotionally associative copy, they have put more emphasis on product benefits. Moreover, visuals have rarely overshadowed written copy. This is consistent with what Leiss and Kline found true of automobiles, which "were given product information treatments" (Leiss et al. 234); it may be true of technologically sophisticated mechanical or electronic goods in general. This pattern can be expected to be most pronounced in special-interest magazines, whose readership is restricted to actual or would-be cognoscenti.

An analysis of the frequency of verbal terms and references used in conjunction with cameras reveals that

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the most common words used overall are "you" and "professional" or "expert". The former is perhaps equally frequent in ads for other products, and in any case it says little about cameras themselves. And again, the reference to expertise may be generically true of consumer products that are used in both domestic and professional contexts.

Finally, the visual contents of 35mm camera advertisements tends to support the historical analysis provided by Leiss and Kline. Within the limitations of the data presented here, 35mm cameras would seem to have moved, like other consumer goods, from a phase of emphasis on the product as an end-in-itself, to phases of consumer satisfaction and lifestyle incorporation. 35mm cameras, in short, were initially new products that needed explanation, and are now commercialized as accepted components of contemporary social life, as are high fidelity stereo systems, tape recorders and home computers. In this sense, to be considered a civilized person today, at least as advertising is concerned, is to have use of a professional quality 35mm camera as part of one's domestic goods. While advertising may imply the exaggerated ideal of every home as a photographic studio, the melding of amateur and professional capabilities has had important consequences for both spheres of activity. These will be examined in the following chapter.

CHAPTER V - ADOPTION AND UTILIZATION

Of all the stages in the diffusion of innovation, the final ones of adoption and utilization are the most resistant to analysis. The reasons for this are manifold, and often parallel those in the study of media effects. The issues raised by the acceptance of new media technologies are at once philosophical and methodological, including the question of how one defines change, whether in terms of behavior or attitudes, in such a way as to allow significant measurement. This is a perennial issue for the social sciences and especially for history, since the bracketing of an age involves the claim that events have reached a decided termination. In the development and utilization of the 35mm still camera, that claim has only a tenuous validity and future hindsight may modify it severely. As a corollary, changes can be assessed as either superficial or profound, to varying degrees respectively. For example, the transition from collodion to gelatin photographic plates had widespread implications, as noted in a previous chapter, but it would be difficult to generate a standard of comparison between its importance and that of the nearly simultaneous move from gas to electric lighting (Rybczynski 1986:139-43). Moreover, both developments may be considered as trivial when compared with events such as the French Revolution. Yet inasmuch as the

discipline of history has traditionally been associated with political history ("kings and battles"), how does one evaluate the impact of a new government alongside shifts in aesthetic taste, medical and hygienic practices, intellectual life or technologies of communication? Or, put in Marxian terms, which developments transform the depths of social structure, and which ones are merely part of the ever-shifting ephemera of "super-structural" conditions? Secondly, one must consider the issue of how suitable causal explanations, of the type familiar to the physical sciences, are to human society and culture, or to organizational structures of any complexity. On one side of this epistemological debate is the position that scientific explanation demands the identification of direct, predictable, causal relationships between phenomena (Pepper 1970: 186-231). On the other hand, one is reminded of a humorous argument, based on Charles Darwin's tongue-in-cheek observation that the number of flowers in any district depends upon the number of bees that pollinate them, which depends in turn on the population of field-mice that can destroy the combs, which depends again on the number of cats available to eat the mice. Several writers have extended this thesis to the apparently logical conclusion that the stability of the British Empire depended upon "a bountiful supply of old maids" because,

Old maids keep: cats which eat: mice,
which which otherwise might destroy: bumble-bees:

these are needed for: clover pollination required
for: clover hay; required for: cavalry horses;
required for: defense of the British Empire (Har-
din 1972:38).

Although an amusing example of interrelated causalities, this observation also serves as a reminder of the unforeseen and even disastrous consequences of applying new technologies to situations in which complexity has been underestimated, as in the cases of various herbicides and pesticides, Thalidomide and the I.U.D, the Aswan Dam project, the St. Lawrence Seaway, and so forth.

Causality and Media Effects

The debate around causality also has a special meaning for communication studies because of the "active media, passive audience" position promulgated by both the Frankfurt School theorists as well as North American behaviorists. In the case of the former, with its "bullet" or "hypodermic needle" model of media sway over social consciousness, this even led to a fairly literal interpretation of audience passivity as a near-hypnotic state. Typical of this approach is the argument that,

Best-sellers address themselves--like the mass media in general--to a public which reacts slowly and is for the most part passive. It is a

public which permits artistic impressions to flow over it without contributing much of its own to the components of the experiences. It persists in a dull passivity which cannot resist emotion and lacks imagination--a sort of defenseless hypnosis...In the case of most of the mass media, like film, radio, and television, the public is passive as to both the(ir) reproduction and reception...Films, radio plays, and television offer themselves...as something ready-made without the listener's or the viewer's being able to have the slightest influence upon the shaping of the products (Hauser 1982: 619).

Aside from cultural elitism that characterizes the Frankfurt School in its rejection of mass culture, the passivity hypothesis has received little empirical backing. Studies of television viewing, supposedly the ne plus ultra of media seduction and hypnosis, yield contradictory evidence at best of an induced trance state or other form of mesmerization. Instead, there are multiple indications that audiences are verbally active participants throughout the viewing process, and that decreased concentration spans may precede rather than result from watching t.v. (Bauer 1964; Kubey and Csikszentmihalyi 1990:111-148). Moreover, if media manipulation or technological adoption do take place either through induced passivity or operant conditioning, it is difficult to explain the failure of even well-researched advertising campaigns, as in the case of the ill-fated Ford Edsel.

Indirect Causality and Over-Determination

In many ways, audience research since the late 1950s has struggled with the issue of causality. The so-called "uses and gratifications" model imitated by Katz (1959), based on work by Lazarsfeld and others (Lazarsfeld and Stanton 1949; modified by Schramm, Lyle and Parker 1961; Blumler and McQuail 1969; Katz, Blumler and Gurevitch 1974), sought to understand media utilization as an active fulfillment of audience needs. Unfortunately, even by shifting analytical focus from media to viewer, the theory of uses and gratifications simply displaces the cause of viewing from one party to another, and usually leaves the concept of "need" as an undefined point of origin (Palmgreen and Rayburn 1982). This is equally true when the idea of media "dependency" is substituted for that of need (Ball-Rokeach and DeFleur 1976). Causal explanation, even to the point of determinism, is also characteristic of McLuhan's theory that new media technologies, as extensions of the human senses, alter the perceptual modalities of entire historical epochs (McLuhan 1965). Less deterministic, but equally reliant on causality, are both the "powerful effects" and "limited effects" theories generated over the past three decades (Noelle-Neumann 1973; Klapper 1960).

A significant departure from causal theories is represented by the hermeneutic traditions more typical of European schools of thought, especially structuralism and semiotics. Because they are more concerned with the formal rules of combination in media messages than with message effects, semioticians can be criticized for operating in somewhat of a conceptual vacuum; the patterned formalism they find in clothing, cuisine or movie images is not usually accessible to untutored members of society. In answer to this charge, and in order to deal with the question of human behavior, reference has been made, via Jacques Lacan, to Freud's theory of symbol and symptom production. As elaborated in The Interpretation of Dreams and other writings, Freud hypothesized that because the unconscious contains contending forces of expression and repression, symbolic productions such as dreams, slips of the tongue, symptoms of mental illness, and works of art, are not causally determined, but emerge from a complex process of over-determination [Uberdeterminierung]. Or, as linguistic theory might put it, each of these productions bundle together so many possible meanings--each equally valid--that they have the same functions as metaphors in spoken language, as in the comparison of one's beloved to a summer's day (Wilden 1972:34-41). Extending the concept of over-determination to the issue at hand, the argument would be made that decisions such as whether or not to adopt or

reject a new technology could be arrived at by any one of several routes. Each of these paths may be sufficient for the final result but, taken as a whole, they form a particularly powerful cluster or unity.

The concept of over-determination in relation to social life has been stressed by Louis Althusser, the French Communist philosopher who has attempted to put Marxism on a supposedly scientific basis by insisting that the true object for study must be social structures, and not the individual human actors who supposed themselves to be the autonomous source of their own actions. Althusser first used over-determination as a way of enriching Marx's discussion of contradictions in society, thereby freeing Marxist thought from the charge of economic reductionism (Althusser 1969; 1970). For Althusser the economic factor is primary but "only in the last instance...which never arrives". Secondly, and more immediately relevant for this study, is Althusser's argument that ideology is not "the ideas of the ruling class" oppressively imposed on those below. For Althusser ideology establishes its controlling power over every aspect of life by appearing as the common-sense, normative texture of everyday, subjectively felt experience. Inasmuch as new technologies can be said to represent the material embodiments of those concepts of efficiency, progress and control vital to industrialized, capitalist societies (Marcuse 1964; Ellul 1967), their ac-

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ceptance would be over-determined by the operations of what Althusser has called the "Ideological State Apparatus", as opposed to the "Repressive State Apparatus". While, according to Althusser, the latter consists of public institutions based on the use of force (i.e. the army and police), the former are constituted by those multiple private institutions whose authority rests on persuasion, and include the family, religion, schools, political parties, mass media, arts and sports, and, one could add, the marketplace. Through these institutions the individual's identity is constructed and reaffirmed. Therefore the individual could be said to be, as Althusser puts it, "hailed" by new technology, and invited to participate in its use, by social relationships organized according to the "structural causality" of the production and re-production of capitalist society (Althusser 1971:127-186).

From Althusser to Gramsci: "Culturalism" and Cultural Formations

While Althusser's structural model advances the argument beyond simple causality, the anti-humanist and anti-empiricist flavor of his thinking, combined perhaps with

the violence of his personal life, have led to corrective dissatisfactions. This is particularly evident in the rediscovery, by the British left, of Antonio Gramsci [1891-1937], a founder of the Italian Communist Party who spent most of his adult life as Mussolini's prisoner. Mindful of the Catholic Church's ability to command loyalties that cross class lines, finding in the Renaissance an example of how intellectual ferment challenged and diminished that power, and anxious to reconcile Marxism with Modernism, Gramsci came to argue that effective political change must be preceded by "hegemony", or control over the entire cultural life of society. A truly Hegelian thinker, Gramsci believed that the success of the bourgeoisie lay not only in its economic power, but in its transformation of the values, traditions and world views of European civilization. From the point of view of the then prevailing Stalinist orthodoxy, Gramsci questioned the doctrine that changes in the economic base of society drive alterations in its cultural and intellectual super-structure. Moreover, by substituting the concept of hegemony for that of domination, Gramsci abandoned an interpretation of history as based on simple class conflict; struggles within philosophical or religious movements often transcend, for Gramsci, those of a purely economic nature (Gramsci 1970).

The appeal of Gramsci for the radical British left may be partly accounted for by the fact that unlike Italy,

France, Germany, and Eastern European countries with active communist parties, there has been no sustained expression of Marxism in English politics except for a lively strain of cultural criticism. Moreover, class structure in Britain is still so deeply embedded in areas such as speech, clothing, manners, recreation and aesthetic taste as to strike North Americans as alien and anachronistic. In any case, Gramsci's theory of hegemony has received elaboration by the "culturalist" strain of modern Marxist thought, represented in Britain by the Birmingham Centre for Cultural Studies, and whose members have included Richard Hoggart, ^{and Richard Johnson} ~~Raymond Williams~~, and Stuart Hall". For them, Althusser's discussion of over-determination and the ideological state apparatus has been tempered by Gramsci's characterization of hegemony as an dynamic, unstable, ceaselessly contested arena of cultural politics. While accepting insights into the formal processes of semiosis, the culturalists have insisted that culture has the metaphorical and metonymic properties of language, so that both "encoding" and "decoding" are somewhat open, often indeterminate and polysemous in nature; a safety-pin in a diaper has one set of connotations, but when placed through an earlobe or nipple it has another (Hall 1980:128-138; Hebdige 1979). A proper understanding of the pin as an object depends not only upon the specification of all relevant interpretative contexts, but also an accounting of what power relation-

ships lie behind certain "preferred readings". These perspectives have permitted the construction of a critical approach that avoids the pitfalls of both functionalism and ahistorical relativism, along with their attendant calls for cultural pluralism (Hall 1980:31-35). In actual fact, the Centre for Cultural Studies has been particularly concerned with the ideological function of pluralism in modern capitalist-democratic societies, chief of which it sees as the repression of ideology itself under the guise of "choice" (Hall 1982:56-90). Central to the culturalist position is an insistence that, on every level of semiosis, there takes place a struggle around "only one axis of power: the reproduction of dominant representations of the social formation" (Allor 1988:225).

Technology as a Site of Cultural Struggle

One of the chief conceptual tools generated by the Centre for Cultural Studies is the idea of social and cultural formations. As units of analysis they have been defined as

those effective movements and tendencies, in intellectual and artistic life, which have significant and sometimes decisive influence on the active

development of a culture, and which
have a variable and often oblique rela-
tion to formal institutions (Williams
1981:171)

Clearly, this is a somewhat loose concept which tends to sidestep the issue of causality, and which has lent itself to studies of "reading formations", "formations of pleasure", "formations of fantasy", sometimes very much along the lines of mainstream North American audience research (Frazer 1987:407-25). Nevertheless, it has the advantage of moving discussions of culture away from the aesthetics of "highbrow" versus "popular" tastes and values, and away from studies of cultural deviance based on the dichotomies of cultivated versus crude taste. Instead, the concept of cultural formations is based on the economic and social relations of production and consumption that take place within the division of capital and labor. This division, it has been argued, runs through all the institutions that Althusser identified as constituting the Ideological State Apparatus (Coward 1978:75-105).

Culturalism and Innovation

A culturalist perspective clearly challenges any simplistic, linear model of the diffusion of innovation.

Instead of interpreting the adoption of new media technologies in terms of individual personality traits such as "innovativeness". or in light of pre-existing customs and habits, or even from the point of view of relative advantages and disadvantages, acceptance of or resistance to new technologies can be understood as one component of many struggles for hegemonic control over the existing patterns of social relationships. New technologies can therefore be assessed for their ideological significance as well as their impact on material practices. Moreover, it now becomes more accurate to speak of technologies with regard to the specific social groups or formations contending over a multiplicity of possible uses.

The concept of formations provides a different optic through which to view Rogers' and Shoemaker's model of adoption, and especially of their attempts to create a typology of adopter categories as Weberian "ideal types". Arguing that "adopter distributions follow a bell-shaped curve over time" (Rogers 1971:179), Rogers divides this curve into five segments as follows:

1. The first 2.5 percent of adopters are those for whom "venturesomeness is almost an obsession," and these are "cosmopolite" personalities whose characteristics include "control of substantial financial resources to absorb the possible loss due to an unprofitable innovation

and the ability to understand and apply complex technical knowledge." Such innovators find attraction in "the hazardous, the rash, the daring, and the risky" (Rogers 1971: 83).

2. The second 13.5 percent consists of those "early adopters (who are)...a more integrated part of the local social system than are innovators." As "localites" they are often in positions of "opinion leadership", are "respected by (their) peers", and are "the embodiment of successful and discrete use of new ideas". "Because early adopters are not too far ahead of the average individual in innovativeness, they serve as a role model for many other members of a social system" (Rogers 1971:184).

3. The third category of adopters reside in the "early majority" segment occupied by some 34 percent of the population, and typically "may deliberate for some time before completely adopting a new idea". "They follow with deliberate willingness in adopting innovations, but seldom lead" (Rogers 1971:184).

4. Another estimated 34 percent of adopters consist of "the late majority" which, skeptical in outlook, accepts innovation only when, "Adoption may be both an economic necessity and the answer to increasing social pressures" (Rogers 1971:184).

5. The remaining 16 percent of the population contains "laggards...the last to adopt an innovation". Ex-

tremely localite in orientation, laggards are conservative and suspicious of new innovations and of early adopters.

"The point of reference for the laggard is the past. Decisions are usually made in terms of what has been done in previous generations" (Rogers 1971:185).

While not discarding these categories entirely, it is clear that they have been drawn without reference to cultural or ideological struggles such as evidenced in the critiques of technical progress and industrialization that have been an important component of Romanticism. Moreover, the conception of adopters solely in terms of individual personality traits undermines the thesis that adoption, almost by definition, must be a collaborative if not collective activity; even Rogers admits that, "Communication patterns and friendships among a clique of innovators are common, even though the geographical distance between the innovators may be great" (Rogers 1971:183). Moreover, the adopter categories given by Rogers are inadequate in that some groups, such as the legal or medical professions, may be technologically innovative while maintaining a core of values that are socially conservative. And if these adopter categories are to be relevant to political considerations--to the questions of how new media technologies may alter distributions of power--an account must be given of how adopters, as individuals and as groups, are introduced to innovations through the institutions of the family,

schools, churches, and other examples of Althusser's Ideological State Apparatus.

While a mapping out of this process will be the function of this chapter, a useful point of departure is provided by an essay by Jean-Louis Baudry entitled, "Ideological Effects of the Basic Cinema Apparatus". Although Baudry's theme was cinematography, the thrust of his thesis is also applicable to still photography. In particular, Baudry argued that

Between "objective reality" and the camera, site of the inscription (of light on film), and between the inscription and projection are situated certain operations, a work which has as its result a finished product. To the extent that it is cut off from the raw material ("objective reality") this product does not allow us to see the transformation which has taken place. Equally distant from "objective reality" and the finished product, the camera occupies an intermediate position in the work process which leads from raw material to finished product...

Cinematographic specificity (what distinguishes cinema from other systems of signification) thus refers to a work, that is, to a process of transformation. The question becomes, is the work made evident, does consumption of the product bring about a "knowledge effect" (Althusser), or is the work concealed? (Baudry 39-47).

Bearing in mind that Baudry's use of the term "work" [travail] also refers to the Freudian "dream-work", one can still substitute photography for cinematography in the passage quoted above. A sociological understanding of the camera can therefore proceed on the basis that the camera is an instrument for working or re-working the "objective reality" of the world, and that this work takes place

within the context of specific social and cultural formations. It is within these formations that values are enunciated and challenged, that exceptions to the rules are negotiated, and that the dynamic and even unstable definitions of "photography", "news", "art", "fashion", "image", "hobby", and even "technology" are hammered out on a day-to-day basis.

Photography: Basic Economic Considerations

It must be admitted at the outset that large gaps in the data base make a detailed account of the camera's adoption somewhat difficult. There has been little research, for example, on the position of the 35mm camera within acquisition patterns for other durable goods such as "clothes dryers, dishwashers, and freezers" (Kasulis, Lusch, and Stafford Jr. 1979:47-57). Conventional market research in this area has been either sporadic or uncited, and what little there is does not fit rigorous standards of analysis. Nevertheless, the quantitative and qualitative information available does allow for generalizations of at least the first order. Other evidence lends itself to more of a case history approach.

The economic dimensions of the photographic industry can be measured in several ways, but August Wolfman, a leading observer, introduced the concept of a

Gross National Photographic Product...the total value of photographic merchandise [at manufacturer's and import price level] shipped to the U.S. market. It includes imports as well as U.S. manufactured photo merchandise. The value of U.S. exports is deduced (Wolfman 1973:16).

Measured in these terms, the Gross National Photographic Product (G.N.N.P.) has outperformed the Gross National Product (G.N.P.) since the late 1950s, and has grown at a higher rate than can be explained by reference to population growth (see Graphs V-1). In 1960 the G.N.N.P. stood at \$1,211,897,000; by 1970 it had reached \$3,821,347,000; and in 1980 it totaled \$14,452,000,000. While the G.N.P. of the United States increased by 46.4 percent between 1963 and 1968, the G.N.P.P. rose by 111.4 percent during that same five-year period; between 1973 and 1978, the comparisons in growth rate are quite similar. It should be noted that, unlike the G.N.P., the G.N.N.P. does not include professional services as part of its calculation; were these to be included, G.N.N.P. figures would be necessarily higher (Wolfman 1969:13; 1974:16; 1985:14). Spending on photographic merchandise seems to occur independently of general business conditions, such as the availability of retail outlets (Graphs V-2) or recessionary trends in the economy (Wolfman 1985:63). Growth patterns

for public spending on film, cameras, accessories and photofinishing have been of almost equally exponential value (Wolfman 1985:71). On the other hand, population increases seem to correlate with patterns of growth for the number of photographic studios and their annual receipts (Graphs V-3), as well as for the number of American photographic manufacturers and the value of their sales (Graphs V-4). Spending on photographic merchandise appears to follow the normative pattern of geographical distribution for all American retail sales, except for under-representation in Alabama, Kentucky, Mississippi and Tennessee, and over-representation in the Pacific states (Graph V-5).

35mm and Other Camera Types: Market Product Mix

35mm cameras are not the only type of camera equipment available to the retail market, but they represent a larger variety than any other camera type. In 1973 manufacturers marketed over one hundred and twenty 35mm camera models of both the reflex and non-reflex type, as opposed to only forty 126-cartridge cameras and fifteen self-developing Polaroids. In 1977, the variety of 35mm cameras, especially of the reflex type, again exceeded any others

despite the introduction of Kodak's popular 110 format. By 1983, new 126-cartridge cameras were almost eliminated, with their places taken by small 110 and Disc cameras. At this point there were also more models of relatively simple non-reflex 35mm cameras than of the more sophisticated and expensive reflex types, but the number of complicated press and view camera models available had increased considerably (Graphs V-6). It is difficult to ascribe these changes to actual consumer demand, except in the case of non-reflex 35mm cameras, as actual shipments of roll and sheet film cameras declined between 1977 and 1983, while those of 35mm cameras continued to grow (Graphs V-7). Some historical perspective on the change in photographic product mix is indicated by counting the number of reviews of each type given by Consumer Reports magazine. Although 35mm cameras were available in America before the pre-war years, the publication gave far more assessments of roll film models until 1957. In issues after 1960 however, the magazine gave increasingly more coverage to 35mm and cartridge-loading cameras, and the larger formats have not been reviewed since (Graph V-8). Incidentally, exposure meters and calculators have not been reviewed since 1947, reflecting perhaps the increasing incorporation of this piece of equipment into the camera itself. In 1971, the only date for which figures are available, 35mm cameras accounted for a little over 20 percent of all cameras in use, a figure

slightly less than that for Polaroid cameras, and less than half that represented by simple, box cameras (Graph V-9B).

Camera Owners: Characteristics

While detailed information on owner characteristics is largely unavailable, some patterns do emerge from the existing data. Generally speaking, camera ownership at least since the late 1960s has been concentrated in the middle and upper income ranges, defined as those that exceed \$10,000 annual household income. In 1968 the highest income ranges--those over \$12,500--accounted for 27.1 percent of all camera purchases; by 1972 this income range was responsible for 50.0 percent of retail sales (Graph V-10A). Around this later date, amateurs bought 60.0 percent of all expensive, professional quality 35mm cameras, with ownership concentrated in the age brackets below 35 (Graph V-10B). A later sampling showed a disproportionate amount of sales of expensive models to users between the ages of 25 and 44, although the proportion of women buying such equipment has been steadily increasing since it was first measured in 1972 (Graphs V-11A and B).

The most detailed information on owner characteristics for various types of cameras comes from surveys conducted in 1984, a date which is technically outside the range of the present study, but included here because it is the only such sampling currently available. According to data drawn from the U.S. Department of Commerce and the Photographic Manufacturers and Distributors Association (reported in Wolfman 1985), the majority of 35mm reflex cameras are married men between the ages of 25 and 44, working for various salary ranges in predominately professional or managerial capacities. Women tend to share almost equal ownership of self-developing cameras of the Polaroid type, and of non-reflex 35mm cameras (Graphs V-12). Unfortunately, these statistics do not distinguish between amateur and professional users. Yet this lack is perhaps characteristic of a technology that is used for both recreational and commercial purposes.

Technological Adoption and Professional Formations

Professional photographers are, by definition, the one social group most closely associated with the camera as a means of production. Any account of the adoption of the

35mm camera must begin especially with those professional photojournalists in Germany and France who were the first to explore its possibilities. To be sure, as previously discussed, commercialization of the dry plate in the 1880s had allowed for the use of miniature hand-held cameras, and for film processing to take place long after and physically removed from the initial exposure. Unencumbered by tripods and chemical equipment, photographers were free to roam outside the confines of the studio. During the 1880s the invention of photolithographic reproduction by means of halftone plates enabled newspapers and magazines to illustrate text with photographs instead of hand-drawn engravings. Despite initial resistance to printed photographs as inartistic (Newhall 1982:252-57; Rosenblum 1981:461; Kahan 1975:53-59), editors preferred the larger selection of views and perspectives afforded by numerous exposures any single photographer could make, and newspapers came to rely on photographs to convey a sense of on-the-spot actuality. Resistance to the use of photographs was also worn down by spectacular pictures of unpredicted and instantaneous events, such as those of the attempted assassination of the mayor of New York City in 1910, and the explosion of the Hindenburg in 1937 (Newhall 1982:257-58).

35mm as Candid Camera

At least three other factors contributed to the rapid adoption of the 35mm camera by European photojournalists, all of them connected to the First World War. First, the immediate aftermath of the Great War was marked by a surge in democratic sentiment. Prior to 1914, absolutist governments ruled in Germany, Russia, Austria and much of eastern Europe, while conservative forces governed England and France; by the end of the war the autocracies were overthrown and the political right had been generally repudiated. The conflagration had been Europe's first experience of total war, one in which the traditional division of battle front and home front was erased as civilians were drawn into nearly every aspect of the struggle. Because it proved to be far more prolonged and sanguinary than the authorities had first promised, governments sought to boost morale and quell dissent by means of propaganda. Germany, itself the subject of often fictitious stories about atrocities its armies had committed in Belgium, was not the only belligerent to impose active censorship on journalists and photographers (Moeller 1989:106-123). The carrying of personal cameras by field troops was also forbidden. What both soldiers and civilians saw of the war was restricted to the visual material supplied by the official government film agencies, Deulig and Bufa. Their newsreels continued

to show German victories even after the armistice was declared (Kracauer 1947:35-47).

Post-war disillusionment with the government, resentment of its deliberate lying, and the experience of a war which had left no aspect of personal life unaffected, all combined to whet the public appetite for candid, uncensored, behind-the-scenes reportage that went far beyond official announcements. German publishers such as Ulstein hired photographers to cover the intense and often secret diplomatic negotiations concerning the Treaty of Versailles and the founding of the League of Nations. The most noted of these photographers was Erich Salomon [1886-1944], who devised numerous methods for crashing these events, disguising himself as a diplomat or house painter, and hiding his small cameras in arm slings, hollowed-out books, and flower vases. Working at first with a single-plate Ermanox, Salomon soon switched to the Leica to produce what one picture editors labeled "candid photographs" (Newhall 1982:219-20). This spirit of breaking down the traditional barriers to photography is also evident in the visual experiments encouraged by the Bauhaus (Willett 1978:139-149).

Salomon's style of candid photographs was quickly taken up by Lisette Model, Martin Munkacsi, Tim Gidal, Philippe Halsman, Ernest Haas, Werner Bischof, Marc Riboud, Felix H. Man and Alfred Eisenstaedt, all of whom helped bring it to magazine work in the United States. At the same time the

small camera was being used in Paris by photographers such as Andre Kertesz and Gyula Halasz [known as "Brassai"] to document street life by day and night. While Kertesz presented an intimate view of small moments in life, Brassi's insistent staring at streetwalkers and the insides of brothels made for unprecedented views of prostitutes interacting with their clients. Such candidness was met with special resistance by public figures such as Franklin Roosevelt, MacKenzie King, Winston Churchill, Adolf Hitler and Joseph Goebbels, and Douglas MacArthur (Manchester 1978:427; Hinz 1979:183). By the 1950s this caution was increasingly challenged by subjects of the photographers known as paparazzi, the journalists who specialized in embarrassing, even scandalous shots of celebrities in unguarded moments. For the paparazzi the small camera and telephoto lens were basic tools of their trade (Freund 1980:181-83).

35mm and Visual Design

A second factor, the release of radio for purposes of public broadcasting in the 1920s, now permitted instantaneous coverage of newsworthy events in such a way as to

deprive newspapers of the immediacy of their reporting. To compete with radio many newspaper publishers expanded their Sunday magazine supplements, providing the kind of in-depth, behind-the-headlines and photographic coverage unavailable through the airwaves. This also occurred at a time of growing sophistication in advertising and motion picture editing techniques, and 35mm cameras such as the Leica, Contax and Exakta lent themselves to a narrative, sequential, cinematographic style of shooting. Picture editors began to experiment with more complex layouts, with collage and montage and with arrangements of pictures into photo-essays (Newhall 1982:259-260).

Thirdly, the war had adapted the internal combustion engine in such a way as to finally mechanize what had been left of a pre-industrial way of life. A conflict that began with cavalry charges, flashing swords and carrier pigeons, ended with tanks, machine guns and aerial bombers. The rapid increase in the pace of warfare was soon extended into post-war civilian life, and this new sense of speed even received praise and photographic expression from the Futurists, whose "photodynamics" recalled earlier motion studies by Marey (Rosenblum 1984:398; Kern 1983:109-130). This interest in speed, flux and the division of time into its constituent fragments was imported into photojournalistic practice by Henri Cartier-Bresson. A prolific and largely intuitive photographer, Cartier-Bresson began using a

Leica in 1932 to capture what he called "the decisive moment" when the placement of subject, camera and lighting coincide to produce a revelatory photograph. This aesthetic, which relies on continuous shooting of an event from inception to conclusion, was soon adopted by his colleagues Sam Tata, Robert Capa, David Seymour ["Chim"], and George Rodger (Newhall 1982:225; Rosenblum 1984:478-79, 483-84;; Hood 1979:11-17; Whelan 1985:71-3); the later three joined him in founding the independent picture agency Magnum in 1947.

The Camera and Journalistic Objectivity: Historical Background

The adoption of the 35mm as a working tool of photo-journalists has also been involved with redefinitions of the concept of objectivity. The term itself is one that is embroiled within various epistemological disputes, including debates within the social sciences on the nature of evidence, the status of hermeneutic approaches, and the philosophical grounds of positivism and empiricism (Giddens 1976:130-154). Without entering into a full discussion of the philosophical issues at stake, one can offer the obser-

vation that objectivity, as variously defined, is a social value of particular occupational groups, namely those involved in what one could call the epistemological professions, or those concerned with observing, transcribing, reporting and disseminating information. The distinction between "knowledge-producing" and "knowledge-using" workers was first made by Machlup (1962:382) in a reading of 1959 U.S. census data, but his categories were shaped so as to include insurance agents, mail clerks, photoengravers and lithographers under the heading of knowledge-producing, while dentists and veterinarians were grouped together with nurses, medical technicians and other therapists as knowledge-users. While this categorization may be useful for certain econometric purposes, it is less than useful in describing the importance of objectivity to these occupations.

Such a description is perhaps also best bracketed by reference to the concept of objectivity as it relates directly to the optical instruments that helped usher in the scientific revolution of the fifteenth and sixteenth centuries; the lenses of both telescopes and microscopes are still called "objectives". As has already been pointed out, almost all the key figures involved in the transformation from medievalism to the modern world view--Galileo, Kepler, Descartes, Newton, Spinoza--also spent major portions of their careers studying optics, the anatomy of the

eye, and the nature of optical phenomena (Ronchi 1970). The materialist distinction between primary and secondary qualities, or between objective and subjective observations, is largely a distinction between those characteristics of matter that are visual [mass, extension, color] and those that employ the other senses [smell, taste, texture, sound)] (Pepper 1970:201-221).

Objectivity and Journalistic Practices

Having said this much, one must pay particular attention to the concept of objectivity as it has been used in the practice of journalism. Smith (1978:153-171), in studying the history of the idea as understood by publishers, remarks that it began as did much of medieval philosophy, namely as the identification of truth with the pronouncements of those vested with formal authority. With the beginnings of a constitutional monarchy in Britain that authority became vested in public opinion, and newspapers were charged with the responsibility for accurate reporting of that opinion as expressed by Members of Parliament and other officials. The invention of shorthand in the 1750s "transformed the business of reporting into a kind of science" (Smith 1978:161), as dictation could be recorded

with the speed of speech. The demand for accuracy in reporting was a concomitant of this technical advance. With the development of telegraphy and an even more rapid style of on-the-spot reporting, journalists also created the foreshortened formula, "Who, What, Where, When, How". With the advent of specialization in news topics, and with more sophisticated layout techniques, "Journalism became the art of structuring reality, rather than recording it" (Smith 1978:168). Particular attention was now paid to questions of coverage and balance.

Dan Schiller, in another historical analysis, underscores the relationship of photography, as a technique, to the concept of objectivity understood as realism (Schiller 1981:88-95). Others have also traced the popularity of the daguerreotype in America, which far exceeded its limited success in Europe, to both the pragmatist and Transcendentalist strains in American culture (Rudisill 1971:37-49). The demand for visual precision required by both empiricist science and mimetic art found its realization in the daguerreotype and other photographic processes, and productions of the camera were readily spoken of as "truth itself...no misrepresentations, no deceits, no equivocations" (Taft 1964:138), or "not copies; - they cannot be called copies of nature, but portions of nature herself" (Rudisill 1971:57). Moreover, as Schiller points out, an artifact claimed to report absolute truth cannot be simultaneously

credited with authorial intent (Schiller 1981:94-95). At another level, scholars such as Schudson (1973), Gans (1979), Schramm (Schramm et al. 1963) and others have linked objectivity, as a journalistic value, to the economics of the newspaper industry. Gans in particular has shown that the concept of objectivity appealed to the early wire services as it allowed them to sell news to clients of varying political persuasions (Gans 1979:186). Along similar lines, Carey assembled evidence that commercial pressures forced the large dailies to serve an audience for which "there was a rather broad consensus concerning values, purposes, and loyalties" (Carey 35). Thus, as journalism became professionalized, it promoted objectivity as a working value (ibid.:33). Chaney (1977) and Tuchman (660-679) have also suggested that journalistic objectivity is now a largely implicit value, at least for the public. The main exceptions are those that prove this rule, as with charges of libel, sensationalism or gross distortion. In these cases, Tuchman argues, a concept of objectivity is used by news management personnel to rationalize their practices to either the public, or for internal purposes. The claim to objectivity in reporting is legitimized on the basis of satisfying the formal attributes of a news story: use of quotations, writing in a third-person and impersonal style, verifying facts by use of public information, presenting official responses to events, presentation of

supporting evidence, and structuring the story so that the most important facts are presented first, and so on (Tuchman 665ff.). Tuchman also makes the case that any so-called objective account will comply with "common sense" understandings of the world, even though the event itself may supply evidence to upset those understandings (Tuchman 664).

Objectivity and the 35mm Camera

The adoption of the 35mm camera coincided with two important changes in photography and photojournalism: a post-war rejection of Victorian sentimentality, and the emergence of a highly bureaucraticized professionalism. The first of these changes sees a rejection of the soft, even out-of-focus work popularized by nineteenth century Romantic and Pictorialist photographers such as P.H. Emerson, H.P. Robinson, Oscar Rejlander, Gertrude Kasebier, Clarence White, and Julia Margaret Cameron (Newhall 1982: 41-164). Photographic modernism, at least in the Germany of the 1920s, was partially identified with a movement in the visual arts called Neue Sachlichkeit or "New Objectivity", and which referred to "objectivity in the sense of a

neutral, sober, matter-of-fact approach, thus coming to embrace functionalism, utility, absence of decorative frills" (Willett 1978:112). Pioneered by the photographer Albert Renger-Patzsch, the movement emphasized ordinary objects and scenes from everyday life, but presented with directness and clarity. One of its favorite techniques was the extreme close-up, an elaboration of near microscopic details very similar to that achieved by enlarging the 35mm negative. The desire to see "the very substance and quintessence of thing itself", without preconception, was also the aim of America's photographic Purists. The visual "look" favored by both movements was clean, hard-edged and impersonal, and represented an aesthetic well-suited to modern photojournalism and precision-camera practices (Weston 1968:78; Gernsheim 1986:92-101).

Photojournalism as Labor

Secondly, the increasing professionalization of photojournalism during and immediately after World War II decreased the autonomy and sense of authorship, craft and entrepreneurship available to photographers as individuals. Although the job of news photographer has existed since

even before the advent of the halftone plate, the typical pattern of recruitment seems to have been identical with that of print reporters, i.e. copyboys or darkroom assistants working their ways up the hierarchy. But by the years 1947 and 1956 newspaper hiring policies changed so that there was a 20 percent increase in the demand for "photographic skills as a tool of newspaper reporting" (Wilcox 497-504). Singletary (585-589) also found an increase of 12.6 percent in reliance on staff photographers as sources for front page news photos occurring between the years 1956 and 1976, and a corresponding decrease in use of freelancers or stock agencies. Calls for college training in photojournalism were made by industry spokesmen in the late 1950s (Witman 3-12). [As of this writing there currently exist 41 undergraduate degree granting programs in photojournalism in the United States, versus the 538 programs that offer the baccalaureate in Journalism. In addition, there are three institutions that offer two-year associate degrees in photojournalism, as opposed to the 212 that offer similar certificates in journalism (Peterson's Guide 1989)].

These changes reflect a reorganization of photojournalism into more formal patterns of recruitment and work. Here the pattern is directly parallel to that of unionized

craftsmanship, where skilled laborers nevertheless are paid fixed salaries for fixed hours, rather than for units of production. The nature of newspaper journalism as an occupation is indicated by the non-union, voluntary and service-oriented association formed by this group in 1946, the National Press Photographers Association (N.P.P.A.). N.P.P.A.'s aims do not include contract negotiations and, "It is not a labor union, nor does it become involved in labor relations" (N.P.P.A. 1987). Most contracts for photojournalists are negotiated by the American Newspaper Guild. Instead, the primary aims of N.P.P.A. could be described as peer support and socializing, or

to become better acquainted with fellow professionals, work together to solve common problems, speak out with one voice against restrictions on our working rights, act together to elevate the status of news photography by developing higher professional standards (N.P.P.A. 1987).

Eligibility requirements for entry into N.P.P.A. demand only that, "you are a professional news photographer or...your occupation is closely allied with photojournalism". These requirements have generated a membership largely composed of "full-time working newspaper, magazine, television and newsreel photographers. Other members are also combinations photographer-reporters, free-lance news photographers, photo editors and executives, photographic manufacturers' representatives, military news photographers, industrial journalists dealing with pictures, photo-

journalism techers and their students...Veterans and beginners alike meet in N.P.P.A. on a common plane of fraternity and professional responsibility" (N.P.P.A. 1987). N.P.P.A. holds periodic competitions and contests, sponsors student workshops and courses, and provides some legal assistance in freedom-of-information cases. It also provides affiliation with Kappa Alpha Mu, a professional photojournalism fraternity (NPPA 1987).

N.P.P.A. therefore bears analysis in terms of what Kleingartner calls a "salaried worker organization" of professionals, as opposed to a true association of independent practitioners. According to Kleingartner,

...the salaried professions do not have the capacity to promote the values of professionalism outside of direct dealings with employers, except in limited ways which do not detract from this generalization...Professional associations would prefer to operate from the assumption that the profession and the employers share a common responsibility in providing high-quality professional service...Professional associations among the salaried professions...are not autonomous organizations, and the members of the profession are without autonomous representation (Kleingartner 1967:104-05).

Photojournalistic Objectivity

Application for membership into N.P.P.A. includes the signing of a separate Code of Ethics, among whose clauses

is the statement that, "It is the individual responsibility of every photojournalist at all times to strive for pictures that report truthfully, honestly and objectively" (N.P.P.A. 1987). While there is practically no information on how photojournalists themselves interpret objectivity as a working value, editors and media commentators have dealt with this issue on many levels. Stevens (1986:24-27) provides an example based upon the publication of five photographs, taken by a Boston Herald American staff photographer, of a failed fire rescue attempt that occurred in July of 1975. These photographs showed a young woman and her child falling to their deaths after failing to reach an escape ladder. The newspaper took the rare step of printing a boxed insert, "Photographer's Story of Pictures", along with a portrait view of the photographer, and his comments, which were mainly technical (i.e. "I kept having to move around because of the light situation...I was making pictures with a motor drive"). These photographs were widely reprinted after being picked up by the international wire services, and they evoked a storm of protest with charges of "cheap journalism, voyeurism, irresponsibility, poor taste, and invasion of privacy".

Stevens points out that defense of the publication of these photographs took the form of reiterating the newspaper's public responsibility to print "the facts". Nora Ephron, in her media column in Esquire, wrote that, "Death

happens to be one of life's main events. And it is irresponsible--and more than that, inaccurate--for newspapers to fail to show it...The only newsworthy thing about the pictures is that they were taken. They deserve to be printed because they are great pictures, breathtaking pictures of something that happened". Another writer suggested that editors could be charged with "manipulating the news" for not running the photographs. Fortunately for the Herald American, a second line of defense was presented a few weeks later, when the mayor of Boston announced a series of fire prevention measures and building code reforms. The newspaper has also received requests from several fire departments for tearsheets and original prints, for use in fire safety awareness programs. These developments should not obscure the primary rationale used, namely that the photographs were justified on the basis of their accurate reporting of actual occurrence. It should also be noted that the photographer himself provided no ethical justification for his actions, and that the decision to publish these photographs and then defend them was taken over by those who edit pictures rather than the individual who produced them. As far as can be ascertained the NPPA never intervened in this issue, nor does it take stands on specific photographs.

Bureaucratized Production and the Choice of Tools

The role of N.P.P.A. as a service organization for salaried professionals, and the relative openness of its eligibility requirements, arise as logical outcomes of the organization of photojournalism as a means of production. This suggests an interpretation of the adoption of the 35mm camera as a tool, based on what Marx first called "the relations of production". As a means of production, the small camera can be said to fit into an organizational structure of the workplace whose central feature is the separation of "the execution of the photograph from its conception" (B. Rosenblum 1978:123). This separation can be traced along four dimensions: periodicity, quality, relation of image to text, and control over copyright and distribution.

The venue or site of production for photojournalists is the daily newspaper, whose relation to time is defined by the meaning of "news". As Bensman and Lilienfeld have said,

...time is a major dimension which determines a vast part of that reporting of events which defines and determines an image of the world...The time feature is not the natural time of natural man, but, because given the periodicity of publication, is an objective factor, subject to conditions and controls that are external to the psychological conditions of action though they may be incorporated into it (Bensman and Lilienfeld 1973:207).

Journalistic time is not necessarily congruent with the amount of time that events take in their unfolding, nor is it the time of leisured contemplation. "Time, for the journalist, is purely an arbitrary accident of the requirements of publication. It has no inherent rhythm other than the economics of publication and the expectations of readers that publication will occur at given intervals" (Bensman and Lilienfeld 1973:207-08). This organization of time is defined by "news" because,

...since every day starts anew, what already exists, what existed the previous day, cannot be said to be new and therefore is not "news". "News," then, is not "the way the world is today." Instead, since the world is pre-given, "news" is "what is new about it," or "what has taken place today" in this pre-given world; that is, the "event" (Clarke 1981:22).

Moreover, the "shelf life" of news as a commodity is itself limited. Photographic images that appear in newspapers, like papers themselves, are produced to be discarded on a daily basis. Even if their usual destination is not the trash can, the high acid content of newsprint guarantees that news photographs will discolor within in a matter of weeks.

The visual quality of newspaper reproduction is often poor, and newspaper photojournalists know that their work is printed via relatively coarse screening methods, using carbon-based inks on uncoated paper stock, and with little enlargement. The news photograph is unthinkingly touched,

I folded, torn up and discarded. This is unlike magazine or fine art photography, in which the image makers often exert far more control over the quality of the images associated with their names. Newspaper photojournalists are also in situations where their work serves primarily to illustrate written text, and in fact a "preferred reading" of their photographs is given by the written caption. Although newspaper photographers are commonly required to provide information that allows for caption writing, few are given responsibility or credit for these accompanying texts. Again, this situation differs from that of the fine art photographer who, if he or she includes text within the presentation of the image, exerts control over its choice and typographic design.

Finally, the newspaper photographer works at a far remove from the distribution of his or her work. The decisions to run certain photographs, to crop them, to place them alongside text or other visual material, are all made by the upper rungs of the newspaper hierarchy. Determinations of assignments also come from photo editors, who may also hold responsibility for issuing film and equipment, and giving access to processing facilities. Often the bulk of the news photographer's day is spent in conference with an editor rather than in shooting. As a rule, salaried newspaper photographers do not retain copyright over their work, and must account to management for every

frame exposed; newspapers frown on staff photographers freelancing while on assignment. The majority of newspaper photographers also remain fairly anonymous, and it has only been in the past twenty years that photographers for large city papers have been credited by name. Moreover, staff photographers have little exclusivity in the work place as photo editors are usually willing to pay amateurs who, by accident of circumstance, are on the scene with their cameras for an unforeseen and dramatic event (see B. Rosenblum 1978:41-62).

Along with these relations of production is the nature of news photography as a task, which is to regularize, as far as possible, the making of images for daily consumption. According to Rosenblum (1978:59-60), this combination of factors provides working photojournalists with the incentive to make their tasks as efficient as possible, by adopting two strategies: overshooting and the making of standard, visually conventional images. Since the worst possible fault of a journalist is missing the story, news photographers "cover their tracks" by shooting the same event from as many angles as possible. The economics of cheap film and the possibility of making thirty-six exposures before changing a roll [which may as well be finished before processing] encourage use of an apparatus which allows for many exposures to be made and processed as quickly as possible. The ability to change lenses quickly

so as to provide for a multiplicity of perspectives, and a light-weight compactness that facilitates moving the equipment to obtain various angles of view, also favor the choice of the 35mm camera for news photographers.

The making of standardized, genre news photographs also simplifies the photographer's relations with editors, wire services, and colleagues. The pressure of group conformity, always strong within the press corps, is a function of genuine collegiality, similarity of education, (Bennet 1988:105-144) and demographic homogeneity. Bethune's study, "A Sociological Profile of the Daily Newspaper Photographer" (1984:606-14), found that 50.9 percent of staff photojournalists are between the ages of 25 and 35; that male photojournalists outnumber women at a ratio of 8:1 (a proportion double that of print journalists); that white press photographers predominate over their black and Asian colleagues in a ratio of 56:1 and over Hispanics at a rate of 131:1; and that nearly ninety percent are Protestants or Catholics. Contrary to media cliches, photojournalists also tend to be "family men", with 62.1 percent being married, and 50.8 percent having children. Their socioeconomic status could be described as lower middle income, 51.8 percent earning \$10,000 to \$20,000 annually, and 57.8 percent owning their own homes. Bethune describes their political orientations as "middle-of-the-road", 40.8 identifying themselves as independent, and 30.9 percent

affiliating themselves with the Democratic party. The majority--81.2 percent--ranked "the opportunity to improve craft skills" as their major source of job satisfaction.

This internal coherence is also reflected in similarities of working methods and ethical values. In a controlled experimental situation, Fosdick and Tannenbaum (175-82) confronted a sample group of newspaper photographers with test targets, and issued a set of open instructions on how to render them photographically. The results indicated a high degree of consistency among these photographers in their use of "model angle, light contrast, camera angle, camera tilt, image size, vertical light angle, horizontal light angle, number of lights, background tone and overall print tone". This study would suggest the use of formulaic solutions to problems, rather than spontaneous or innovative choices (Slattery and Fosdick 182).

Together with this consistency, a survey conducted by Hartley (1983:301-4) discovered a coherence in professional ethics with regard to the sensitive areas of subject matter such as "violence, privacy, sex and public morals, and faking". On the whole, news photographers tend to be less strict in their application of ethical principles than the general public; they are more tolerant of faking, of minor infractions of the law (parking, trespassing, First Amendment rights), and of the depiction of nudity and violence. Moreover, "a camaraderie exists in press photography dis-

couraging unprofessional behavior toward one another". Slattery and Fosdick found that this coherence tended to exise even gender distinctions, so that female acceptance of the codes of professionalism "minimizes the effect of sex status" in their working lives.

A tendency to work in routinized, formulaic, short-hand style is logically facilitated by equipment that allows for the rapid, improvisational making of exposures, as opposed to working methods arising from tripod-based formats in which every exposure must be focused, composed, set, exposed, and processed individually. Since the 35mm camera is also inobtrusive enough to be concealed when the occasion demands, it additionally lends itself to the invasions of privacy tolerated by news photographers. And collegiality can be enhanced by the trading around of interchangeable film, lenses, batteries, accessories, and camera bodies. From all these point of view then, the adoption of the 35mm still camera as a professional tool may be said to be over-determined by the nature of photo-journalism as a form of labor.

Amateurism: Definition and Organization

Perhaps one of the most important observations to be made about the 35mm still camera is that it spans the traditional categories of recreational and professional or commercial use; although photo-journalists were among the first to adopt it, the small camera was immediately also sold to "serious" hobbyists. While it is difficult to speak precisely of amateurism or hobbyism as social formations, they can be understood as arenas for various modes of production, with various degrees of relation to professional work. Bourdieu (1965) has pioneered research in this area, drawing attention to the quasi-aesthetic, quasi-realistic, quasi-day dreaming quality of amateur photography. Unfortunately, Bourdieu's work is so dated and specific to his own society as to make cross-cultural comparisons between France and America quite difficult.

The path to an analysis of amateurism is perhaps inevitably indirect due to lack of consistent definitions and accurate data gathering. The term "amateur" has historically been applied to the two areas of fine art and sports; in the former instance it referred to connoisseurs who adopted an attitude of "pure" or "distanced" aestheticism, while in the later it has underscored the spirit of fair play. Amateurism has been bracketed on one side by

commercialism, and on the other by dilettantism, with both these alternatives representing a vulgarization of l'amour pour l'amour. Such usage has become archaic in contemporary society, largely because the specifically aristocratic codes of honor which underscored them have now become obsolete, at least in North America. In the United States, organized amateurism includes involvement in activities as diverse as orchestral music, golf and judo, ham radio, astronomy, trap shooting, and orchid growing. It is interesting that the majority of camera clubs operate under the aegis of the Photographic Society of America [founded in 1934 as the Associated Camera Clubs of America, and with a current membership of 11,000], which permits membership to "amateur, advanced amateur, and professional photographers" (PSA 1990). No guidelines are provided to distinguish these categories from one another. While this lack of definition inhibits certain kinds of empirical study, it also suggests that amateurism has a more fluid character in the context of democratic societies. Indeed, numerous ads in photographic magazines suggest to amateurs that they augment their incomes by commercializing their hobby interests (Illustration V-1).

The Politics of Leisure

This shift in meaning has an important parallel in the changing significance of the concept of leisure. As many commentators have pointed out, "leisure" has been a highly politicized idea since Aristotle's justifications for a contemplative strata of society to be supported by slaves. Observers as diverse as Clement Greenberg (1953:57-61) and Bertrand Russell (1935:9-21) have remarked that the meaning of leisure is deeply intertwined with the nature of time in industrialized societies; leisure is defined as a negative, as "not-work". Only those who work on a regular basis may experience leisure, while "idleness" is a characteristic of the extremely wealthy and impoverished strata of society. As Fussell (1983:30ff.) notes, these are the only two groups that have no need for timepieces. Smythe (1977:1-27) even makes the argument that leisure is not time away from work, but time spent in the re-creation of labor power via activities such as shopping, cooking, exercise and hobbies. According to Smythe, the fundamental purpose of leisure is to simply reinvigorate the worker by allowing him/her to act as a consumer; "'free time' and 'leisure' belong only in the monopoly capitalist lexicon alongside 'free world', 'free enterprise', 'free elections', 'free speech', and 'free flow of information'" (Smythe 1972:122).

That leisure has been considered a social problem is demonstrated by a number of government studies and task forces, as well as by the increasing professionalization of supervisors of recreation. The quickened tempo of both trends are most evident in the founding of the National Recreation Association and its graduate school program in 1926; national recreation conferences in 1937, 1939 and 1957; the Outdoor Recreation Resources Review Commission reports to the federal government of 1962; and the founding of the Outdoor Recreation Resources Review Commission in the early 60s (Douglas and Crawford 1963:47-69). Many of the philosophical rationales for the government's assumption of responsibility in this area seem derived from the fear that, "The devil finds work for idle hands". As one official put it,

Monotony in work and in off hours is a social danger no less than disease, disorders, and illiteracy. Our failure to embrace this belief is raising the crime rate, increasing the population in mental hospitals, multiplying the physical and moral weaklings rejected by the armed forces, and raising the percentage of youths who want security as the very onset of their careers and who are afraid of trial and adventure (Charlesworth 1963:34).

And according to the Group for the Advancement of Psychiatry, "for many Americans leisure is dangerous," and can even lead to a "Sunday neurosis" (1958, Neulinger in Johannis and Bull 1971:55).

Efforts to regulate leisure-time activities have come from both government and business. Examples of the

former include the censorship of films and published materials, regulation of radio and television licensing, the establishment of special postal rates for books and magazines, national amateur sports training programs, control over drinking and gambling and "recreational" drugs, administration of the national parks system, non-commercial fishing and hunting licenses, the creation of equipment safety standards, funding for the arts and for civic projects such as playgrounds, and patronage for specific artists or entertainers at official government functions. Businesses have often presented self-regulation as an alternative to direct government intervention, as in the rating practices of the Motion Picture and Distributors Association, the use of league commissioners in sports such as baseball and boxing, and the official sponsorship of amateur sporting events.

Leisure and Social Prestige

Veblen, who first pointed to leisure as an arena for the conspicuous consumption of time, remarked that, "leisure in the (narrow) sense, as distinct from exploit and from any ostensibly productive employment of effort on

objects which are of no intrinsic use, does not commonly leave a material product" (Veblen 1931:45). The most socially prestigious forms of leisure are, according to Veblen, the most contemplative. Examples would include "quasi-scholarly or quasi-artistic accomplishments and a knowledge of processes and incidents which do not conduce directly to the furtherance of human life...These accomplishments may, in some sense, be classed as branches of learning" (*ibid.*). Moreover, one could suggest that this learning is personally acquired and displayed as an enhancement of the individual, rather than for the sake of a social group or collectivity. As such, these activities would be far less subject to external regulation.

In actual fact, the small amount of empirical research done on the relation between leisure and prestige does indicate that, in the 1950s at least, the most overtly regulated and mass leisure-time activities--recreational automobile driving, drinking in bars, and attending spectator sports--were also generally considered the least prestigious, and drew most interest from the lower socioeconomic levels of American society. Activities such as reading, attending museums and concerts, and going to lectures were much more part of what was then called "highbrow" culture (White 1955, in Larrabee and Meyersohn 1958: 205-214). These findings become especially relevant when one consid-

ers the often close relationship of amateur photography to fine art.

Considerations of prestige in use of leisure time also become especially important in periods of affluence such as that enjoyed by the United States in the period following World War Two. With a decided movement of the economy away from production and toward consumption, spending on leisure items and activities began to exceed 15 percent of family incomes, especially in the higher income brackets (Fortune 1953:169). Spending on items such as "nondurable toys and sports supplies" rose from \$910,000,000 annually in 1947, to \$1,209,000,000 in 1953. This was matched by increased expenditures on "durable toys and sports equipment" from \$906,000,000 to \$1,108,000,000 in the same period. The greatest increase recorded was that for power tools, which went from \$31,000,000 in 1947 to \$209,000,000 in 1953 and for allied do-it-yourself items (ibid.:163). The U.S. Department of Commerce attributed economic growth in this area to a marked increase in suburban home-owning by young, affluent couples with large families. Such couples, often familiar with power tools due to wartime service and employment, tended to buy houses that required either expansion or renovation. By 1954, it was estimated that "11 million homes in America now have workshops".

The Do-it-Yourself way of improving and beautifying the home, both inside and out, the search for new recreation outlets in the hobby fields, the increased

activities in home dressmaking--all are a part of the new way of life (U.S. Department of Commerce Business Service Bulletin 1954: 275).

With home-owning a relatively new symbol of affluence for young couples, "home improvement" activities may be said to have enhanced the sense of status, especially by harnessing the sense of autonomy or rugged individualism that attends the do-it-yourself fireplace, cabinet, or article of clothing (see Larrabee 1953).

Do-It-Yourself Photography

While it difficult to ascertain the exact growth in the number of home darkrooms in the post-war period, circumstantial evidence does allow for some tentative observations in this area. First, while sales figures for enlargers and similar equipment cannot be traced, impact on the number or annual receipts of commercial photographic studios in the United States seems to have been minimal (Graphs V-3). On the other hand, there is reason to believe that interest in photography corresponds in intensity with "do-it-yourself" activity in general. This is suggested by the close correlation between the number of books published in the English language on photography with all

those whose titles begin with "How To..." [including how to build your own house, write your own will, construct your own telescope, etc. (Graph V-13)]. The period of maximum intensity of publication for both fields occurred from the time of the Depression until the end of the war, with another upswing in the 1960s.

The shifting nature of hobby photography is also indicated by a content analysis of articles on the subject in two do-it-yourself magazines, Popular Mechanics and Popular Science. As shown in Graphs V-14 and V-15, these can be broken down into four distinct categories: articles on how to use the camera or accessories such as filters and flash; articles on special cameras or processes such as used by the military or in technologically sophisticated scientific investigation; do-it-yourself articles on building camera, darkroom or lighting equipment which include actual blueprints, diagrams or other plans; and announcements or reviews of new products such as fast films or Polaroid cameras. Based on these categories, and counting only full page articles, two general observations can be made. First, frequency of publication of any articles in these magazines on the subject of photography exhibits definite periodicity, with peak periods in the years 1937 to 1950, and 1963 to about 1973, and a marked decline between 1955 and 1962. This periodicity matches that found in Graph V-13. Secondly, while articles on "how to" and

do-it-yourself predominate in the earlier periods, there has been a shift to product reviews in the later. Articles on special cameras or processes, featured during the war years, have also declined in frequency.

A variety of explanations suggest themselves with regard to these changes, assuming that these two magazines are representative of general trends. First, the increasing automation of camera functions such as light meter reading and exposure controls has left less and less for the hobbyist to do. Similarly, the manufacture of accessories such as automatic flash units, close-up equipment and micro- or telescope attachments has made it easier to buy than to build these sorts of units. Secondly, the increasing popularity of color slide and print materials (Graph V-16A) favors commercial photofinishing rather than the home darkroom, as color requires far more expensive and difficult processing. Finally, one can speculate that photographic hobbyism has moved from emphasizing the camera as a tool of production to one where it symbolizes ownership and status. As cameras become more complex, their use becomes less interchangeable. It is not uncommon for even instructors of photography to be incapable of operating student cameras with which they are personally unfamiliar.

Amateurism and The New York Times

The intensity and characteristics of amateur photography can also be traced through articles on the subject in The New York Times; the frequency of its coverage is depicted in Graph V-17. In 1936 the newspaper commented on the popularity of cameras, and estimated that there was "roughly one machine to every family" in New York City. It divided users into two groups: "unambitious people who are still in the hobby stage of photography" and "advanced amateurs". The former group consisted of occasional users, while the second were credited with "fifty or sixty rolls...over the period of a year". The newspaper also noted that amateur photography was no longer a seasonal pursuit because of better film and camera equipment, and that small cameras were increasingly used as travel companions on long vacation (Feb. 2, VII:11:1, 1936). "Certain cruise ships now have dark rooms aboard where the photographer may develop his films if he so desires" (NYT Jan.16, XI:10:2, 1938).

The Times attributed attributed the volume of interest in photography to the advent of the "miniature" camera, a term "now generally applied to all types of small cameras" including 35mm. These cameras had opened up new areas of amateur photographic activity because with them, "the amateur is able to achieve all the photographic 'effects'

that were once though obtainable only with the large and more unwieldy camera". The main advantages of smaller machine were listed as

compactness...speed and ease with which it can be manipulated, the cost of film and equipment is smaller...focusing is more accurate, less exposure time is required, poor lighting conditions are no handicap and the miniature camera may be used indoors as well as out (Dec. 8, XI:14:2, 1935).

The Times also observed a growing number of camera clubs whose exhibits, lectures, field trips, classes and other activities revolved around the smaller camera. The number of camera clubs in the New York metropolitan region increased from twenty in 1932 to over one hundred in 1938. Their membership was reported to be drawn from various strata of society, from "business executives to housewives" (Apr.3, II:13:2, 1938).

The Times writers noticed another trend among amateurs in the immediate post-war period, "a steady deterioration...to the point where a photographer who has renounced darkroom work altogether thinks nothing of accepting full credit for a print even though the processing has been done by someone else". Lamenting the loss of craft in photography, columnist Jacob Deschin argued that, "technique...is simply a vehicle, the indispensable language whose syntax (the photographer) must master to express whatever he has to say in photography" (Dec. 2, II:17:1, 1951).

This deterioration coincided with a decline in amateur photographic salons (May 9, II:14:4, 1954). Deschin eventually concluded that, "amateurism in the real sense of enjoyment of a creative avocation has become almost a rarity" (Dec. 19, II:16:1, 1954).

By 1965 however, Deschin was able to report that amateur activity had increased, with 26 percent more money being spent by hobbyists than in the previous year. Much of this increase was attributed to the introduction of the Kodak line of Instamatic cameras. Another increase in spending, of 21.6 percent, was noted the following year, again fueled by the cartridge cameras. Similar trends were noted in 1967 (Dec.19, II:25:5, 1965; Dec.31, II:20:5, 1967; Dec.18, II:24:7, 1966).

Resistance to the Small Camera

While the introduction of the small camera was credited with an increase in amateur activity, it was also accompanied by some concern that this would reduce photography to the level of a fad. Two points were at issue: the increasing candidness of views that the portable camera allowed, and the perceived easiness of its use. With

regard to the first factor, public figures became especially sensitive about being caught off-guard in unflattering poses. Winston Churchill for one protested the "discourteous...effrontery" of photographers who snapped their shutters while officials were eating, so as to depict their open mouths (NYT Nov.13, 29:6, 1937). Franklin Roosevelt's press secretary went so far as to ban the use of small cameras from all federal government buildings, after Acme News Pictures and the Associated Press released clandestine photos taken during an informal meeting on what was supposed to be a secluded island (POP Oct.1937:13-14:86). Popular Photography ran a series of debates on "the candid camera craze", in which the increasingly intrusive nature of even amateur photography was dismissed as a temporary phenomenon (POP Aug.1937:32-33:66).

Objections with regard to loss of photographic quality also resulted in public and published debates. These often involved amateur organizations such as the Miniature Camera Club of New York, or popular magazines such as U.S.Camera (NYT Nov.17, II:20:2, 1946; Aug.8, II:13:2, 1961). Detractors argued that use of the small camera left too much to chance, and therefore led to indiscriminate shooting, while the degree of enlargement required produced optically degraded images. Proponents touted the 35mm camera's versatility, its usefulness in covering sports and other active events, and its ability to help create a new aes-

thetic, one built on "slice-of-life" spontaneity. In a special 1955 issue on the 35mm camera, Popular Photography went so far as to claim that,

For millions of photographers, 35-mm means more than just a film of camera size: it symbolizes an approach to pictures, a philosophy of photography...even a way of life.

This philosophy was to be based on an approach to photography that was "lively, unposed, realistic" (POP Aug. 1955: 56,59).

The Miniature Camera and Modernity

In making claims for the possibility of a new visual aesthetic based on the precision small camera, the photographic trade press echoed the idea that photography was deeply rooted in the condition of modernity, if not within Modernism itself. To understand this claim, one must look at the emergence of photographic Modernism in relation to amateur photographic practices.

To begin with, it is clear that Modernism's insistence on "art for art's sake" did not arise as a clean, clearly defined break from Romanticism, but first passed through a Symbolist phase at the fin-de-siecle. An adequate study of

Symbolism in relation to still photography has yet to be written, but it is clear that the artistic movement in photography known as Pictorialism combined a Romantic sense of an aristocracy of spirit and sensibility with the visual equivalent of the demand for poesie pure enunciated by Mallarme (Hauser IV:193-199). The aristocratic component of Pictorialism is reflected in the upper class structure of the amateur salons in which it was promulgated, and in the high social status of its proponents. In England its chief adherents, inspired by the soft-focus portraits of the wealthy Julia Margaret Cameron, included P.H. Emerson, a physician who could afford to travel via private canal boat throughout East Angli~~a~~a, and to give copies of his book on this area to all the camera clubs in Britain. Another prominent Pictorialist was George Davison, a founding director of the British Eastman Photographic Materials Company. In Vienna, the Pictorialists were championed by the Baron Alfred Von Liebig. In the United States the movement was supported by famous photographers such as Clarence White, Gertrude Kasebier, Doris Ulmann, Edouard Steichen and Alfred Stieglitz, all of whom either came from or soon entered the higher socioeconomic strata of society. The Baron Adolf de Meyer, a member of the Stieglitz circle, seems to even have adopted the aristocratic title that improper lineage had denied him. Also, salon organizations such as the Royal Photographic Society, the Club der Ama-

teur-Photographen of Vienna, and German camera clubs and galleries operated under official government--which is to say royal--imprimatur.

The demand for a purely aesthetic photography was largely met by soft-focus, impressionistic, heavily textured images made from hand-manipulated, large-format negatives and unenlarged prints. An atmospheric treatment was given to scenes of rural life, to picturesque landscapes, to ancient cathedrals and to contemplative artists, with captions and titles drawn from Biblical or Latin references. Sergei Mikhailovich Prokudin-Gorskii, the official photographer for Tsar Nicholas II, also used a Pictorialist aesthetic in his highly pastoral, bucolic images of Russian life which contain no hint of the strife that would soon give rise to the Revolution (Newhall 1982: 141-164; N. Rosenblum 1981:299-332).

While it is relatively easy to identify Pictorialism with an elitist sensibility and social organization of salons, a lack of primary research makes it difficult to simply equate "straight" or Purist photography with more democratic camera clubs. To begin with, many of those who championed an unadorned, unmanipulated approach to the medium were transitional figures such as Stieglitz and Steichen, Edward Weston, Imogen Cunningham and Ansel Adams, all of whom had begun their careers under the influence of the Pictorialist aesthetic (Newhall 1982: 167-197). Sec-

ondly, much of their work was based on large format cameras, although Stieglitz had helped pioneered miniature camera use (Stieglitz 1897 in Lyons 1966:108-110). Thirdly, there is no empirical evidence known to this writer concerning camera club exhibits, juries or publications that would allow for a history of the adoption of straight photography by these organizations. Finally, none of the camera clubs contacted during the course of this research project had kept any demographic records of their memberships.

Again, one must rely on the circumstantial evidence. The only statistics available indicate that investment in a high quality 35mm camera seems to take place almost equally middle and high income levels (Graphs V-10, V-12). Secondly, although camera clubs may promote "creative" approaches to choice of subject matter, the majority of amateur photographs appear to be of people in ostensibly conventional poses (Graph V-16B). Thirdly, although the number of hobbyists almost doubled between 1973 and 1984, there seems to be a relatively homogeneous distribution in terms of years of active involvement (Graphs V-18); whether this or gender factors are reflected in camera club memberships is impossible to determine. Moreover, and most importantly, it is difficult to argue that the kind of self-conscious sensibility about photographic art that motivated the salons still operates in the camera clubs. However, from

an amateur's point of view the 35mm camera is clearly an advantageous choice in terms of equipment; in the absence of professional technical skills and of universally held rules for lighting, composition and subject matter, the possibility of making several rapid and inexpensive exposures of a any given subject allows amateurs to experiment, edit, and discard their less successful results.

As a mode of production therefore, organized amateur photography remains a field still ripe for investigation. On one hand, the rather open nature of admissions standards and the large number of social functions such as field trips and banquets, all suggest at least a semi-collective approach to photography. On the other hand, events such as annual slide and print contests veer towards a more individualized and competitive use of photography that is closer to commercial practices. How camera clubs balance these factors is still an open question.

Amateurism and Genres

If any non-empirical generalizations can be made about amateur photography, they might begin on the basis of what Allor has termed a "political economy" analysis of the

audience as an active participant in the production of meaning, both for itself and for the socioeconomic organization of capitalism (Allor 1988:221). On a qualitative basis, it could be argued that the production of meaning in amateur photography takes place through the codification of aesthetic standards through what Williams identifies as genres. Williams argues that in the field of literature, genre theory operates as "the combination of at least three types of classification: by literary form, by subject-matter, and by intended readership" (Williams 1977:182). A mixture of empirical and idealist considerations, the classification of genres differs from both forms and conventions; the first are more abstract and "classical" in origin, whereas the second are the result of ever-changing custom and fashion. With regard to modes of production, strict and disciplined artistic forms continue to be associated with aspects of "high culture", e.g. ballet, easel painting, carved sculpture, whereas conventions apply to more mundane aspects of culture such as table settings, dress, and the rituals of everyday etiquette. Genres exist in a middle range of taste and behavior, allowing for individual variations that nevertheless respect the dominant forms.

The predominance in photography of genre thinking is partly illustrated by "photography's best seller of all time" in terms of books, namely the Eastman Kodak Company's

anonymously authored How To Make Good Pictures. First published in 1913, over five million copies of this book had been sold by 1967, when the thirty-second edition went to print (N.Y.T. 16 July, II:12:4, 1967). Aside from basic camera-handling skills and film selection, the bulk of this guide to amateur photography encourages the use of the camera on a personal basis "by...form, by subject-matter, and by intended [viewership]". The later, and not ideal or art historical standards of beauty, are used to define the success of a photograph: "if you like a picture, it's a good picture. If everybody likes it, the picture deserves to go in Class A" (E.K. 1952:12). "Snapshots", which clearly fit into William's definition of a genre, may be found everywhere but, "It's the small things--the daily, intimate events--that yield the best pictures. Overlook them, and you're wasting pure gold. Capture them, no matter how trivial they may seem at the moment--and you'll treasure them forever" (ibid.:68). Formal considerations such as composition, lighting and balance are discussed by giving formulaic receipes for each, such as the "rule of thirds", lighting ratios given as small whole numbers (1:2, 1:4, etc.), or directions for achieving color "harmony" (ibid.:56-65). Specific forms such as the close-up, table-top, still-life, stunt picture and silhouette are also given, but always with the instruction to experiment and find individual ways "to please the eye" (ibid.:182-188).

The genre-based character of amateur photography as defined by How to Make Good Pictures clearly favors the use of the 35mm camera. The book itself recommends the reflex camera because, "These cameras can be used at ground level, at waist level, and even upside-down overhead, at arm's length, for a 'bird's-eye' viewpoint" (ibid.:47). The book groups cameras according to their features and the kinds of photographs for which they can be used, and the more sophisticated models are "the cameras the real picture-taking enthusiasts use" because they "make picture taking easier, quicker, and more fun" (ibid.:41). "Feature for feature--including lens speed--a good miniature camera costs less than any large camera of equivalent quality and construction" (ibid.:49). These cameras take the Kodachrome film that "yields jewel-like transparencies which can be projected to high size...The colors are brilliant, sparkling, glowing with light..." (ibid.:48). Finally, the numerous exposures provided by the 35mm camera are useful because, "the expert never takes 'just one shot'" because, "Every experienced photographe knows that a good subject or situation holds many good pictures" (ibid.:8). But the numerous "good pictures" available in every domestic situation may lie there because of both the relatively ambiguous nature of genre photography, which is bound on one side by relatively open conventions about poses (in the bathtub, in the den, outdoors, etc.), and bounded on another side by clas-

sical, academic and therefore foreign standards of artistic accomplishment. The 35mm camera finds a niche then in the aesthetic decision-making of "serious" amateurs who negotiate such questions in the vague area between museum art and personal domesticity.

The Small Camera and Modernist Aesthetics

It is relatively easy to correlate the adoption of the small camera, and especially the 35mm, with certain aspects of modernity, especially if that modernity is defined in terms of motion, speed, dynamism, disruption of perspectival space, and a decidedly non-Newtonian experience of time. Jacques Henri Lartigue, as a child living in France at the turn of the century, was one of the first to use a collapsible 4.5 x 6 cm hand-held camera. Lartigue recorded the new realm of sensation made possible by the internal combustion engine as it propelled race cars, bicycles, bobsleds, paddle wheelers, and above all airplanes (Newhall 1982:216-219). The small camera, with its fast lenses, high shutter speeds, portability and ease of operation, made it possible for human vision to participate in events that now exceeded the speed of normative perception.

Modernism, as a cultural formation located within the twentieth-century sense of modernity, has a complex history which includes fairly ambivalent attitudes toward photography. Yet any discussion of photographic Modernism must be prefaced by a discussion of art itself as a mode of production.

Fine Art Photography As a Mode of Production

Discussion of fine art as a form of production is often hampered by aesthetic attitude which insists the arts be "artless", and that "works of art" be presented in finished states. Nevertheless, as Howard Becker has pointed out, art production can be studied from a sociological point of view. Becker identifies eight stages or conditions in fine art production: original conception, execution, manufacture and distribution of art materials, distribution of the work(s) of art, response, "creating the maintaining the rational according to which all these other activities make sense and are worth doing", training of producers and support personnel, and construction of "conditions of civic order such that people engaged in making art can count on a certain stability, can feel that there

are some rules to the game they are playing" (Becker 1982:-226-271).

Demographic information concerning the area of fine art photography is illuminating insofar as its rarity attests to the fluid nature of this type of cultural production, and resistance to systematization standing as one of its primary values. To begin with, census procedures in both the Canada and the United States do not distinguish "art photographers" from "artists", "photographers", or "camera artists", although these terms have currency within the realm of fine art. Moreover, the term "artist" is applied to persons with a broad range of education, experience, exposure, financial reliance upon art works for their livelihood, and fidelity to time-honored canons of style and content. Becker makes the useful distinction between what he calls "integrated professionals" [those who work within commonly accepted canons of production], "mavericks" [those whose work is too innovative, difficult, or otherwise outside the canons held at the time of production], "folk artists" [those producing "art done by people who do what they do because it is one of the things members of their community, or at least most members of a particular age and sex, ordinarily do"], and "naieve artists" [those who, without formal training or knowledge of the systematized arts, produce work for the private pleasure of themselves or those within their immediate social circle]

(Becker 1982:226-271). For purposes of discussion one should concentrate on those photographers clearly integrated into the realm of fine art, and include those mavericks whose work lies on the boundaries of the disreputable avant-garde. One does so only at the risk of ignoring the extent to which the work of amateurs or otherwise "naieve" photographers has become part of the accepted canon, as for example the use of snapshot cameras and styles by professional camera artists (Green 1974).

Biases of Canonization

This problem is also complicated by biases in the canonizing process itself. Fine art photographers do not attain their stature simply through receiving a degree, or by joining a professional association. Their work follows an artisinal pattern, inasmuch as the judgement of others is the sole criterion of success, and inasmuch as it is usually up to them as individuals to promote favorable judgement through personal contacts as well as work. In this situation, certain institutional affiliations and specific individuals have become important gatekeepers, as publishers, critics, curators, and art historians. Obvi-

ously the tastes and preferences of a Beaumont Newhall [former head of the George Eastman House and author of a standard text, The History of Photography], a John Szarkowski [Curator of Photography at the Museum of Modern Art], a Nathan Lyons (editor, author, and head of the Visual Studies Workshop) or a Helmut Gernsheim [collector and author of several histories of photography], are of intense concern for those interested in canonization.

Some of the more obvious kinds of curatorial and editorial biases involved in canonization can be traced along the lines of gender and nationality. Slattery and Fosdick's 1979 study (243-47) reported that the ratio of male to female professional photographers in the United States was approximately six to one. Not all professionals are artists, and not all artists are professionals, but this figure does provide a rough base line for comparison. Newhall's 1982 History of Photography lists 102 books and monographs on individual photographers in its index; of these, only eleven are of women. Of sixty more general titles listed by Newhall, ten are authored, edited, or co-authored or co-edited by women. Gernsheim's Creative Photography (1962) lists 27 books about photographers, of which only one is about a woman and was written Gernsheim himself; in the area of works by photographers, Gernsheim's ratio is close to Newhall's, at eleven out of 103. An almost identical ratio obtains in Ian Jeffrey's Photogra-

phy: A Concise History (1981), where seventeen women (two as part of husband-wife teams) are included among the 175 photographers mentioned. In Peter Pollack's The Picture History of Photography (1977), another standard text, 12 women are named among 225 photographers. More typical is Nathan Lyons' influential Photography in the Twentieth Century (1967), bearing the imprimatur of the George Eastman House, and listing 14 women among 150 artists. Lyons' Photographers On Photography (1966) contains articles on 23 figures, two of whom are women. The ratio of women to men represented in anthologies of interviews or critical writings is often lower than the ten percent figure found in the books mentioned above. Although a woman, Peninah R. Petruck, edited two volumes of writing entitled The Camera Viewed (1979), only 5 out of 37 articles are by women; in Danzinger and Conrad's Interviews With Master Photographers (1977), one interview with a woman is given out of a total of eight. These figures must also be read against the fairly high involvement of women in the process of photographic education. A survey of the 1989 membership list of the Society for Photographic Education, the largest association of teachers of photography, reveals that out of 1482 members, 735 are men and 655 are women; 92 are unidentified or institutional memberships. However, the ten to one ratio reappears in a comparison of number of listed institutional affiliations. The ratio of men listing such

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affiliations to those who do not is 141:594, or approximately 1:4. The ratio of women listing affiliations to those who do not is 56:499. This is in spite of the fact that the 1989 Board of Directors includes 7 women among its 16 members, that 10 women hold chief positions among the 23 Regional Chairs and Officers, and that the S.P.E. does include a Women's Caucus as part of its organization S.P.E. 1989). Finally, Politi's semi-official international guide Photo Diary: The World's Photo Directory (1989) gives another set of indicators. In Canada, for example, Politi lists 64 male and 23 female art photographers. On the regional basis the proportions vary from Montreal (13:3) to Toronto (18:6), Vancouver (18:6), and "others" (30:23).

Of interest here too are the contrasting proportions of gender identity in the critical and curatorial occupations. Politi counts 2 male and 1 female photo art critics in Canada, albeit all of them located in Toronto. In the United States he lists 20 males and 3 females in the same occupation, whereas in the United Kingdom the ratio is more equalized at 14:13. Politi's reporting seems flawed in many respects, but one should note that his directory is used as an international resource. On the other hand, the disproportionate number of women in at least the lower economic ranks of curatorial activity is evident on at least an impressionistic basis. Taking all "parallel", or artist-run centers in Canada as an example, one finds a

ratio of 51 women to 29 men listed as directors, curators, or co-ordinators of these galleries, with an additional 3 as heads of exclusively womens' spaces. These figures in and of themselves prove little but suggest adherence to traditional role-models of men as producers, and women as respondents to fine art.

In terms of national identity one might begin by stating the obvious, namely that Yousuf Karsh is the only Canadian photographer listed in most histories. Newhall acknowledges relatively few non-American photographers, 18 British, 16 French, 2 Italian, 9 from Germany and Central Europe, and none from Africa, Asia, South America, or the Middle East. Gernsheim, who was born in Germany and spent time in England before immigrating to America, lists 48 British photographers, 18 French, 20 German, 12 from Central Europe or Scandanavian countries, and none from Africa, Asia, South America, or the Middle East.

The difficulties in obtaining other information on the canonizing process are seriously compounded if one seeks to determine how many photographers consider themselves to be "avant-garde". The concept of the avant-garde presents a unqiue set of terminological and methodological difficulties, and as pointed out by Poggioli (1981) there are few studies that attempt the treat the topic from a sociological perspective. Nevertheless, one needs to take into account the degree of qualitative differneces that have

traditionally separated art photography from news or magazine photography. At least in the Modernist period, artists have seen themselves, and have been seen by others, as working on the peripheries rather than within the mainstream of normative cultural production. In lieu of historical data one can point to a recent poll of 41 stock photo agencies conducted by the Catskill Center for Photography (1989). Each agency was asked if and how it made a distinction between fine art and commercial photography. The majority of respondents (20 men and 21 women) endorsed such a distinction, with 22 agreeing that it exists, 12 denying its importance, and 9 not responding to the question. Those who made the distinction often expressed a deprecatory attitude toward fine art with comments such, "Artsy photography rarely sells in the stock business,"; "Most art photographers' egos get in the way of understanding stock,"; "Most fine art photographers do not know what will sell or why it sells,"; and, "Fine art is beautiful, but generally means it won't sell".

Sociology of the Avant-Garde

This gap between so-called commercial and fine art photographs poses serious methodological problems, especially if fine art is taken to be largely synonymous with avant-garde art, which may not always be the case. On the one hand one could suggest approaching the avant-garde as a series or set of subcultures, countercultures or "parallel" cultures. Art historical analysis identified nodal points within the totality of the avant-garde such as Romanticism, Bohemianism, Decadence and Post-Impressionism. But whether one considers these as progressive stages or isolated moments in the unfolding of Modernism is itself an important value judgement. Indeed, the question of time scale is central to any definition of the avant-garde, for several reasons. For example, Dumont's discussion of les cultures paralleles contrasts une culture dispersee with une culture institutionnalisee (Dumont 1982:15-34). The attractiveness of this concept is that it points to the importance of access to and emplacement within social institutions--academies, museums, government agencies--in marking off the differences between marginal and mainstream cultural movements. But two objections present themselves immediately. First, it is inadequate for describing the day-to-day intersections and overlaps between these two

modes of cultural production, other than as the relationship of haves and have-nots. Secondly, it is inadequate for describing the sociohistoric processes whereby marginal movements such as Romanticism, Surrealism or Cubism are often integrated into mainstream culture, to the point where formerly "revolutionary" movements provide the stylistic and ideological orthodoxies of the culture institutionnalisee.

Recourse to subcultural theory also has its advantages and drawbacks. In the hands of Hebdige (1979) and others, it makes sense of seemingly anarchic behavioral patterns, and reads them for stylistic consistency and group coherence. Yet in reviewing the movement in Britain from ethnographic to subcultural studies, Blake (1980:134-157) noted that with few exceptions, work done in this area under the aegis of the Centre for Contemporary Cultural Studies has concentrated on youth cultures, i.e. subcultures of consumption rather than production. This orientation has become part of the definition of "subculture" itself, as in Blake's statement that, "Subcultures, because they remain in the area of leisure, are negotiated rather than oppositional forms" (Blake 1980:134). Indeed, the bulk of subcultural studies have concentrated on groups such as surfers (Pearson 1979), motorcycle gangs (Willis 1978), hippies and junkies (Schwartz 1972), or British youth phenomena such as mods, rockers, Teddy boys, rude boys, and skinheads (Heb-

idge 1979), all of whose behavior tends to conventionally fall under the heading of "delinquency". While the avant-garde may, on occasion, identify with or draw inspiration from these subcultures, the values of the avant-garde have run more towards production than consumption, and toward production with some claim to intellectual respectability. Subcultures are popular or "middle brow" cultures, whereas the avant-garde is usually identifiable with high cultural values (Gans 1974:75-81). However, Johnson (1971) and others have traced the impact of hippie, drug, rock, black power, and similar movements during the 1960s on journalism, particularly the growth of "New Journalism" in both underground and aboveground newspapers and magazines.

Counterculture and Avant-Garde

Counterculture theory is also highly inflected by its empirical groundings. Yinger, who coined the term "counterculture" before it was popularized by Roszak (1969), spent little time applying it to the avant-garde as a sociohistoric movement, other than "to sketch and illustrate briefly the extent to which and the ways in which the values of a society can be challenged by artists of every

variety" (Yinger 1982:42). Such generalization is achieved at the expense of detailed analysis of the differences in strategies and historical context of Dada, Surrealism, Futurism etc. Consider also Yinger's definition of "counterculture":

The term counterculture is appropriately used whenever the normative system of a group contains as a primary element a theme or conflict with the dominant values of society, where the tendencies, needs, and perceptions of the members of that group are directly involved in the development and maintenance of its values, and wherever its norms can be understood only by reference to the relationship of the group to the surrounding dominant society and its culture (Yinger 1982:23).

Contrasting countercultures with subcultures, Yinger also argues that, "Countercultures are emergent phenomena, not rooted in traditional subsocieties, ethnic communities, occupational groups, or other fairly stable social structures" (Yinger 1982:41). Since the avant-garde is neither a "group" in the sense of persons sharing regular, day-to-day contact, nor is it without some tradition at least in the loose sense of an art historical self-consciousness, the scope of countercultural theory per se would appear to be too narrow to accomodate avant-gardism. At the same time, as with subcultural theory, one must acknowledge the presence of certain countercultures in the creation of venues, stylistic conventions, and modes of distribution in movements such as New Journalism.

The Avant-Garde as Cultural Formation

For purposes of the present discussion therefore, one must remain content with a functional definition of the avant-garde as one of what Williams (1981:117) called a "cultural formation". As Williams himself noted (ibid.:83), the conceptual tools for a detailed analysis of the avant-garde remain unforged, but one could start by distinguishing national or what Williams calls "paranational" formations from smaller units such as those based on formal membership; those loosely organized around "collective public manifestations" such as art exhibits; and those even more loosely built around "conscious associations or group identifications" such as--to use Williams' own examples--the Futurists or Surrealists (Williams 1981:69). Williams offered a heuristic framework for discussing the avant-garde as an instance of the later, and suggested that the central feature of avant-garde movements was metropolitanism, "where 'metropolitan' must be distinguished from both 'urban' and 'national capital' definitions, its key factors being a relative--especially cultural--autonomy and a degree of internationalization, itself often related to imperialism" (Williams 1981:83-84).

Bearing in mind that Williams called for more research in this direction one can, for purposes of this study, regard the use of the term "avant-garde" as a Weberian

ideal type, a heuristic construct formed by "the accentuation of one or more points of view...arranged...into a unified analytical construct" (Weber 1949:90). It is as an ideal type that one can tentatively proceed in understanding the avant-garde as characterized by what Calinescu identifies as "praise of nonconformism" (Calinescu 1977:-95), to the point where Poggioli states that, "The avant-garde...is originally a fact of individual culture: it becomes group culture...only insofar as it is fatally led to transform itself by self-proselytizing" (Poggioli 1981:93). Poggioli analyzes the main themes of the avant-garde as "activism, antagonism and nihilism, agonism and futurism, antitraditionalism and modernism, obscurity and unpopularity, dehumanization and iconoclasm, voluntarism and cerebrvralism, abstract and pure art" (ibid.:226). What holds these themes together, according to Poggioli, is a care of alienation, "social and economic, cultural and stylistic, historical and ethical". The main tendency in this alienation is a rejection of the society and culture in which the artist must also strive for success, and a turning inward and toward more individualistic pursuits. Specifically, this entails rebellion against mass culture, its large-scale institutions, its reduction of all aesthetic values to use values, and above all its anonymous, corporate or bureaucratic organization of cultural production. As Poggioli points out, the contemporary alienation

of the artist represents a disillusioned version of nineteenth-century beliefs in individualism, genius, and creative autonomy. While this emphasis tends to add an existential inflection to the avant-garde, the extent to which this alienation is an occupational matter--a condition of production--must be kept in mind. Rogers' and Shoemaker's first-line, cosmopolite adopters may in fact be among those who perceive themselves to be permanently alienated from mainstream society.

This excursus into the complex methodological problems presented by the avant-garde is made necessary by two factors. First, the avant-garde tends to fit into Rogers' category of early adopters. Secondly, the historical record indicates that the avant-garde is not a monolithic entity and that on the question of art as a sphere of privileged individuality or subjectivity, there has been a full range of views. On the whole, the Romantic precursors to the avant-garde placed a prime value on genius and individual expressiveness, which continued into early Modernism (Hauser IV:166ff.). While expressionism has inflected aesthetic theory and practice throughout the twentieth century, major symbolist, surrealist and formalist movements have emphasized the transpersonal elements of creativity. The "purist" photographer Edward Weston, often identified in art historical texts as a pivotal figure in the photographic avant-garde, insisted that the aim of

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photography was to render "the very substance and quintessence of the thing itself," (Weston 1968:78) rather than the personality of the photographer. Similar ideas lay at the core of the Neue Sachlichkeit movement.

Photography as Privileged Subjectivity

Before discussing the emergence of a 35mm camera aesthetic, the question may be asked as to how the nominally objective photograph can be said to be subjective in any sense at all. This issue preoccupied the early Romantic practitioners of photography, and they evolved a set of techniques to deflect the camera's seemingly inherent affinity for realism. These techniques included soft-focus lenses, hand-coloring of prints, extensive retouching of the negative, the use of textured printing materials such as gum bichromate, limited depth-of-field, and the photographing of staged sets (Borcoman 1974:69-82). The appropriateness of these techniques, championed by the Pictorialist movement in photography, was successfully challenged by the Modernist, "Purist" practitioners of "straight photography", after years of critical debate (Newhall 1982:167-197). The visual hallmark of the Purist style is

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the "fine print", as exemplified by the later work of Stieglitz, Weston and Ansel Adams; that is, a print made with minimum enlargement, compositionally balanced and printed with a rich and complete tonal range of black, whites and greys (see Adams 1967).

However, as John Szarkowski has argued, the Pictorialist/Purist debate does not illuminate the differences between objective and subjective photography (Szarkowski 1973:21-22). The soft-focus images of P.H. Emerson, a major contributor to the Pictorialist aesthetic, were social documentary photographs meant to improve the lives of fishermen in East Anglica (N. Newhall 1975). On the other hand, Ansel Adams and others have always defined the "fine print" as an "expressive one" (Adams 1967:1). In place of the Purist/Pictorialist dichotomy, Szarkowski has suggested a continuum of artistic practices with two poles: one "realist", the other "romantic".

The distinction may be expressed in terms of alternative views of the artistic function of the exterior world. The romantic view is that the meanings of the world are dependent on our own understandings...It is the realist view that the world exists independent of human attention, that it contains discoverable patterns of intrinsic meaning...the word (realist) is used here to stand for a more generous and inclusive acceptance of fact, objective structure, and the logic of process and system...the word romantic is used here...as a term that suggests the central and indispensable presence in the picture of its maker, whose sensibility is the photograph's ultimate subject (Szarkowski 1973:18-19).

Szarkowski suggests that both approaches may be intensely "personal", in the sense of romantic photography tending to "autobiography, or autoanalysis", and realist photography dealing with concerns "that are personal in the sense that they are not popular. These concerns may be unfamiliar, eccentric, esoteric, artistically arcane, stubbornly subtle, or refined to the point of aridity...Nevertheless, these pictures might also be called disinterested or objective, in the sense that they describe issues that one might attempt to define without reference to the photographer's presence" (Szarkowski 1973:21). Finally, Szarkowski leaves open the question of the extent to which specific sociohistorical conditions favor one approach over another. Szarkowski does mention the decline of the general interest magazine as a venue for realist work, and the siting of photographic instruction in university art schools as favoring romantic expressiveness (ibid.:13-15). His views also suggest that subjective expressiveness in art is a position that somehow exists as an a priori drive or potential, rather than a motive which arises out of institutional sites or cultural conflicts. Also unanswered is the question opened by Foucault's essay, "What Is An Author?" (Foucault 1977:113-138), namely to what extent the idea of personal expressiveness, whether realist or romantic, serves as what Tuchman has called a "strategic ritual" (Tuchman 1977:660-679) for the museum or

gallery as an institution that privileges artistic subjectivity or "vision". That is, one must question the extent to which affixing one individual's name to a work supports, and is supported by, an entire social apparatus that includes copyright laws, the organization of exhibitions, the writing of reviews, interviews and biographies, the creation of careers and reputations, and the entire tradition of solitary, non-collaborative methods of artistic production.

Emergence of 35mm Camera Aesthetics

The creation of new artistic approaches based on the hand-held camera is bracketed by a number of considerations. First, photography's acceptance as a fine art, by Modernist standards, has always been partial and compromised. Modernism has drawn upon the heritage of Kantian idealism to define visual art as the rendition of "significant form", and to characterize that form as essentially abstract. Derisive of "descriptive painting" or "pictures that tell stories," Modernist theory has sought "to exclude the representational or the 'literary'" (Greenberg 1965:195), and to preserve the artistic experience from

assimilation into the less exalted world of everyday emotions (Bell 1931:3-30).

Having said this much however, it is arguably true that the type of photography pioneered by Henri Cartier-Bresson, despite its journalistic content, has centered on the revelation of "significant form". Writing of Cartier-Bresson's images, Lincoln Kirstein argued that,

as in the other plastic arts, geometry is the supreme pleasure, the corroboration of absolute structures, eliminating coincidence. To the classical artist there is no coincidence and few happy or unhappy accidents, except as these are reduced to the just alignment of properly selected or edited elements...(In Cartier-Bresson's work...) there is the permanent effort to reach towards underlying laws and governing principles...(Kirstein 1963).

Typically, Cartier-Bresson speaks of his Leica as "the extension of the eye" (Newhall 1982:225; N.Rosenblum 1984:-512-513).

In direct, often self-conscious opposition to Cartier-Bresson's "significant form" stands, in a sense, an anti-aesthetic also based on the 35mm camera. Arising out of a tradition of street photography pioneered by Walker Evans and Henry Callahan, this approach is epitomized by the photographers Lisette Model, William Klein, and Robert Frank. Frank, originally a Swiss photojournalist, toured the United States in 1955 under the auspices of a Guggenheim Grant. The resulting work, published in 1959 under the title The Americans, resulted in an uproar among re-

viewers and critics; the editorial board of Popular Photography was almost unanimous in condemning Frank for his depiction of Americans as, "simple beer-drinking, jukebox-playing, pompous, selfish, intolerant, money-worshipping, flag-waving, sacrilegious, insensitive folks". Frank was also criticized for his association with Beatniks such as Jack Kerouac and Allen Ginsberg; the former had written an introduction to The Americans. The photographs were characterized as "faithful to the school of candid grab-shotism," as "a sad poem for sick people," as full of "cheap thrills" based on "out-of-focus pictures, intense and unnecessary grain, converging verticals, a total absence of normal composition, and a relaxed, snapshot quality" (POP May 1960:104-06).

Frank's anti-aesthetic was clearly based on using the limitations of the 35mm camera to defy the "fine print", highly finished look favored by the photographic Purists. As such, he worked in what Szarkowski would call the "romantic" mode, and in a way as to finally achieve canonization for this approach. The initial controversy over Frank's book died down and became so reversed that by 1964, the artist was included in Beaumont Newhall's 1964 edition of The History of Photography. The following year, the George Eastman house began to circulate photographs from The Americans as part of a traveling exhibit (Tucker 198: 10-12). Acceptance of Frank's anti-aesthetic became even

more widespread as it was taken up by a following generation of street photographers who allied themselves with the values, and publication venues, of The New Journalism.

Photography and the Counterculture

Any discussion of photography's place within the North American counterculture of the 1960s and 70s must begin with the acknowledgement that, as a predominantly youth culture, it consisted largely of a demographic group that had been targeted for sales by the photographic industry. As early as 1945, National Photo Dealer magazine ran a feature entitled, "Teenagers: The Great Untapped Market" (N.P.D. Sept. 1945:56-57,120). The author, a managing editor for Popular Photography, argued that, "Youth is the largest untapped market in photography".

America's high school population has certain characteristics worth noting by the photographic industry:

They are technically minded.

They spend money.

They are hobby minded.

They are intelligently planning their careers, their recreations, their part in the community.

The call to address the young as potential hobbyists or practitioners was also conducted by the Eastman Kodak

Company, both in its advertising and in publications such as Peter and His Camera: My First Book About Photography (Spitzing and Steinorth 1973), in which a young boy, having received a camera, uses it to document his father's innocence with regard to a traffic accident. The "baby-boomers" have remained an important segment of the consumer photographic market (Marketing News February 4, 1983:6; March 4, 1983:3; American Demographics January 1982:26-29; Forbes, February 5, 1979:35-36; N.Y.T. July 14:32, 1981).

Secondly, one must note the rapid expansion of formal photographic education in the post-war period (Graphs V-19A and V-19B).

Prior to World War II, it was generally understood that one became a photographer through informal apprenticeship, self-instruction, or some mixture of the two. A few schools existed which were by courtesy of term called professional schools. In fact they were not quite trade schools in the traditional sense of the term; since photography was controlled by no licensing system, there was no body of knowledge that had to be learned as the precondition for admission to practice.

Until the postwar years, photography was almost nonexistent in the curricula of American universities. Rapid change began with the ambitious departments of the 1940s; that of the University of Iowa was perhaps seminal...the dramatic escalation of photographic education came during the decade of the sixties. As each generation of photography students received their Master of Fine Arts degrees, and were thus certified as teachers, new programs were begun in other institutions; enrollments tended to expand geometrically...Between 1964 and 1967 the number of colleges and universities that offered at least one course in photography increased from 268 to 440. In the years between 1966 and 1970 the number of students studying photography or cinematography at the University of Illinois (Cham-

paigh-Urbana) increased from 132 to 4,175--a growth of over three thousand percent in four years (Szarkowski 1978:14-15).

One could argue, with some degree of certainty, that a majority of art photography practitioners working within the past two decades drew many of their values from the post-war youth culture, or at least had to confront that culture during the process of forming their personal and artistic values.

Counterculture Photography: New Journalism

Four important components of the counterculture are of relevance to still photography, and all share the core of Romanticism central to that movement. First, as part of a critique of scientism and technological progress, the issue of objectivity was challenged, negotiated, and redefined in a period that saw the ascendancy of a style labeled "New Journalism". A sociological profile of New Journalism is difficult to draw because the term itself was always a loose one. Dennis and Rivers (1974:12) listed the following subcategories under its general heading: "the new nonfiction, alternative journalism, journalism reviews, advocacy journalism, counterculture journalism, alternative

broadcasting, precision journalism". The major writers are usually identified as Tom Wolfe, Gay Talese, Norman Mailer and Truman Capote, although Hunter S. Thompson is often included under the separate but related heading of "gonzo journalism". What these subcategories and names had in common were, as Culbert says (1975:168-169), four characteristics: a rejection of traditional journalistic ideas of objectivity, extensive use of dialogue, use of third person perspectives, and the incorporation of details to suggest greater levels of meaning. Stylistically, the New Journalism drew on sources within popular culture to develop a series of voice that were irreverent, entertaining, tumultuous, and self-conscious with regard to the use of style (Fishwick 1975:101-102). Epistemologically speaking, Wolfe claimed to be drawing on Max Weber, and in particular on the concept of a methodology based upon verstehen (Wolfe 1973:18), while the writing of other New Journalists has been compared with the "New Sociology" of Erving Goffman, or even the Chicago school's orientation toward non-positivistic field studies (Sommer 1975:143-148; Meisenhelder 1975:471). The New Journalism's rejection of objectivity as a journalistic value had several sources and ramifications. John Merrill, arguing for an "existential journalism", attacked what he called "the rationalist stance" in reporting: "neutralist, Platonist and Apollonian, prosaic, objectivist, impersonal, formal, reportive, disinter-

ested, non-judgemental, calm, unemotional, conservative" (Merrill 1977:45). This list suggests the political and cultural climate in which New Journalism came into being. Abe Peck, another observer, believes that New Journalism was only the "aboveground" version of underground journalism, a commercially acceptable variation of the styles and themes treated more directly in publications associated with the anti-war, feminist, and black power movements (Peck 1985:165-180).

Objectivity and Censorship

The question of objectivity in the mainstream media was also raised many times during this period. This was especially true during the Nixon administration, which had inherited a "credibility gap" from the presidency of Lyndon Johnson. The Tet offensive and My Lai massacres in particular had called nationwide attention to ways in which the government and the military manipulated news about the war in the name of "national security" (Peck 1985:69-82). High speed color slide film, motor drives, excellent telephoto and wide angle lenses, the wire transmission of color photographs, a street photography aesthetic, and strong

career incentives induced photojournalists to cover the war in close-up.

The moral suasion of images of the Vietnamese becomes most evident when one considers the three photographic icons of the war: Malcolm Browne's 1963 photograph of the burning monk, Eddie Adams's 1968 photography of the Tet execution, and Huynh Cong ["Nick"] Ut's 1972 photograph of the napalmed children--and, one could add, Ronald Haeberle's 1968 (published in 1969) series of the My Lai 4 massacre (Moeller 1989:402).

Richard Nixon, who entered office with a history of antagonistic relations toward the press, initially promised more candor than his predecessor. Nevertheless, within his first year as president, Nixon was criticized for imposing curbs on reporting about the war. The army, marine corps, navy and air force classified, censored and even destroyed photographs made by their own photojournalists and other servicemen when they depicted the negative aspects of the war (Moeller 1989:367-68). In the aftermath of anti-war rallies and demonstrations during the fall of 1969, Nixon went on the offensive against the press. The first shot was fired by Spiro Agnew, in a famous speech denouncing the media as "an effete corps of impudent snobs" (Porter 1976:43). This was followed by other Agnew speeches in a similar vein, along with White House demands [funneled through the Federal Communications Commission] that the networks provide transcripts of certain news reports for review (Porter 1976:45). As the war wore on and the Watergate

scandal erupted during the president's second term, Nixon grew increasingly heavy-handed in his treatment of the media. Through the F.C.C. the administration threatened anti-trust actions against the networks and other media enterprises; several of these organizations were audited by the Internal Revenue Service; the government sought and received "prior restraint" injunctions from the Supreme Court in the case of the Pentagon Papers; and the Caldwell case upset the traditional power of the press to protect its sources (ibid.:234ff.).

The airing of a C.B.S. documentary entitled "The Selling of the Pentagon" in early 1971 forced the media to confront charges of bias brought from within its own profession. C.B.S. was accused of editing a filmed interview with an administration spokesman in such a way as to mismatch questions to their answers. A House of Representatives committee attempted to subpoena the outtakes, but C.B.S. successfully resisted this action. In rising to the defense of C.B.S., and of activist reporting in general, the Boston Globe's editor Tom Winship argued, in a well-publicized speech, "that the media forget about objectivity standards in reporting and focus on personal reportorial interpretations of the events". A study conducted by the American Institute for Political Communication tested, among other questions, responses to Winship's proposal. The overwhelming majority of respondents, including members

of the Washington D.C. newspaper corps (93.6%) and broadcast corps (92.3%), newspaper editors (94.1%) and broadcast news executives (93.8%) rejected the Winship thesis (A.I.P.C. 1972:36-37).

Photographic New Journalism

It was within the context of these debates about objectivity that certain publications, notably Esquire, Harper's Bazaar, and the British magazine Nova sought for a photographic complement to the New Journalistic writing they began to feature. In the United States, three photographers came into prominence as "New Documentary" image makers, namely Lee Friedlander, Garry Winogrand and Diane Arbus. In a 1967 Museum of Modern Art exhibit of their work, curator John Szarkowski distinguished their concerns from those that had characterized the older documentary photographers:

In the past decade a new generation of photographers has directed the documentary approach toward more personal ends. Their aim has been not to reform life, but to know it. Their work betrays sympathy--almost an affection--for the imperfections and the frailties of society. They live the real world, in spite of its terrors, as the source of all wonder and fascination

and value - no less precious for being irrational...(Szarkowski 1967).

In Canada, the National Film Board's Still Photography Division had traditionally framed documentary within centralizing, federalist definitions of Canadian identity. Now however, influential teachers such as David Heath and John Max, and photographers like Judith Eglington and Michael Semak brought into view a darker, alienated, for more subjective approach to the medium. This personalized, "romantic" approach to documentary is still evident in the work of Canadians such as Sandra Semchuk, Cheryl Simon, Gabor Silasi, Robert Boffa and Michel Campeau (N.Rosenblum 1984:534-37).

Of all the stylistic innovations introduced by New Documentary photographers, perhaps the one that points to a direct rejection of documentary is the deliberate use of a snapshot aesthetic. John A. Kouwenhoven defines snapshots as "predominantly photographs taken quickly with a minimum of deliberate posing on the part of the people represented and with a minimum of deliberate selectivity on the part of the photographer so far as vantage point and the framing or cropping of the image are concerned" (Kouwenhoven 1974: 106). Diane Arbus, noted for the grotesque nature of her subject matter which included transvestites, nudists, people with physical deformities, and those with eccentric personalities and accomplishments, used a small camera to produce "formal snapshots" (Arbus and Israel 1972; 1984).

Similar images, which combined the qualities of snapshots and formal studio portraits, and which often contained the photographer's shadow or reflection, were also made by Friedlander (1978) and Garry Winogrand (Szarkowski 1988). Like their compatriots Danny Lyons and Bruce Davidson, all received art world recognition at the same time that the cinema verite of Frederick Wiseman, the Menkas brothers, and J.C. Pennebaker were receiving public recognition.

Photography and Rock Music

The second important element of importance to photography was music. Rock and roll is often spoken of as the central, if not defining expression of 1960s youth culture, and the visual arts seem to have served a subsidiary function to music, mainly by way of publicity images and album design. Mainstream music--represented by Hollywood music tracks, Broadway show tunes, and albums by Bing Crosby and Frank Sinatra--typically relied on formal studio portraits of the artists, as they did on studio recording. Jazz albums tended to employ lettering, drawings, and formal photographic portraits, although an occasional effort such as Miles Davis' 1956 "Birth of the Cool" used a grainy,

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available-light style performance photograph made by Aram Avakian. Elvis Presley's first album featured a candid performance photograph, but as the singer's fame and audience grew successive albums began to rely on a more polished studio look. But the phenomenal success of the Beatles allowed this group to take contractual control over its albums' cover art, and this helped inaugurate a steady use of more candid, bolder photographic experiments with photographic design. With the rapid growth of "live" rock music and a rapid proliferation of competing bands in the 1960s, record album covers became important sales tools and, "double sleeves became the norm even for new groups; fold-outs, die-cuts, embossed and complicated constructions hit the market, with posters, books and other novelties thrown in" (Hamilton 1977:14). The Doors went so far as to use nothing but photographs on their covers, with the album titles for "Strange Days" (1968) and "Morrison Hotel" (1970) embedded in the images. Yet as far as a predominant style is concerned, most rock albums used the principles of collage and superimposition, as in The Beatles famous cover for "Sgt. Pepper's Lonely Hearts Club Band" (1967). Similar approaches were taken by the Rolling Stones for "Their Satanic Majesties Request" (1967), Jefferson Airplane's "Crown of Creation" (1968), and John Lennon's "Mind Games" (1973). Infra-red, hand-colored photographs, and optical effects were also in evidence on the covers of Frank Zap-

pa's "Hot Rats" (1969), Roxy Music's "For Your Pleasure" (1973), the Electric Light Orchestra's "Eldorado" (1974), and Ry Cooder's self-titled album of 1970. The Curtis Mayfield band went so far as to replicate and hand-color one of Dorothea Lange's photographs for the Farm Security Administration, on the 1975 cover of its album, "There's No Place Like America Today".

Rolling Stone and Rock Photography

In terms of publicity, it is instructive to look at Rolling Stone magazine's use of photography. Although a relative late-comer to the music scene--its first issue was not published until 1967--Rolling Stone quickly became its most popular and successful expression. Like the 1960s rock scene itself, Rolling Stone integrated music, politics, comments on drug use, and other social issues together with experimentation in the visual arts. Early magazine covers used performance shots, film stills, sequential photography, cartoons and duotone reproduction. A controversial cover in 1968 featured John Lennon and Yoko Ono posing in the nude; a 1969 cover on the "American Revolution" used the photograph of a helmeted police officer

I holding down a bleeding man with his baton. From 1971 to 1973 the magazine relied primarily on black and white photographs for its covers, but it then turned to the use of painted or drawn illustrations. By 1975 it came to rely once more on photographs, but now it used color and staged, studio settings with formal, self-conscious poses still in evidence today. These later cover photographs tend to be indistinguishable from those used in other area of mainstream entertainment, which is what rock has largely become.

Most of Rolling Stone's early photography was done by Annie Leibovitz who, as a woman and a self-taught amateur, was an anomaly within the photojournalist's profession. Working initially in a snapshot mode, Leibovitz began her career at the age of twenty after graduating from the San Francisco Art Institute in 1971. Regarding her first assignment for Rolling Stone, Leibovitz recalled that, "I had heard through the office grapevine that Jann (Wenner) was going to New York to interview John Lennon. I walked into his office and appealed to him through a subject close to his heart. 'Jann, if you hire a photographer back East, it's going to cost you \$150 a day. I can fly youth fare, stay with friends and eat their food.' He agreed. My expense report for the two weeks was \$25." (R.S. Dec.17, 1977:62). Leibovitz specialized in off-stage photographs of rock stars, shooting them at home, in their bedrooms,

vacationing, partying with groupies, vomiting, being stitched up after an accident, and so forth. In 1975 Leibovitz became the official tour photographer for the Rolling Stones, but returned the following year with a special feature entitled "Capturing the Soul: Seven Master Photographers and the Tools of Their Magic Trade" (R.S. May 6, 1976). Of the seven photographers profiled--Henri Cartier-Bresson, Andy Warhol, Richard Avedon, Henri Lartigue, Ken Regan, Helmut Newton, and Ansel Adams--five were 35mm camera users whom Leibovitz photographed posed with their instruments. Ansel Adams, shown in his darkroom but hiding his face from the camera, was quoted as decrying the famous exhibition The Family of Man (1955). "'I worked so long for print quality and subtlety...it all went out the window because the kids would come in and say, 'Well, the Museum of Modern Art says this is art, so now I don't have to worry about print quality. I can focus on social problems. They had no idea what a destructive effect it had.'" (R.S. May 6, 1976:46). Certainly, Adams' fine print aesthetic was completely challenged by the type of photography favored by the rock music industry.

Photography and Self-Realization

The third major component of the counterculture that affected photography was the element of spiritual or psychological introspection, which emerged as political activism gave way to what Lasch has termed "the therapeutic sensibility" (Lasch 1979:13-16ff.). The two major figures, or gurus, in this area were Ralph Hattersley and Minor White. Hattersley, a regular columnist for Popular Photography, published a book in 1971 entitled Discover Yourself Through Photography. In it, Hattersley offered a number of practices to "free your creative mind". Hattersley's chapter headings reflect the mixture of Jungian and Gestalt psychotherapies that framed his writing:

Getting ideas for photographs by using methods which are in attunement with the creativity patterns of your mind...Using your camera to help understand your friends and neighbors better and to relate to them on a deeper level...Using photography to discover, analyze and express visually the two sides of yourself: the masculine and the feminine...Using photography to unearth your unconscious psychic symbols and to discover what they really mean to you...The Self-discovery and Self-liberating techniques given in this book relate to various esoteric teachings in Eastern and Western religions. Use photography to help you in Self-perfection (Hattersley 1971:8-9).

Aside from giving "lessons", or suggested spiritual cum photographic assignments to his readers, Hattersley asked his readers to discover "The Christ in All Things".

"Christ said: 'I am the light,' and his life was a lesson full of stop and go signals for all mankind." (ibid.:289). Not without a sense of humor, Hattersley captioned one of his photographs--two cats eating from a dish directly underneath a crucifix--"Cats and Christ. If you can't love a cat you won't find Christ. Though true, this isn't a welcome thought to cat haters" (ibid.:295).

This playfulness was not matched by Minor White, a photographer, editor, curator, teacher, critic and publisher whose influence far exceeded that of Hattersley. While teaching at the Rochester Institute of Technology, White founded the journal Aperture which, with its superb reproductions and prestigious contributors, became America's foremost fine art photography publication. In the 1960s White moved and became head of M.I.T.'s creative photography program, a position which he used to curate a number of exhibitions whose themes were meditative and spiritual. The most important of these, Light⁷, was organized and published by Aperture in 1968. White himself contributed only one image to the show, but sent out detailed instructions to other contributors among whom were major figures such as Ansel Adams, Dorothy Norman, Jerry Ulesmann, Hiro, Walter Chappel, Barbara Morgan, and James Lemkin. The text by White, sprinkled with short quotes from Jung and from a Navajo creation chant, took on the form of an incantation.

Let The Light Regenerate

Light has healing power. It works both ways: the light in photographs that change the states of other people will first of all change the state of the photographer. The change is known: from the ego centered to the perfect servant through which the light can work. The search for authenticity to the I AM Self.
(White 1968:13).

Perhaps the most "romantic" of recent photographers, White sought to reintroduce a Symbolist aesthetic, and the photographs used in the show had little obvious affinity for each other, in terms of both style and content. At the time of White's death in 1976 however, this introspective and neo-Symbolist approach to photography was already being replaced by far more intellectualized approaches based on structuralist anthropology and linguistics. Nevertheless, the use of photography as a form of self-exploration also took on clinical and psychotherapeutic forms. The term "photoanalysis" was coined to describe the use of family photo albums as way of recalling repressed memories from childhood (Akeret 1975), while Judy Weiser, a Vancouver social worker, coined the neologism "phototherapy" to describe "a therapy technique that allows an exploration into the private worlds of those unable to articulate their emotions verbally". Patients or clients were taught pho-

tography with a view toward encouraging self-expression (Weiser 1975:33-36).

Photography as Alternative Technology

The fourth component of the counterculture in which photography found a place was within the movement to establish autonomy through either going back-to-the-land, or by making other use of alternative, "soft" technologies. Two publications exemplify this tendency: The Mother Earth News, and The Whole Earth Catalog. Mother, as it styled itself, claims to be "more than a magazine...a way of life", and has featured articles on solar energy, the building of log cabins and green houses, composting and other organic farming methods, and similar topics. Interestingly, while Issue #9 (Spring 1974) included an article on how to "Freelance With a Tape Recorder", it was not until Issue #32 (July/August 1978) that Mother ran an article on how to "Set Up a Tintype Studio". Although the magazine usually carries advertisements for cars, trucks, tractors, drilling rigs, and household appliances, literally no photographic product has ever been sold through its pages. Nevertheless, The Mother Earth News has made con-

sistent use of photography for illustrating its pages; by 1980 photographs had replaced drawings as the main form of cover art.

Photography also received comparatively short shrift from The Whole Earth Catalog, whose criteria for inclusion for items were they they were, "useful as a tool, relevant to independent education, high quality or low cost, and easily available by mail" (W.E.C. 1971:1). The first issue of the Catalog contained no mention of photography at all, but by the second edition (1969), the topic was given two pages out of over four hundred. Included in the Catalog's selection were the Zone System Manual [a book usually associated with large format photography], the Life Library of Photography, Polaroid Land cameras, and Aperture magazine. The commentary, a review of other books on photography, employed counterculture rhetoric:

There is a lot of bullshit about photography; it is easily [and usually] a subject for egoistic subjectivism and it is much in the hands of the people that push consumption. But like any other art form, the thing is to shut up and get dirty learning, working feeling it...

There may come a time...when you wish to make love with [photography], form koan, fix energy. The process is capable; photography can be an art form with just as much subtlety of creation as pottery, glazes, dyeing, weaving...

You can do it. Hell, you can do it yourself...

There is a book for telling you how to do

platinum, palladium and gum arabic prints. Other processes, too, all of days gone by. Interesting. They're powerful, could be a heavy trip if you've got the negatives to print out...I haven't done it yet but imagine it would be as hard as making DMT [which I haven't either] (W.E.C. 1971:353).

By 1986, long after The Last Whole Earth Catalog had been replaced by The Essential Whole Earth Catalog, photography appeared on only a page and a half out of some four hundred, under the general heading of "Communications" (W.E.C. 1986:320-21).

Photography as Fine Art

If photography had only a marginal, incidental, somewhat peripheral relationship to the counterculture, its relationship to "high culture" (Gans 1974:75-81) was more complex; during the period in question here, many wished to see photography rise from the status of a commercial trade and hobby to one of fine art. A number of developments point to the increasing institutional acceptance of photography on this level. Although salons had often sponsored their own exhibitions, it was not until the First International Photographic Exhibition of 1938 that amateurs from around the world were invited to participate in an open

submission (N.Y.T. Feb.27, XI:8:2, 1938). By 1940, New York's Museum of Modern Art created a department of photography, under the curatorship of Beaumont Newhall. This followed the popular and critical success of a 1937 exhibition entitled "Photography 1839-1937" (N.Y.T., Dec.31, 17:4:1940). Earlier, in 1934, the Royal Photographic Society of England held its first all-American exhibition; the following year the National Academy of Design opened its first exhibition of photography (N.Y.T. April 14, II:2:5, 1935).

In 1949 Beaumont Newhall left the M.O.M.A. to become director of the new International Museum of Photography at the George Eastman House in Rochester, New York. Newhall soon began work on his The History of Photography, and began to offer courses on the subject in conjunction with the University of Rochester's School of Liberal and Applied Studies (N.Y.T. Feb.21, II:14:6, 1954).

In 1955 the M.O.M.A. opened a major exhibition of photography, The Family of Man. Curated by Edward Steichen, the exhibit hailed itself as "the most ambitious and challenging project photography has ever attempted" (Steichen 1955:5). Depicting scenes of daily life around the world, the exhibit drew heavily on the work of photojournalists associated with Time, Life, and agencies such as Black Star and Magnum. As such, the exhibit represented a culmination of what Szarkowski has called the "realist"

approach to the medium, especially as associated with a humanist ethos.

Meanwhile, amateurs were also becoming self-conscious about photography's relationship to the world of the museum, whose directors began refusing to hang annual salon shows. With important rejections in Portland, Milwaukee and Baltimore, camera clubs in Brooklyn and New Jersey saw breakaway groups splinter off from "the glamour of the blue ribbon and the silver cup, symbols of conformity". With greater emphasis on individual self-expression and experimentation,

These signs of progress are accompanied by some confusion, some fumbling, along with many signs of accomplishment on increasingly mature levels...The stress is on contemporary life, exploitation of the medium for whatever potentials it may have, the growing realization among amateurs that photography is not a rut in a road but a broad avenue of exciting adventure, of individual expression on the photographer's own terms (N.Y.T. July 12, II:9:2, 1953).

Awareness of the history of photography also helped fuel an increasing critical attitude and awareness. The first International Symposium on the History and Criticism of Photography, held in Rochester in 1964, brought together teachers, historians and art critics who discussed strategies for the legitimization of photography as a fine art (N.Y.T. Dec.6, II:31:1, 1964). By 1968, A.D. Coleman inaugurated a regular column of photographic criticism in The Village Voice, and soon began to contribute to the

Sunday New York Times (Coleman 1979). John L. Ward, a professor at the University of Florida, issued an influential book entitled The Criticism of Photography as Art (Ward 1970), and Janet Malcolm began to write a regular column of photographic criticism for the New Yorker (Malcolm 1980).

Meanwhile, fine art collectors were taking an increasing interest in photographs. The first gallery exclusively devoted to photography was established in New York City in 1959 (N.Y.T. March 1, II:11:1, 1959), and the Society of Photographic Collectors of North America was founded by 1968 (N.Y.T. Sept. 1, II:31:1, 1968). That same year, a Photography Hall of Fame was created by the Photographic Art and Science Foundation (N.Y.T. Dec. 15, II:38:4, 1968). The photographic industry soon began to associate itself with fine art exhibitions, with the Photographic Manufacturers and Distributors Association hosting juried shows at its annual trade conventions (N.Y.T. April 19, II:24:5, 1959; May 28, II:12:2, 1972). By the 1970s, several well-established and international galleries and auction houses began to deal in photographic prints, including Sotheby Parke Bernet, Christie's, and P. & D. Colnaghi (Blodgett 1979:217-219). Vintage nineteenth-century photographs of no particular aesthetic value were sold for prices of \$2500 and more if they had been produced by "name" photographers or even established commercial studios; images by recog-

nized contemporary artists reached \$1500 for a Diane Arbus print, \$5000 for an Edward Weston, and \$10,000 for a Paul Strand (Blodgett 1979:136-214). Moreover, prints by the Pop artists Rauschenberg and Warhol, which clearly derived from 35mm still photographs, commanded even higher prices.

From Visual Literacy to Semiotics

Finally, a proliferation of new image-making technologies led not only to artistic experimentation with photography, film, video and television, holography, and electrostatic photocopier machines, but also to academic interest in the history and cultural implications of communications technologies. Marshall McLuhan's Understanding Media (1964) seemed to many to call for an overthrow of linear, literate thinking in favor of imagistic modes of experience. Proclaiming that "the era of the book" was over, educators sought to define a "new literacy" and to include it in even high school curricula. The Eastman Kodak Company sponsored the first National Conference on Visual Literacy in 1969, where "psychologists, art teachers, linguists, AV supervisors, speech pathologists, inner-city leaders, and other educators" met on the basis that, "First, because

of TV and other factors, today's child is far more visual in his learning needs and preferences than the child of a few years ago...Second, success in dealing with today's world requires a degree of visual sophistication and literacy hitherto not so necessary" (Debes 1969:i). Papers at the conference dealt with the hierarchy of visual skills, with the nature of visual symbols, with curriculum development, and with the possibility of substituting student media productions for written essays.

The usual references to literacy as a mode of perception suitable for photography had already been enunciated by Minor White as a methodology for "reading" images (White 1957:48-50). Moreover, linguistic models have always had a special appeal for art critics and social scientists in North America, perhaps one more lingering heritage from Puritan literalism. One recalls, for instance, Emerson's celebrated essay on "Nature" (1839), a Romantic and metaphysical vision of the universe writing itself out in signs and symbols. Language is also a central concern in the pragmatist tradition, from Peirce's "semiotics" to G.H. Mead's "significant symbol" and Dewey's view of art as communication. Kenneth Burke's dramatist concept, Susanne Langer's arguments in Form and Feeling (1953), and continued interest in the Sapir-Whorf hypothesis also reflect perspectives on art, society and culture as meshes of symbolic, often linguistic interactions.

By the end of the 1970s, models of photographic perception and interpretation, based on some concept of literacy, began to come under the influence of French structuralism and semiotics. To some extent this was involved with disillusionment with mainstream photographic practice as mentioned in Chapter 1, below. It also seemed motivated by a desire, on the part of certain critics, to put photographic interpretation on a systematic basis, much as the kind of "science of culture" promised by semiotics. Leroy Searle, for example, writing on "Language Theory and Photographic Praxis" in Afterimage, began with a succinct introduction of linguistic terminology derived from Saussure and Chomsky - phoneme, morpheme, signifier, signified, surface structure and deep structure, transformational grammar, and so on (Searle 1979:33-34). Surprisingly, Searle used this vocabulary for fairly conservative purposes, arguing along traditional Modernist lines that "photography is a language" that must be studied "as photography, respecting the integrity of the medium as 'like' nothing but itself, and that:

if we wish to treat photography as a language, we must learn to read it according to significant and distinctive features of its syntax, seeking out principles inherent in the medium and appropriate to a visual modality (Searle 1979:34).

One of the few photographers to take Searle at his word, albeit avant la lettre, was Lew Thomas, a California photographer who issued a book actually entitled Structur-

al(ism) and Photography (1978), and who also curated a large show on "Photography and Language" (1977) in San Francisco. This show attempted to expose the hidden epistemological assumptions behind what it called "the pictorial tradition". Many of the presentations were visual critiques of that willing suspension of disbelief that allows photographs to be seen as windows of reality, and some photographers attempted to show up even the driest documentary images as chimeras and pieces of fiction. Not without humor, one photographer made the whole point clear by simply writing, beneath his work, "These Pictures Are Bullshit!" (Thomas 1977:85). Thomas' own Structural(ism) and Photography employed the "syntactical" properties of the 35mm camera, by presenting rows of 36 exposures of a darkroom timer, a sink filling up and draining, a sprinkler system, and so forth. Thomas also made sequences of identical self-portraits which varied only because he closed down the aperture one stop per exposure.

Photography and Early Post-Modernism

The topic of Post-Modernism is a vast one, but its relationship to photographic practice might be summed by

arguing that under Modernism, art was asked to be for itself, whereas Post-Modernist has demanded that art be about itself. The Modernist insistence that art is an autonomous and self-justifying activity, ultimately responsible to itself alone, has served to establish a high moral ground from which to defend art and artists from the propagandizing demands of left and rightwing politics, and from overt commercialization. "Pure" art, setting its own internal problems and standards, has sought to appeal to a supposed universality of aesthetic response, a trans-cultural and even trans-historical recognition of those sublime qualities which bring out the best in men and their civilization. Aspiring to the supposedly abstract condition of music, Modernism has typically privileged form over content in an effort to transcend those emotions too easily evoked by recognizable subject matter, one reason why a content-laden medium such as photography has never sat well within the Modernist canon.

The turn to art about art--to "meta-art"--can be interpreted as both an outgrowth and repudiation of the Modernist perspective. Insofar as Modernism has sought to enhance the general level of aesthetic sensitivity through art education, it has struggled to close the gap between fine art and the tastes of the general public. This gap has been understood as the opposition between Culture and Society in the early nineteenth century, and between High

Art and Mass or Popular Art since the 1880s (Williams 1958). But the triumphs of Modernism in the area of art appreciation has also generated a realization of its own worst fears, namely that reconciliation of art and life within the commercial sphere which renders art overly facile, mundane, banal. Modernism's linkage with mass consumerism goes at least as far back as the Bauhaus, which elevated ordinary household objects--furniture, appliances, kitchenware, utensils--into precious objects d'art (Heskett 1980:101-04). The principles of industrial design, which might be summed up as aesthetics for, if not by, the masses underlie the current plethora of designer consumer products, from cosmetics to blue jeans, from toiletries to salad dressing.

Despite itself, or at least despite its naivete about commercialization, Modernism has encouraged the transformation of aesthetics from the contemplation of heightened experiences, into the absorption of the self within a field of pleasurable environments. Art need no longer be confined to the concert hall, the gallery or the museum when it can be appropriate for "lifestyle" purposes. "Classical" Muszak is heard in elevators and subway stations; prints, paintings and photographs by the masters appear on greeting cards, calendars, postage stamps, restaurant menus; and exquisite care is given to the design, packaging, display and sales promotion of telephones, lottery

tickets, cheque books, food processors and bathroom tissue. Even avant-garde art now receives corporate sponsorship.

Pop and the End of Modernism

The adoption of aesthetic awareness as a widespread mark of "the good life" has apparently led to personal and professional frustration on the part of artists trained to believe in the transcendence of art and the originality of their own talents. The circling of the wagons can already be seen in the appropriately named movement called "Pop" art, a form of image-making which, according to its founders, cynically celebrated the collapse of culture into society, and of museum art into advertising (Alloway in Russell and Gablik, ed., 1969:41-53; Warhol and Hackett 1980). Pop surfaced around the same time that still photography achieved official art world status, and it was largely from the camera that Pop could be said to have learned to make art that was specifically about other art--partly by means of quotation or outright incorporation of other images (see Compton 1970). This strategy was often directly distilled into those aspects of Post-Modernist art that have come to rely upon the re-presentation or appropriation

I of either mass media images or other art. But where Pop's quotes were often perceived as slick, glib and often sarcastic, some of the more interesting Post-Modern artists have used similar devices in a sort of rescue mission, an attempt to resuscitate the rebellion spirit of avant-gardism, a refusal to allow art's vitality to be absorbed by advertising and entertainment. In many ways, this is an old battle: if Romanticism addressed industrial society as a form of moral criticism, and if Modernism took on the role of that society's aesthetic criticism, then Post-Modernism has partly evolved from a position of media criticism. The perceived failure of Modernism has demonstrated that high art is not strong enough to be purely for itself, at least in the original sense of an incorruptible autonomy. Post-Modernism proposes an art which is at least about itself, about the conditions of its own production, circulation, history and reception, in a period where it is increasingly accurate to speak of art as being produced and consumed much like other commodities. The role of photography in this heightened visual self-consciousness is still an open question.

SUMMARY AND CONCLUSIONS

The writing of a critical history of the 35mm still photographic camera involves central issues in the relationship of culture to technology in North America in the twentieth century. As an artifact it claims direct descent from the key inventions of modern life: optics and photochemistry, but also the integrated business organization and the assembly line. The camera has been put to uses that are simultaneously rational, empiricist and objective, as well as domestic, personal, and aesthetic. As an example of the diffusion of innovation, the 35mm still camera demonstrates the pitfalls in any simplistic model of development, distribution or adoption. The notion that "technology proposes, culture disposes," cannot be upheld in view of the complex relationships between technological invention and social use.

The history of the 35mm camera suggests that, at least in terms of advanced industrial societies, technological innovation is inseparable from--but not necessarily synonymous with--a set of social needs. In the case of the camera, those needs are once scientific, artistic, technological, political, military, and social. As such, the invention of a roll film camera that is light, portable, inconspicuous and versatile, can be said to be "over-determined" by any number of factors which, taken individually,

I would favor a specific technology. But the invention of the camera also illustrates how the patent system operates, not only to establish industry standardization, but also to support the development of large, horizontally and vertically integrated media industries.

The creation of the 35mm camera proceeded along roughly two lines of industrial development. The first, typical of the resource-poor but administratively centralized economies of Germany and Japan, focuses on sophisticated, specialized technology to make relatively expensive value-added photographic products. The second, more typical of the United States and especially of the Eastman Kodak Company, relies on greater horizontal and vertical integration to appeal to a large, domestic mass market on the basis of convenience and economy. As a result, a two-tier situation has evolved, with Japanese photographic manufacturers now leading in the growing area of imaging and information. Meanwhile, the Eastman Kodak Company has lost much of its early initiative and, since 1973, has spent considerable time and energy fighting antitrust and restraint-of-trade actions brought against it by various parties including Bell and Howell, General Aniline and Film, Berkey Photo, and Polaroid Corp. (NYT Jan.21, III: 1:1; June 3, 3:1:1 1973). From this point of view, the choice of writing a history that spans 1896 to 1980 is somewhat more than ironic, inasmuch the first date marks

Kodak's belated re-entry into the 35mm film market while 1980 marks the nearly total demise of even the American photographic importing business.

The failure of the United States to create and support a high-grade optical industry had important ramifications for that country's military efforts during both world wars. Those wars, and especially the later conflagration, also perturbed the photographic marketplace in significant ways just as the 35mm camera was introduced. The forces of nationalism, strategic necessity, economic blockades and federal regulation of demand may have provided a brief moment of opportunity for American manufacturers of high quality cameras, but that moment was soon lost. Instead, the United States government actually encouraged the growth of a vigorous Japanese photographic industry, an encouragement which reached its height during the Korean War. Photojournalists, deprived of their supply of German equipment, quickly adopted Japanese cameras and were pleased with the results. An American domestic consumer market eager for quality, competitively priced cameras became receptive to oriental photographic goods.

The marketing history of the 35mm still camera is partly reflected in the history of its advertising. From 1960 to 1975, Japanese firms invested more in at least specialty magazine advertising than any of their international rivals. Apparently, once a price range for cameras

I had been established, consumer appeal was directed away from economic competition. On the whole, readers of a magazine such as Popular Photography have been addressed as informed consumers familiar with technical terminology, but not content with the mere listing of product features. Discussions of product benefits, rather than visuals or symbolic associations have dominated ads of this type. References to expertise and professionalism have been the most dominant themes of non-trade, specialty magazines.

The blurring of traditional lines between amateurs and professionals, implicit in advertising, corresponds to social reality. Professional photojournalists, for whom the 35mm camera serves as a useful tool given an essentially bureaucratic mode of image production, may find themselves "scooped" by equally well-equipped and fortunate amateurs. From the point of view of editors of newspapers and magazines, the numerous perspectives on subjects offered by the 35mm camera affords considerable control and leeway over the work done by photographers. For amateurs or "serious hobbyists", the same camera allows personal aesthetic decisions to be made as a genre-based practice, one which skirts the edges of established high art while also bordering on informal, personal snapshooting. The snapshot as a formal device, and as made with high-quality 35mm equipment, also typifies much of the 1960s counter-culture practice as seen on record albums covers for rock

bands, as well as in the pages of Rolling Stone magazine. Moreover, the technical limitations of the small camera have also been used to create an anti-aesthetic, as exemplified by Robert Frank and the New Documentary photographers.

The adoption of the 35mm still camera by domestic consumers also comes at a time of greater acceptance of photography as a fine art. Traditionally excluded from the Modernist canon as being too "literary" and replete with content, photography has reached a popularity among both the general population and avant-garde visual artists that may threaten Modernism altogether. The democratization of high quality and often anonymous image-making, the growth of a quotation aesthetic, and the sheer proliferation of photographs has contributed to a heightened visual self-consciousness which presents interesting opportunities as well as dilemmas for a technologically-intensive society.

Towards A Sociology of Photography

The recent translation of Pierre Bourdieu's 1965 Un art moyen, rendered in English as Photography: A Middle-Brow Art, presents an interesting basis of comparison for this current study. At the outset, the obvious differences

in data base must be taken into account, as Bourdieu's work is now twenty-five years old, and was undertaken just before photography reached its fine art status. Moreover, Bourdieu's material was based on a France where a distinguishable peasant class still viewed amateur photography as an individualizing luxury, and which accepted photography only as a means of commemorating ritual, family occasions. Bourdieu's arguments that the main function of photography is to provide "private images of private life" (1990:30), while "the different social classes encourage the practice of photography to a different degree" (ibid.:42) find mixed support from this present study. Bourdieu's findings that photography as an amateur practice is one that tends to be shunned by persons at the lower income levels is only partly corroborated by the information presented in Graph V-12-B; while the concentration of presumably amateur activity is in the upper strata, the purchase of expensive camera equipment is almost equally distributed among all income levels. This puts into question Bourdieu's argument that, "One can...seek to own a quality camera without being concerned about the qualities of that camera" (ibid.:33), although some support is given by the somewhat amorphous nature of the photographic advertising analyzed in Chapter IV of this document. The idea that the pursuit of photography as an aesthetic activity is concomitant with more individualizing ways of life is difficult to discuss as

empirically as one would wish, at least in the context of North American society where the majority of quality camera owners tend to be of the professional and/or managerial segments of the workforce (Graphs V-15). However, when dealing with fine art photography as an occupation, one does well to remember that it follows an essentially artisanal pattern of small-scale entrepreneurship in that artists must both produce and market their own goods instead of working on a contract or commission basis.

Moreover, a study of camera clubs, undertaken by Bourdieu's collaborators Castel and Schnapper (Bourdieu 1990:103-128), concludes that there is an "inability of photography to establish an autonomous aesthetic of its own, and that the pursuit of justification is determined, via the image of photography itself, by the social image of art and technology, their roles and conditions" (ibid.:128). The study reported in this document can neither support nor refute that statement except to reiterate that it is now twenty-five years old. Since then the increasing acceptance of photography as a fine art, at least in North America, leads one to suspect that these conditions have changed. Bourdieu's calls for an analysis of photography in terms of the sociology of taste and practice must be acknowledged as an important contribution to the study of social formations and cultural hegemonies. Although the phrase, "this study points to the need for

further research" is one of the great cliches of academic life, it seems clear that an updated replication of Bourdieu's work in North America would pay enormous dividends which, when combined with studies in the diffusion of innovation, would present a comprehensive and critical history of the 35mm still photographic camera.

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APPENDIX: GRAPHS AND ILLUSTRATIONS

All graphs are derived from tabulated statistical information; no graphs are copies or modifications of existing charts. Graphs III-E, III-F, IV-A through IV-X, V-9, V-16, V-18 and V-19 represent original research.

Figure I-A

Even if you never own one, Nikon will touch your life.

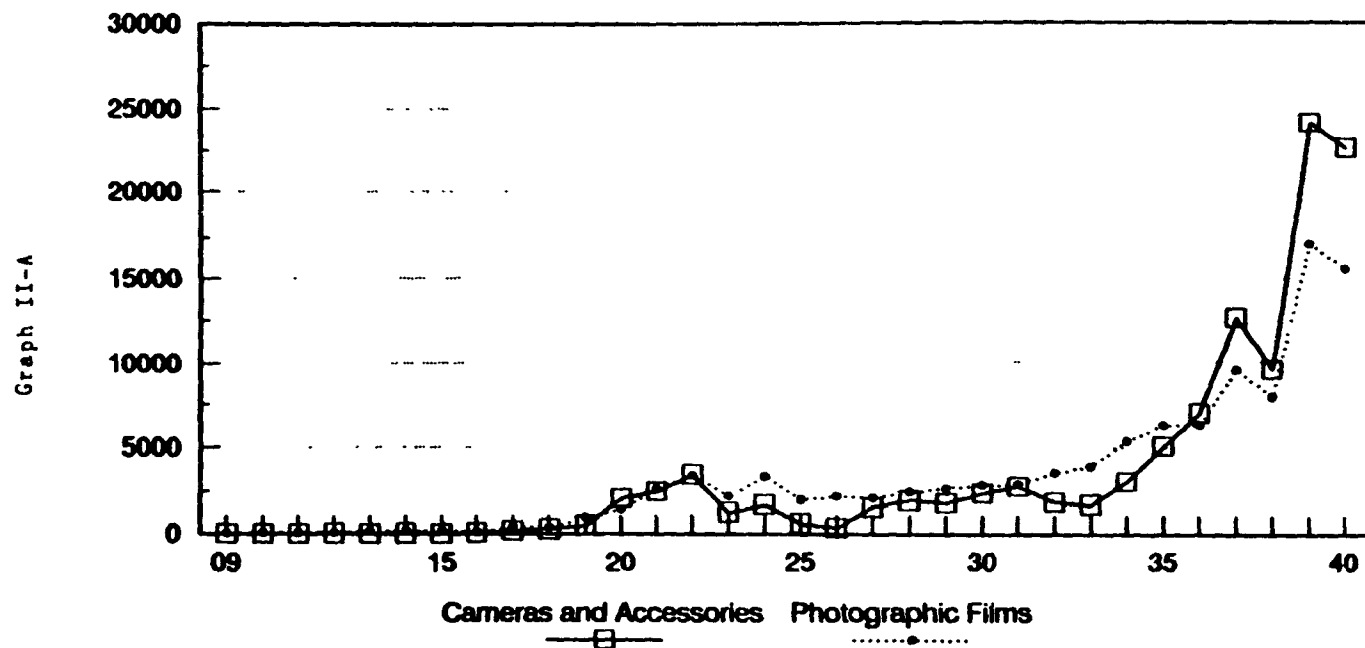


For the past several years, Nikon has been the world's leading manufacturer of cameras. And now, with the introduction of the Nikon F3 SLR, the company has taken the market by storm. The F3 is a compact, lightweight camera that offers a wide range of features and options. It's a camera that's perfect for both professional and amateur photographers alike. And it's a camera that's sure to touch your life.

The Nikon F3 is a compact, lightweight camera that offers a wide range of features and options. It's a camera that's perfect for both professional and amateur photographers alike. And it's a camera that's sure to touch your life.

The Nikon F3 is a compact, lightweight camera that offers a wide range of features and options. It's a camera that's perfect for both professional and amateur photographers alike. And it's a camera that's sure to touch your life.

Annual Household Expenditures in Japan Cameras and Photographic Film 1909 - 1940

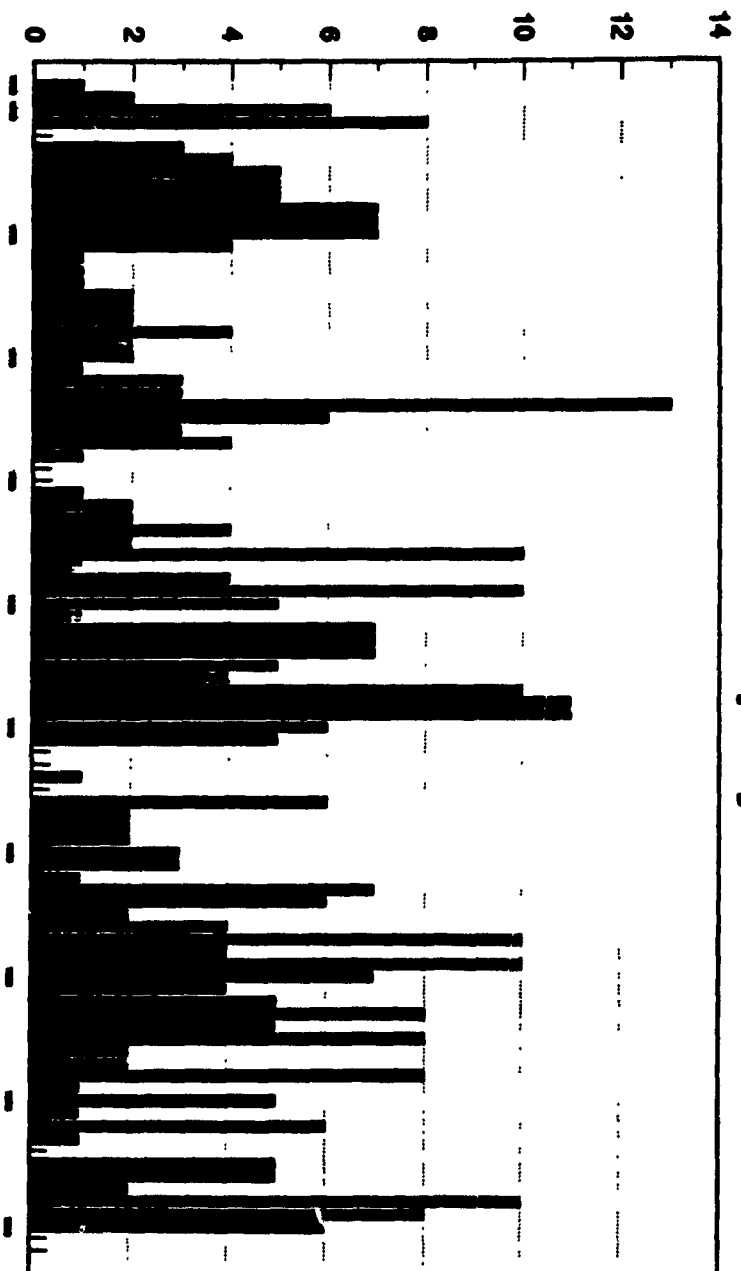


In thousands of 1967 yen

Source: Mihohel Shinohara, ESTIMATES OF LONG-TERM ECONOMIC STATISTICS OF JAPAN, Tokyo 1967

GRAPH III-A

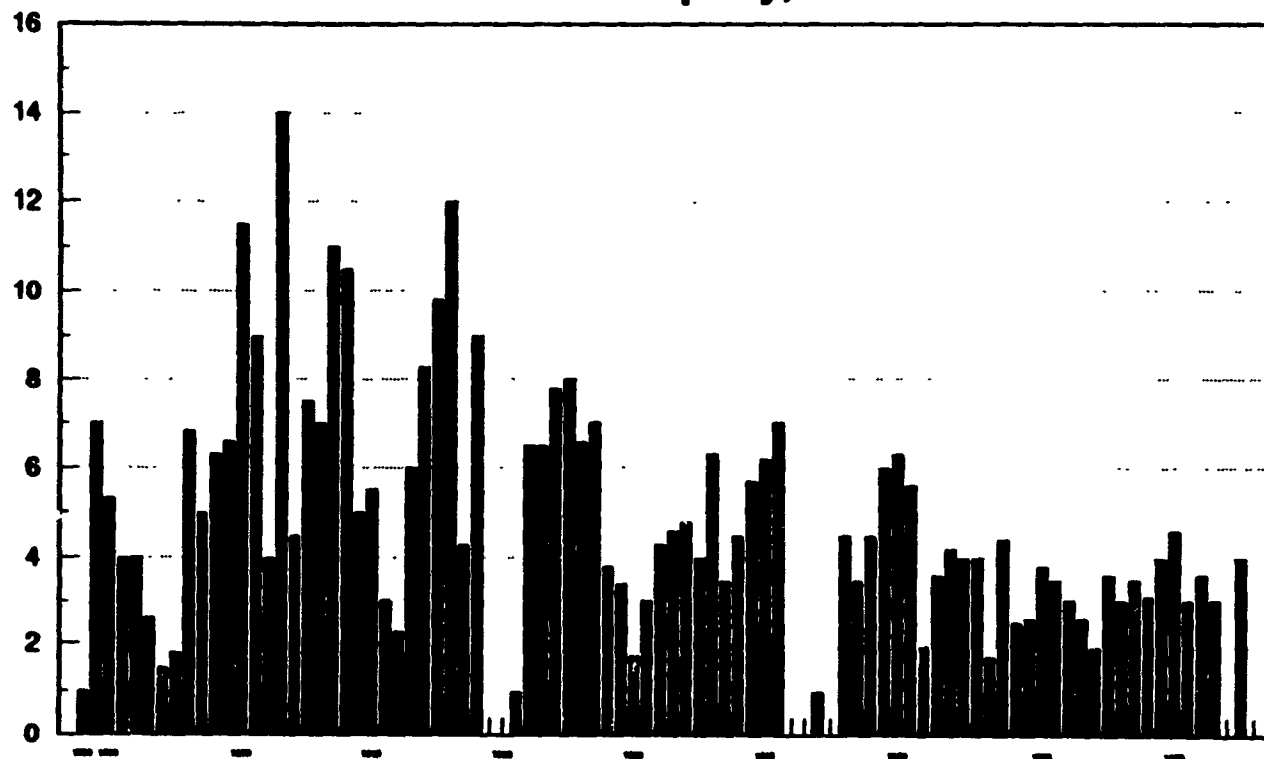
Number of New Camera Models, U.S. Market Eastman Kodak Company 1888 - 1980



Source: McKoon and McKoon,
Collectors' Guide to Kodak Cameras, 1981

GRAPH III-B

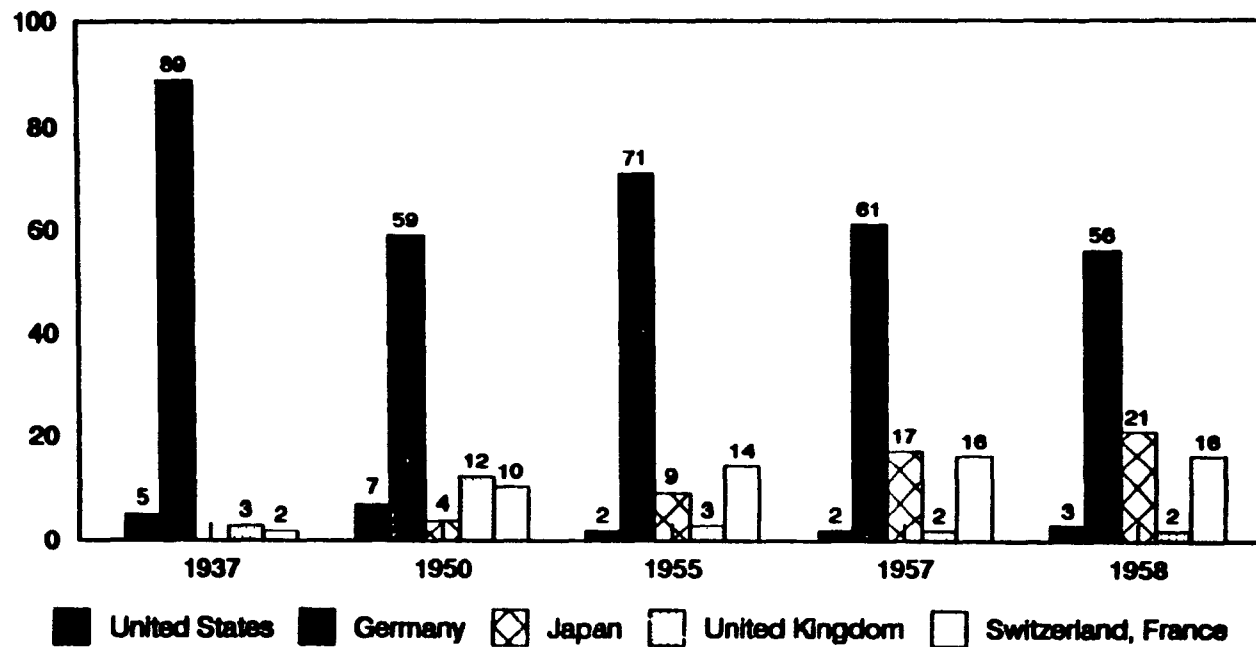
Average Camera Model Production Span Eastman Kodak Company, 1888 - 1975



Source: McKeown and McKeown, 1981

GRAPH III-C

Percentage of World Export Market Still Photographic Cameras 1937 - 1958



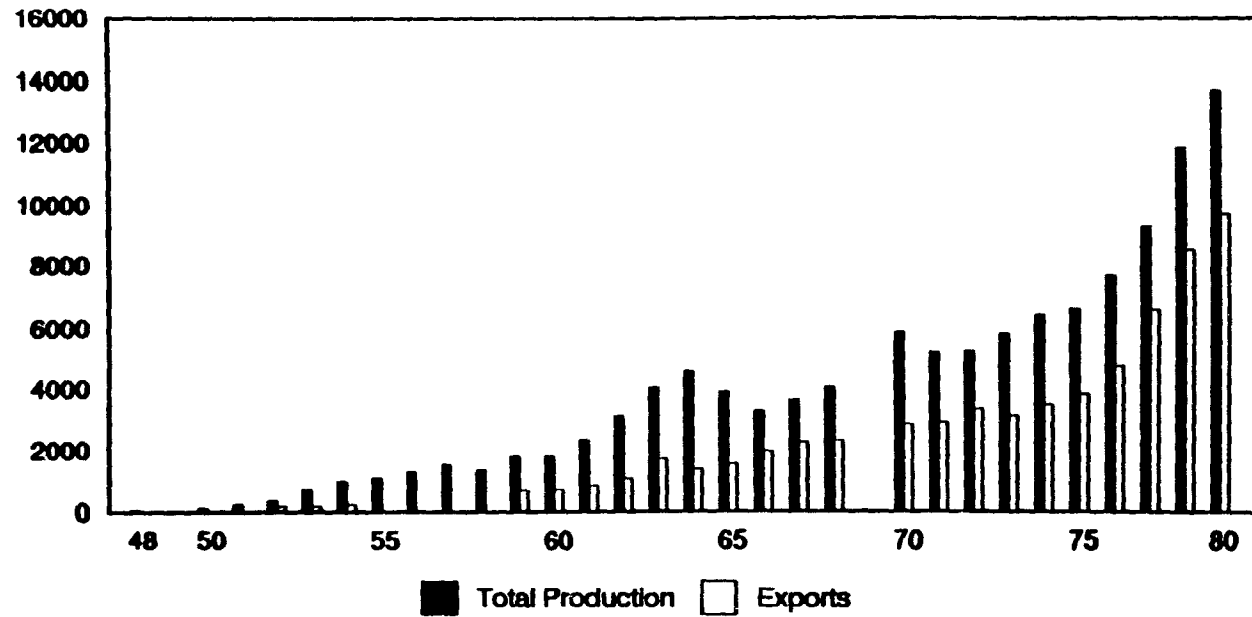
Source: Alfred Mazels, INDUSTRIAL GROWTH AND
WORLD TRADE, Cambridge University Press 1965
Missing Percentages: Russia, other countries

GRAPH III-D

Annual Japanese Production and Exports Still Camera Units 1948 - 1980

(Source: ORIENTAL ECONOMIST YEARBOOK)

Thousands of Units

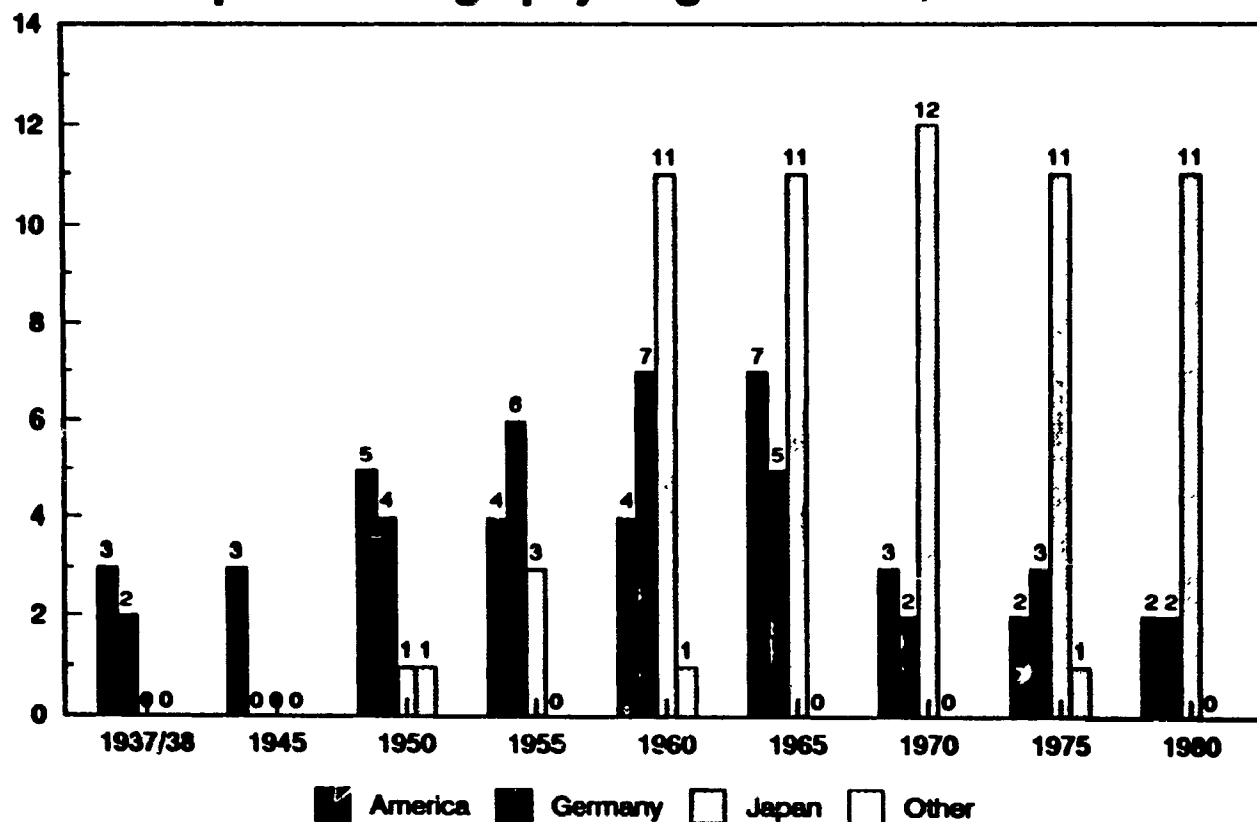


Production figures for 1949 and 1950 unavailable
Export figures for 1949, 1950, 1951, 1955, 1956,
1957, 1958 also unavailable.

GRAPH III-E

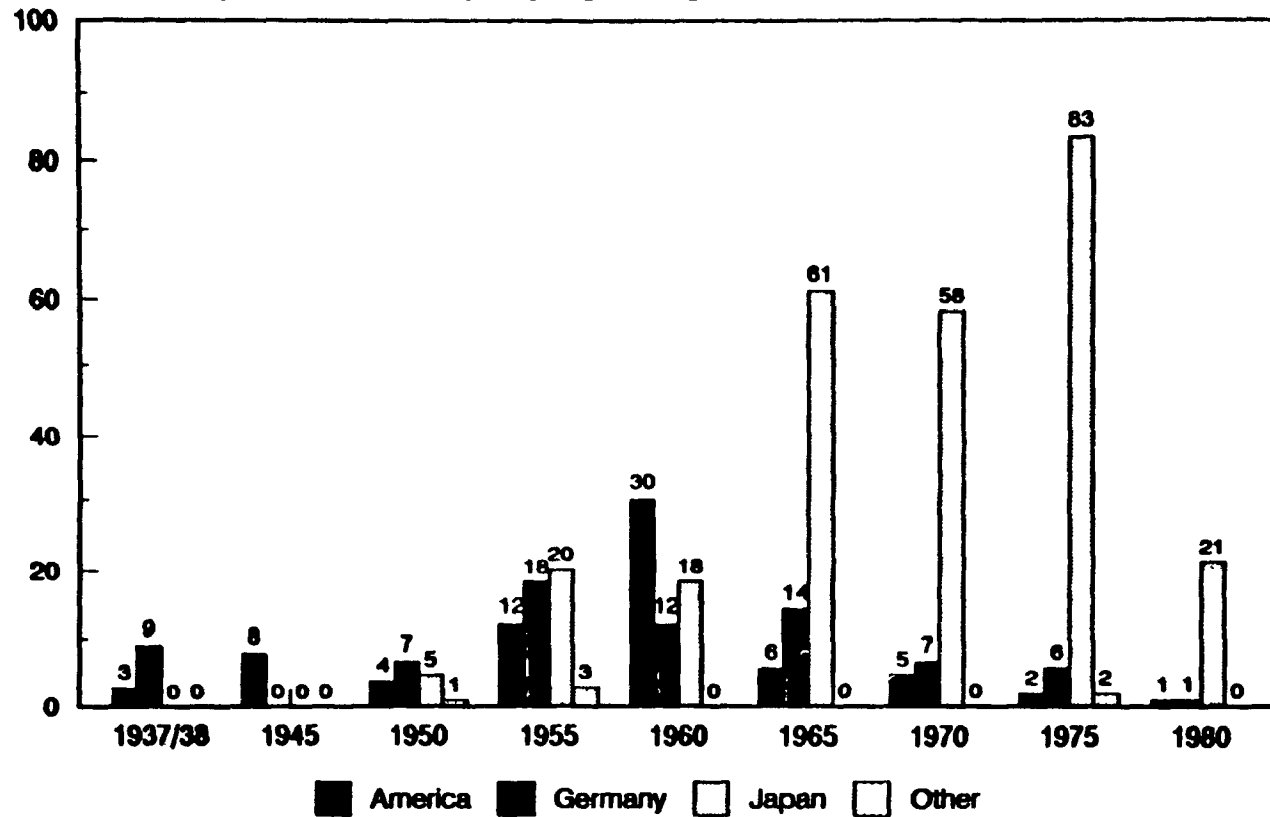
Number of Camera Advertisers by Nationality

Popular Photography Magazine 1937/38 - 1980



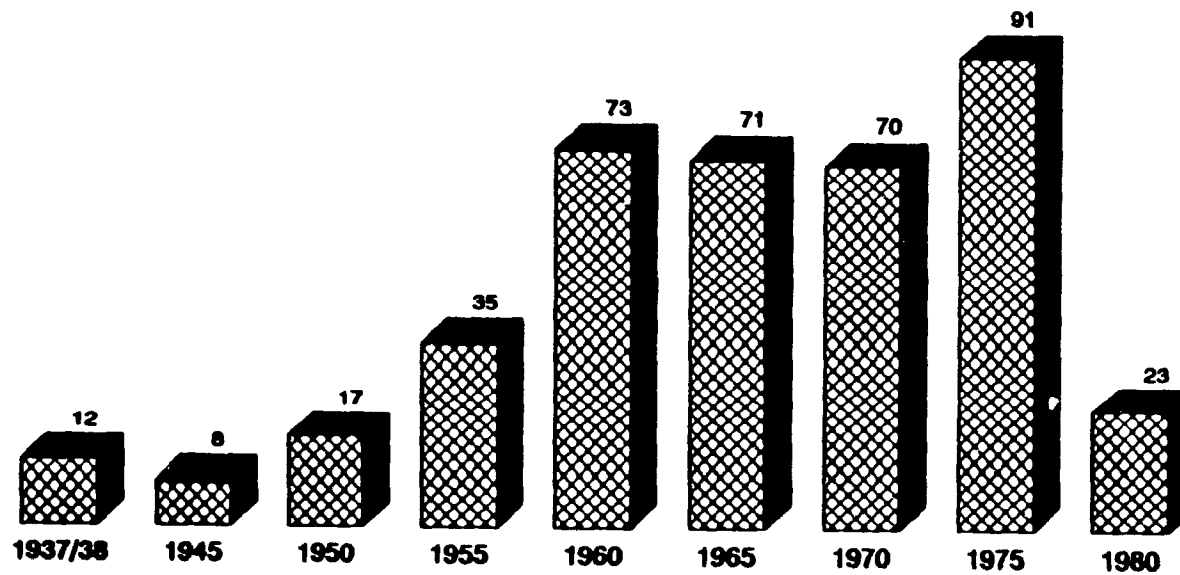
GRAPH III-F

Number of Camera Advertisements by Nationality Popular Photography Magazine 1937/38 - 1980



GRAPH IV-A

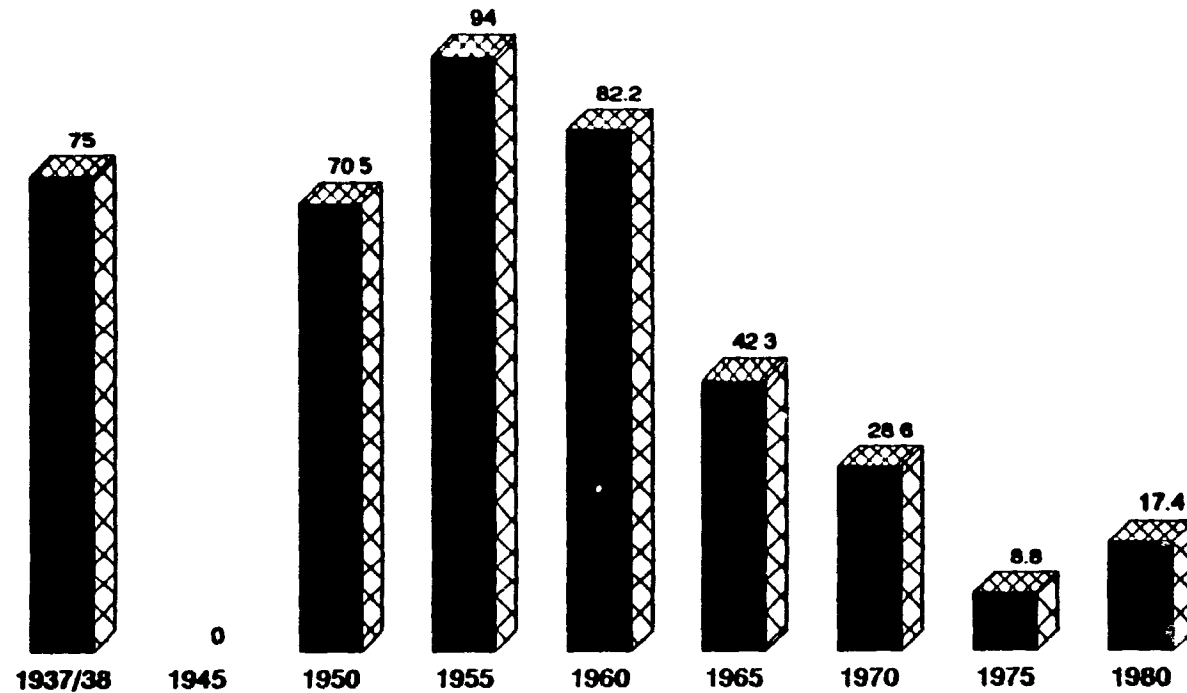
**Number of Different Photographic Advertisements
35mm Cameras, 1937/38 - 1980
Popular Photography Magazine**



All ads one full page minimum length

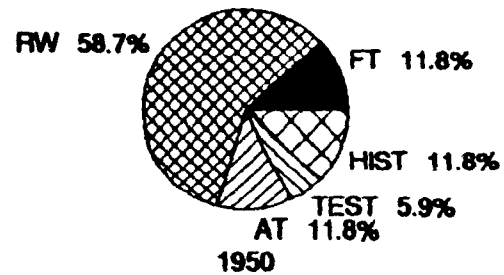
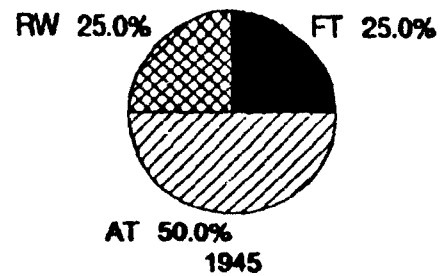
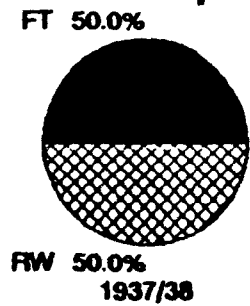
GRAPH IV-8

Percent of Camera Ads Citing Price Popular Photography Magazine 1937/38 - 1980



Frequency of Camera Ad Type 1937/38 - 1950

Popular Photography Magazine

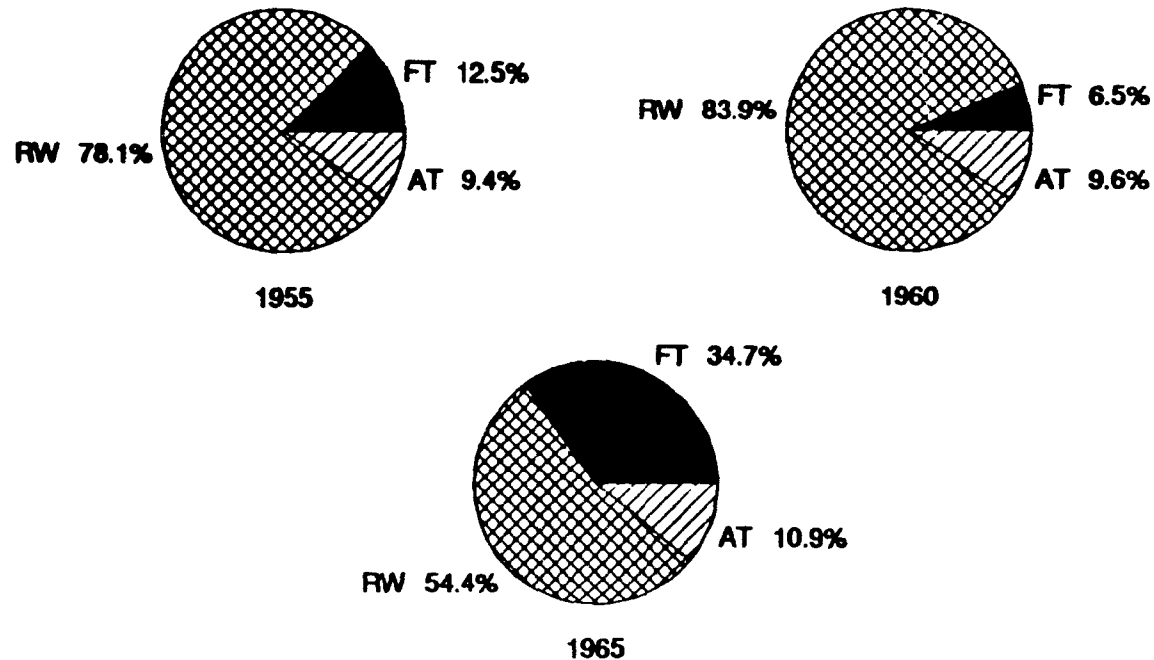


FT = Feature Text RW = Reason Why
AT = Associative Text TEST = Testimonials
HIST = Historical References

GRAPH IV-D

Frequency of Camera Ad Type 1955 - 1965

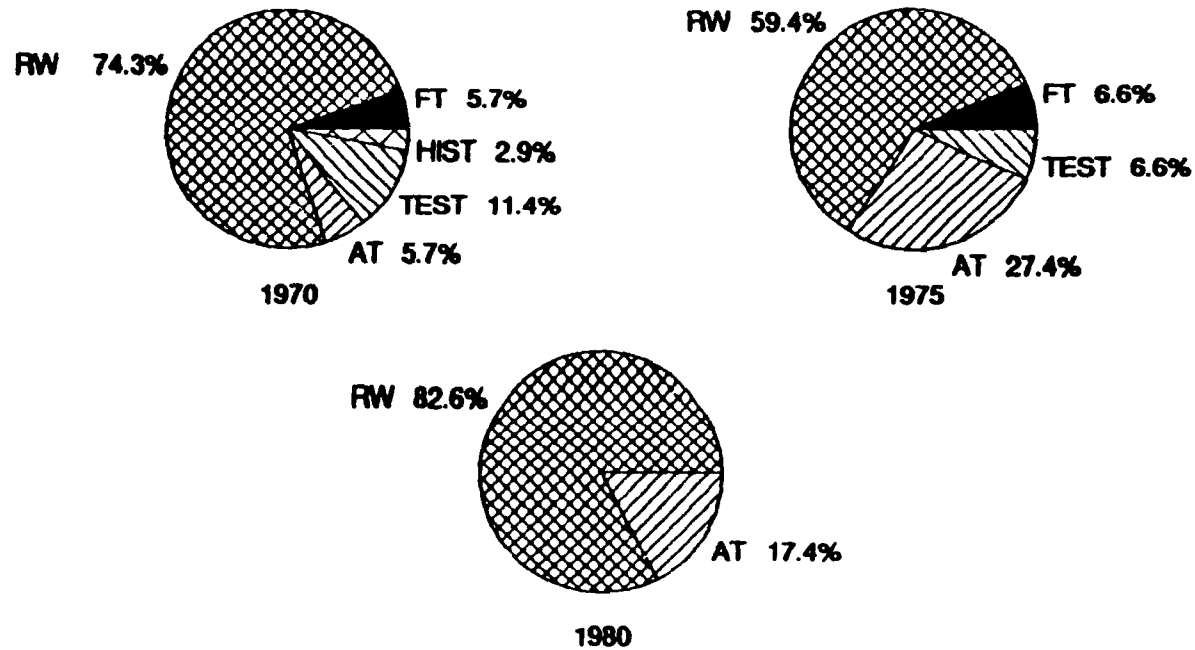
Popular Photography Magazine



FT = Features Text RW = Reason Why Text
AT = Associative Text TEST = Testimonials
HIST = Historical References

Frequency of Camera Ad Types 1970 - 1980

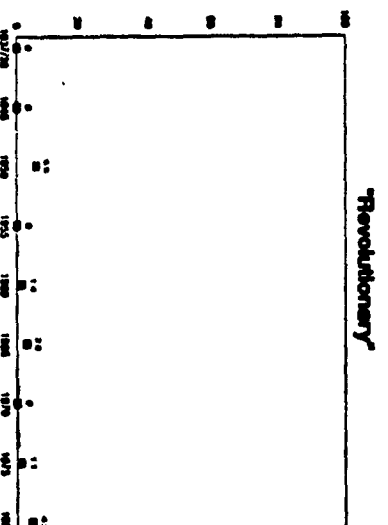
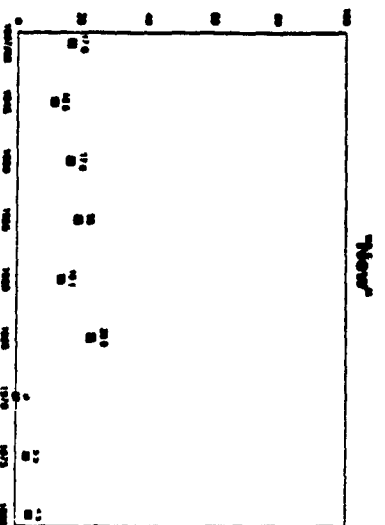
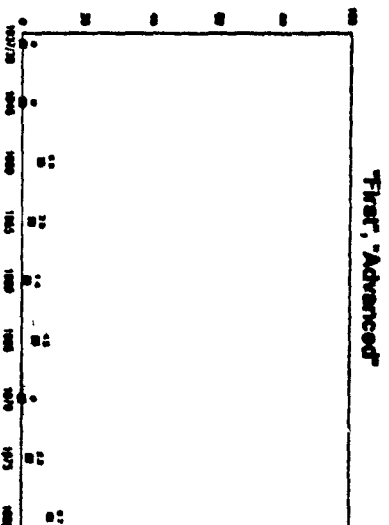
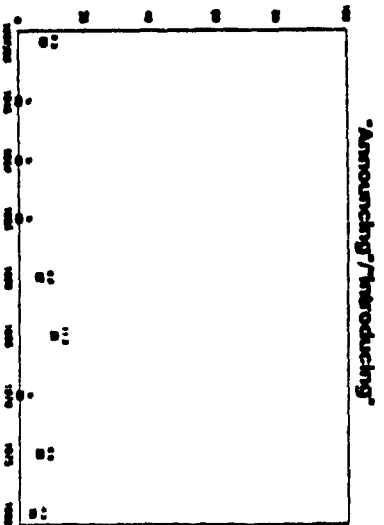
Popular Photography Magazine



FT = Features Text RW = Reason Why Text
AT = Associative Text TEST = Testimonials
HIST = Historical References

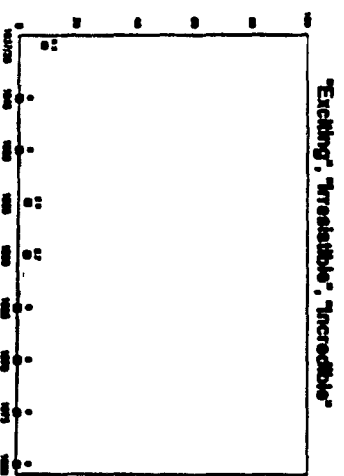
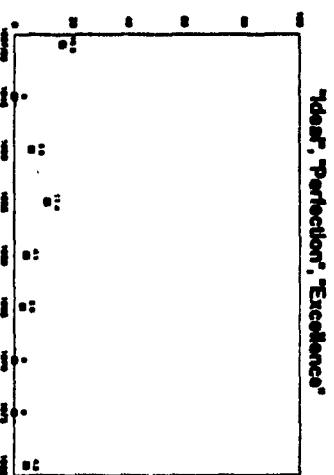
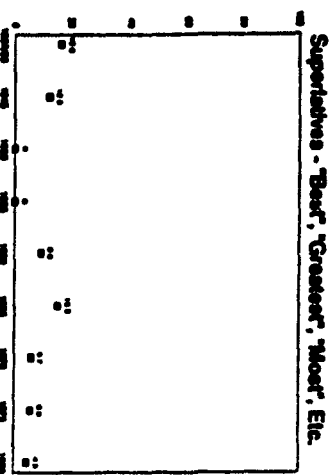
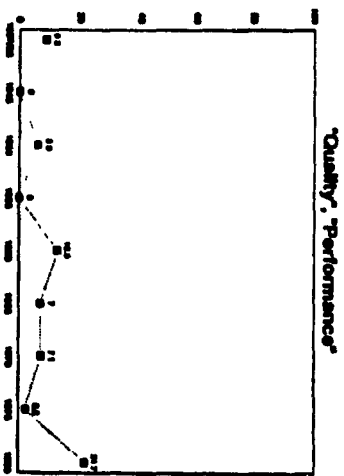
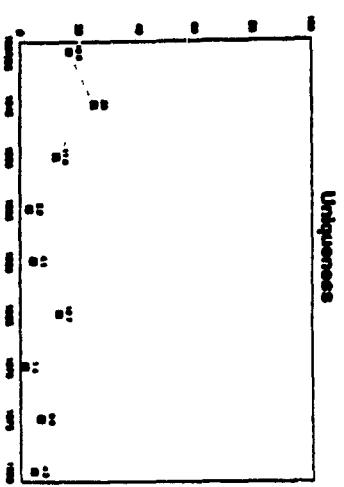
Frequency of Verbal Terms and References

GRAPH IV-F



Frequency of Verbal Terms and References

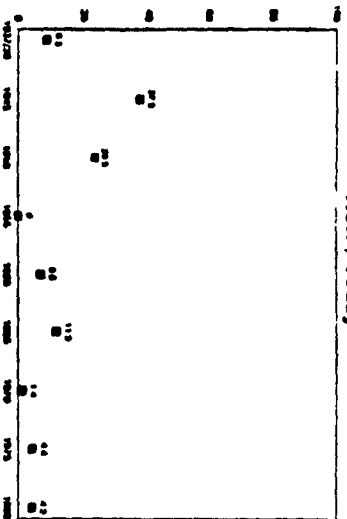
IV-6



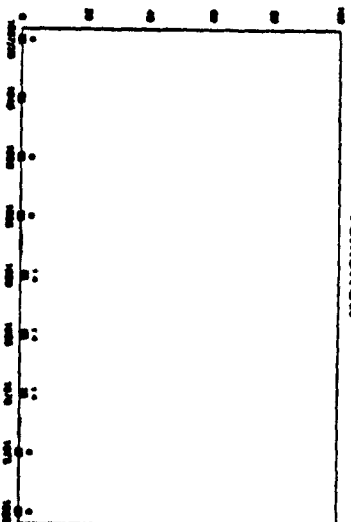
Frequency of Verbal Terms and References

IV-H

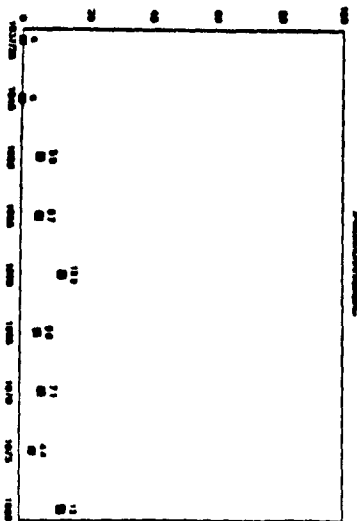
Now/Today



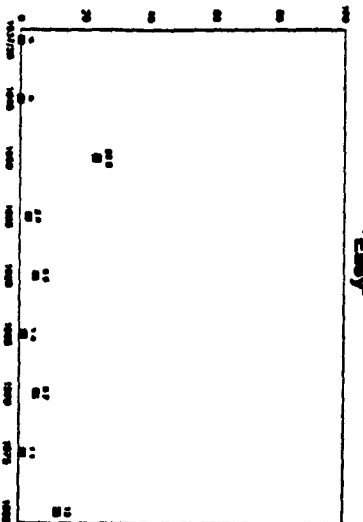
Tomorrow



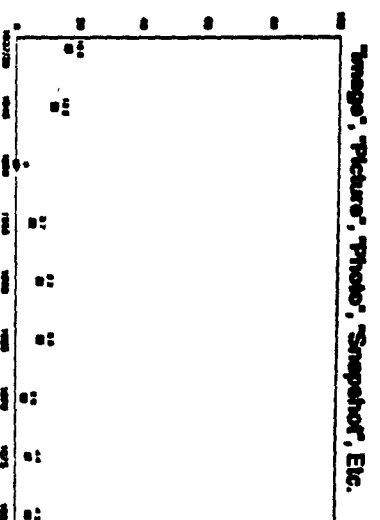
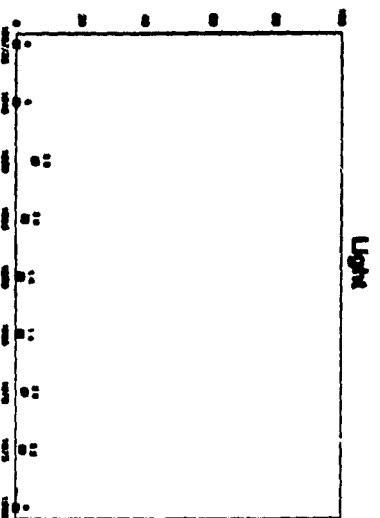
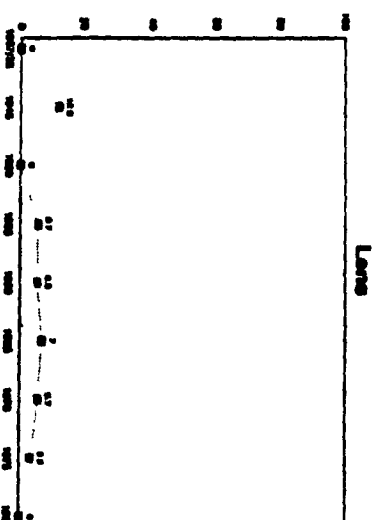
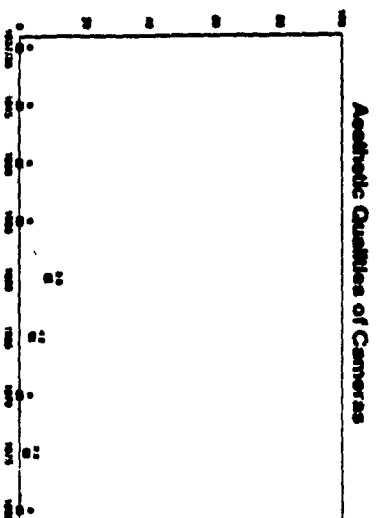
Automatic



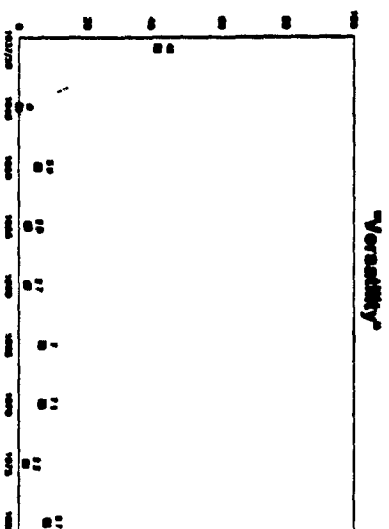
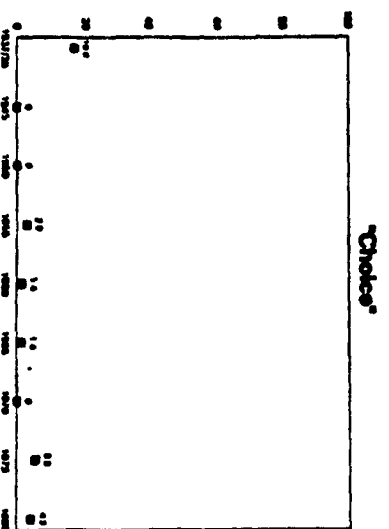
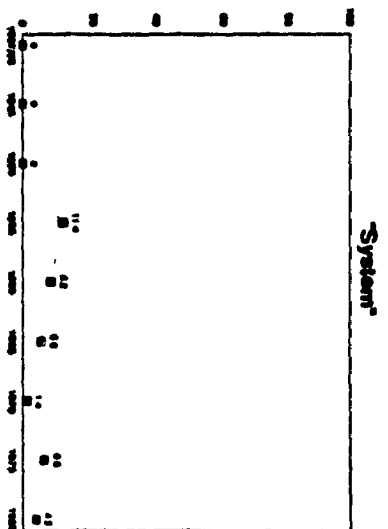
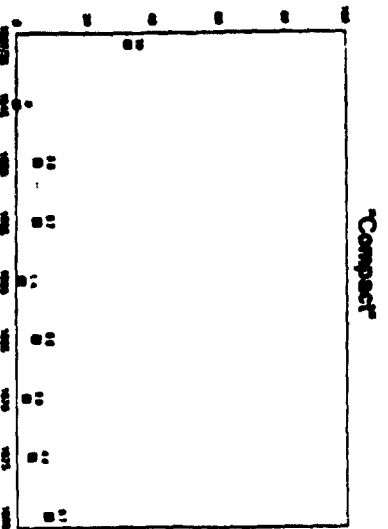
Easy



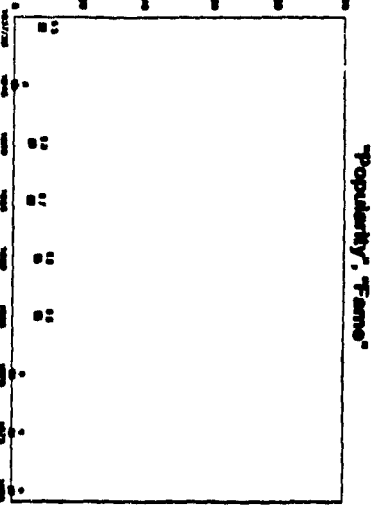
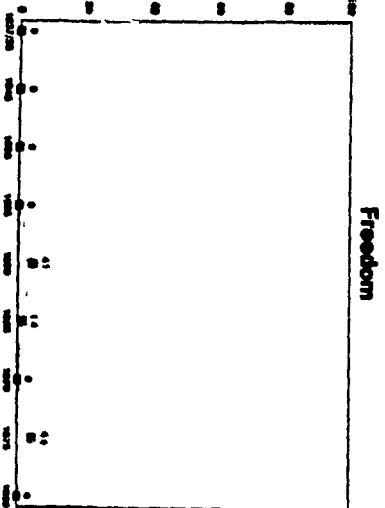
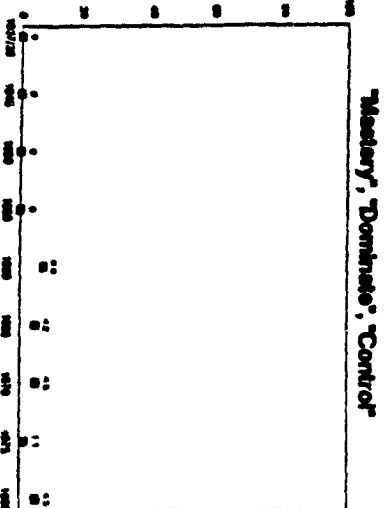
I-AI



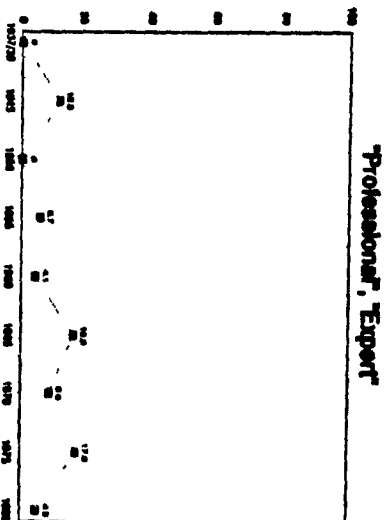
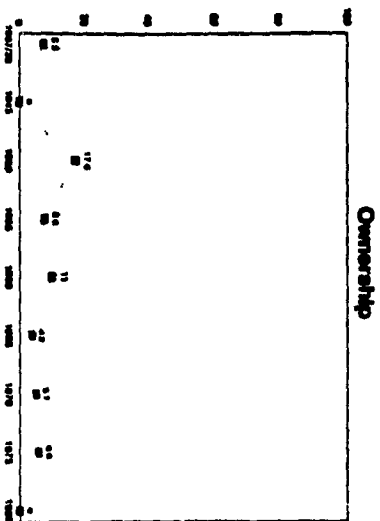
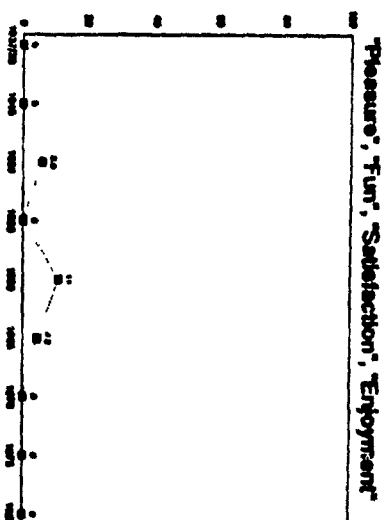
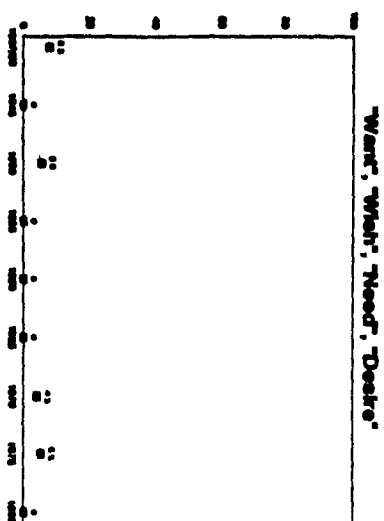
Frequency of Verbal Terms and References



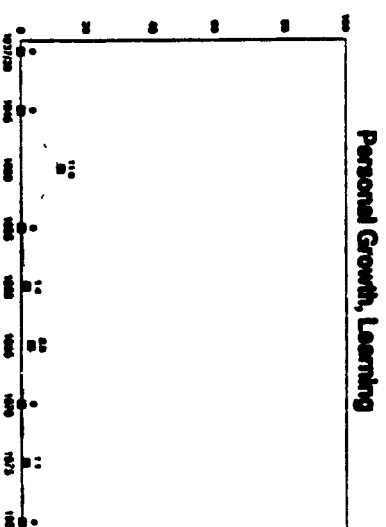
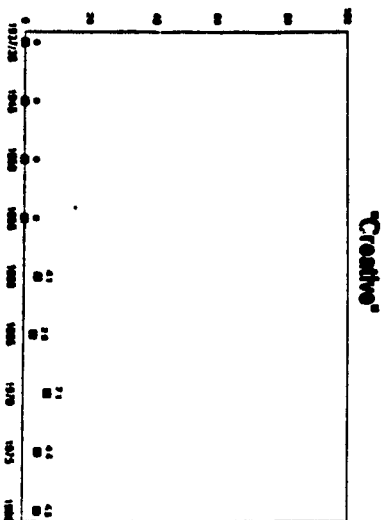
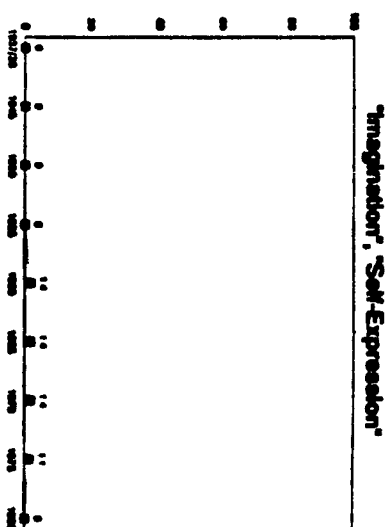
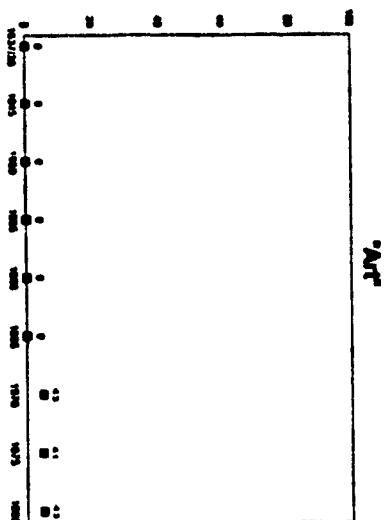
Frequency of Verbal Terms and References



Frequency of Verbal Terms and References

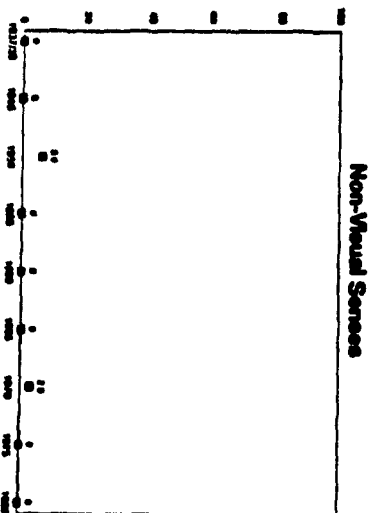
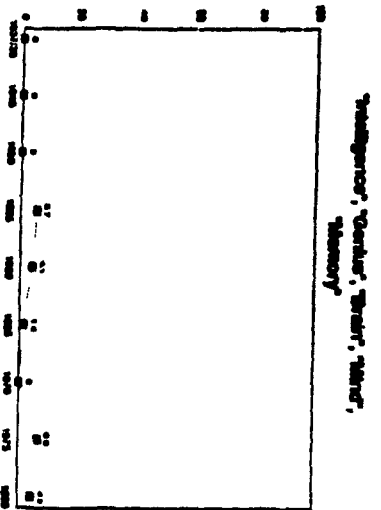
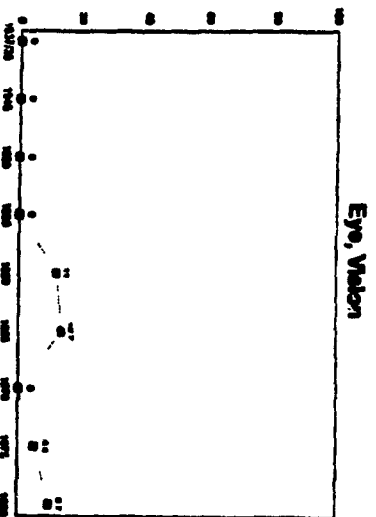


Frequency of Verbal Terms and References



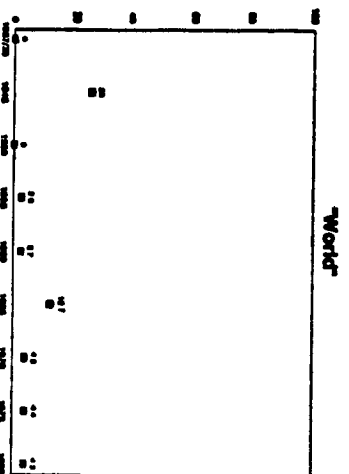
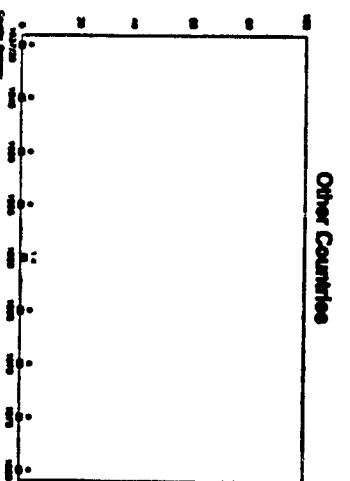
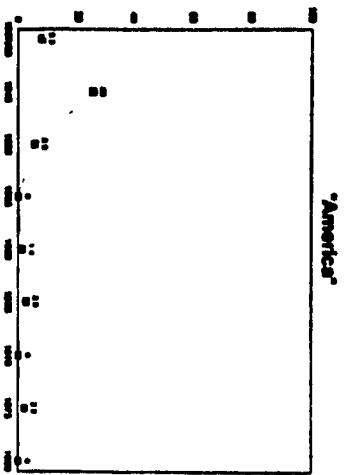
IV-N

Frequency of Verbal Terms and References

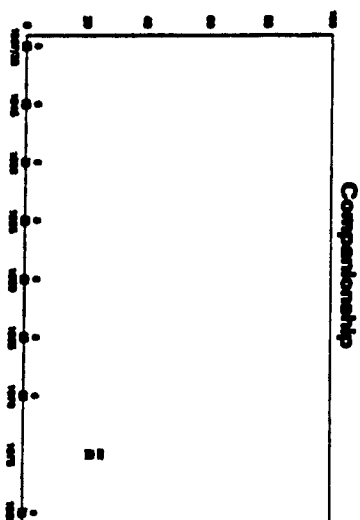
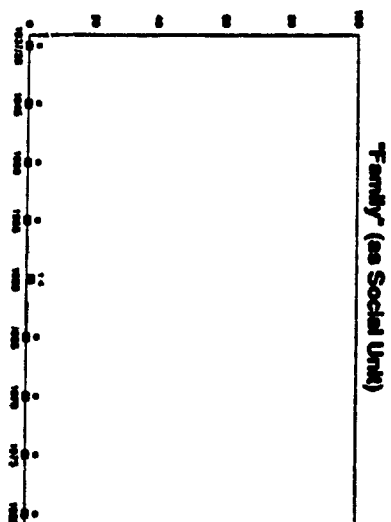
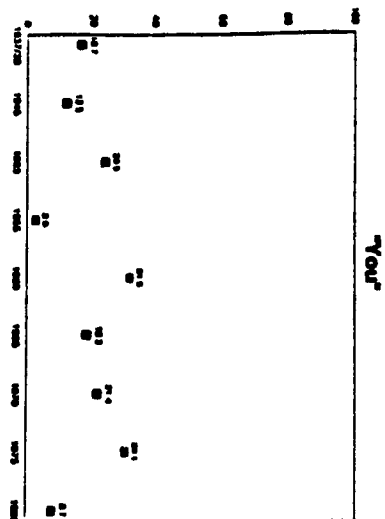


Frequency of Verbal Terms and References

IV-0

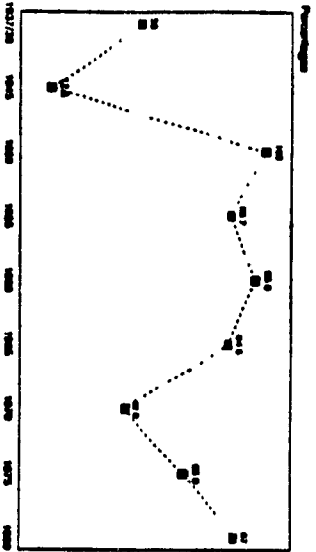


Frequency of Verbal Terms and References



Frequency of Subjects in Ads 1937/38 - 1980:

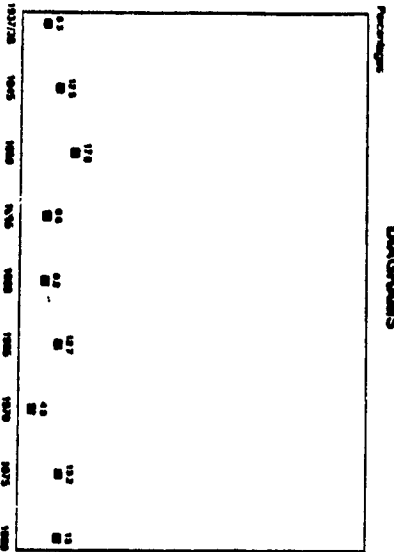
CAMERAS



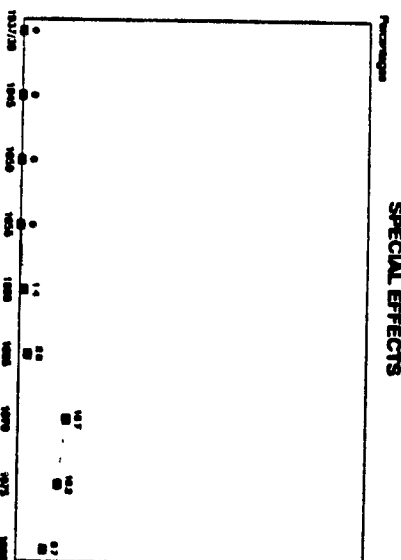
LENSES AND ACCESSORIES



DIAGRAMS



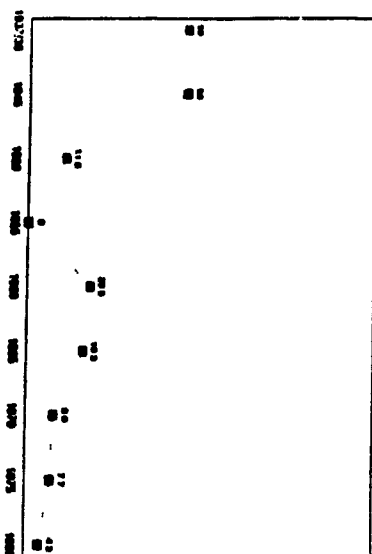
SPECIAL EFFECTS



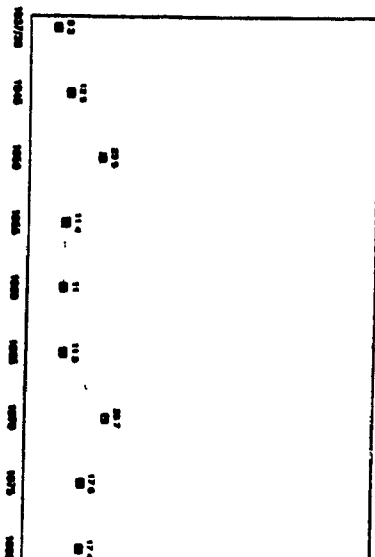
Frequency of Subjects in Ads 1937/38 - 1980:

IV-R

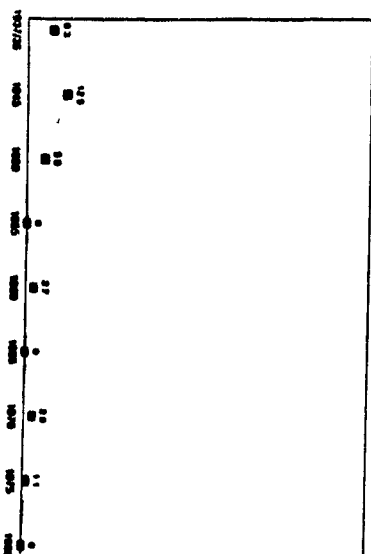
Percentage
MALES



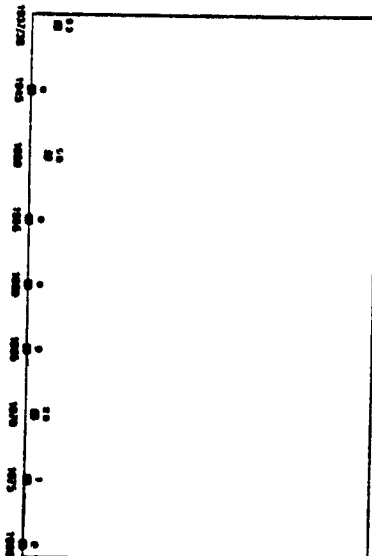
Percentage
FEMALES



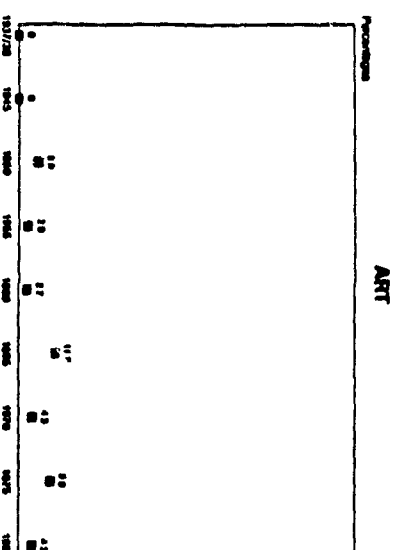
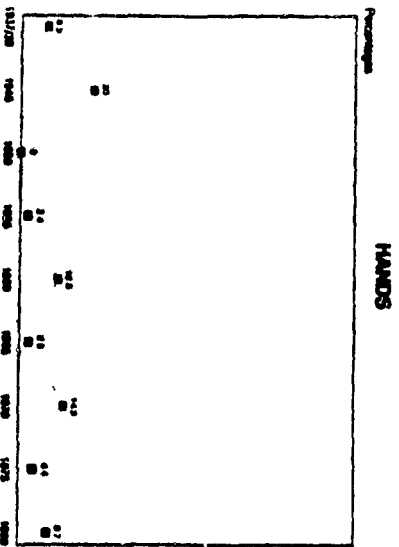
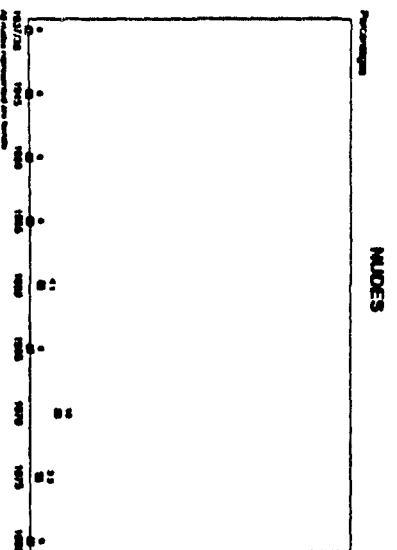
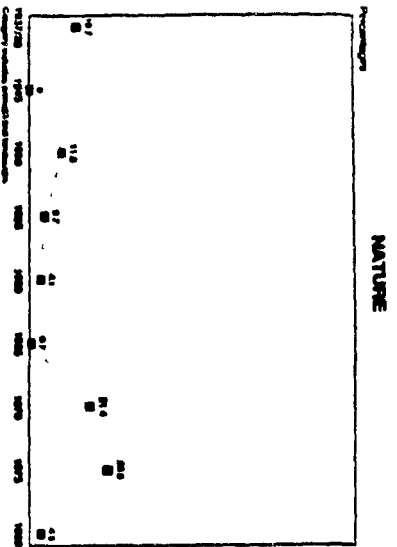
Percentage
CHILDREN



Percentage
COUPLES

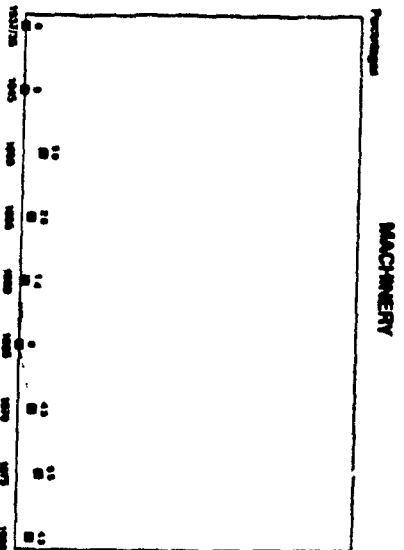
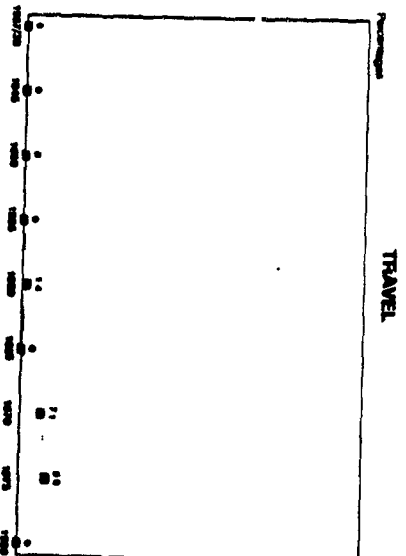
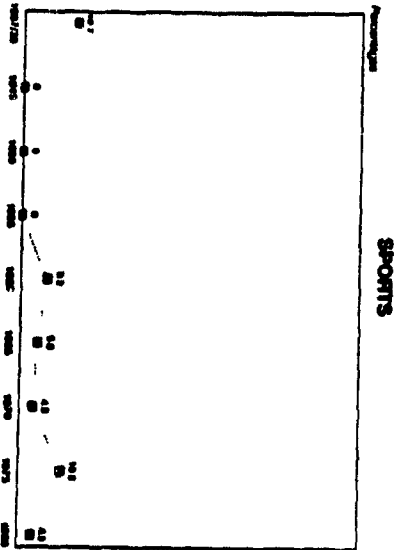


Frequency of Subjects in Ads 1937/38 - 1980:

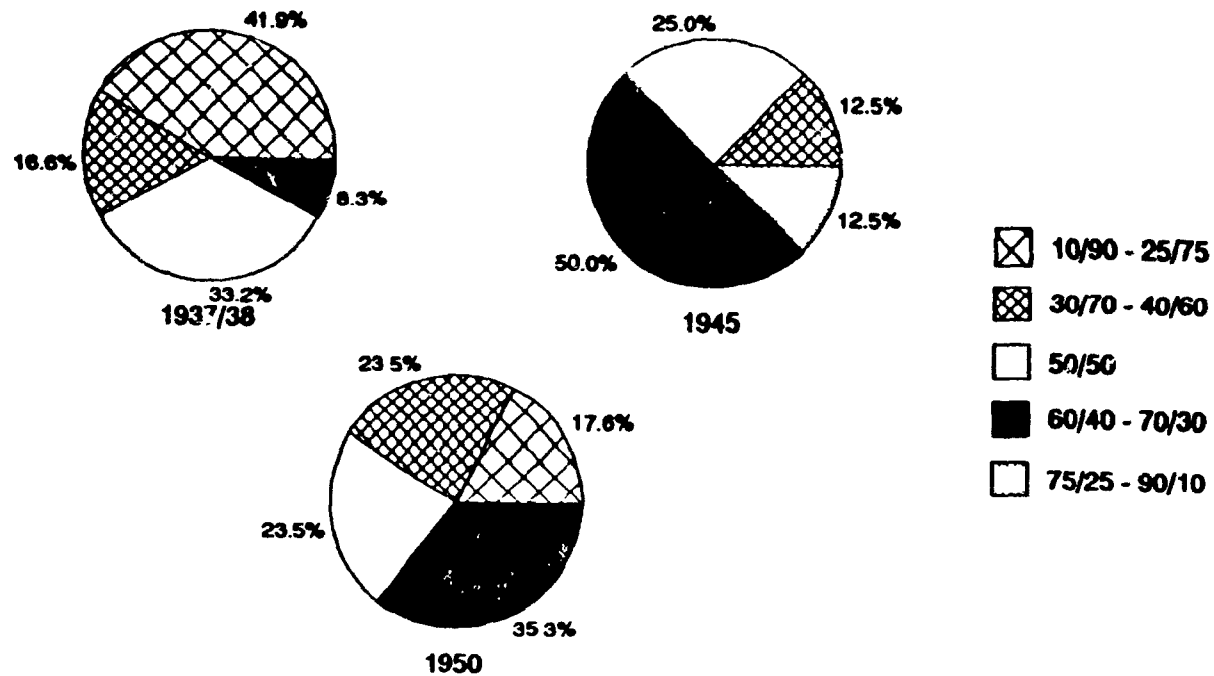


IV-1

Frequency of Subjects in Ads 1937/38 - 1980:

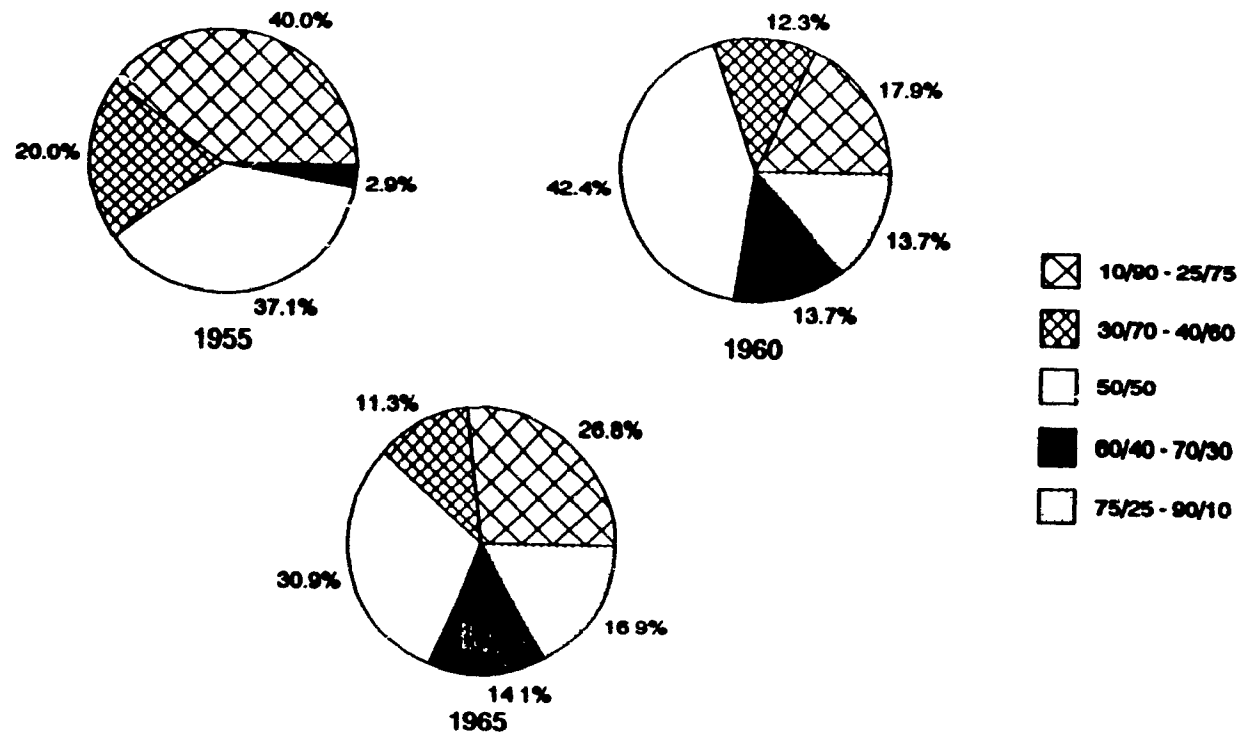


35mm Camera Advertisements: Ratios of Image to Text 1937/38 - 1950



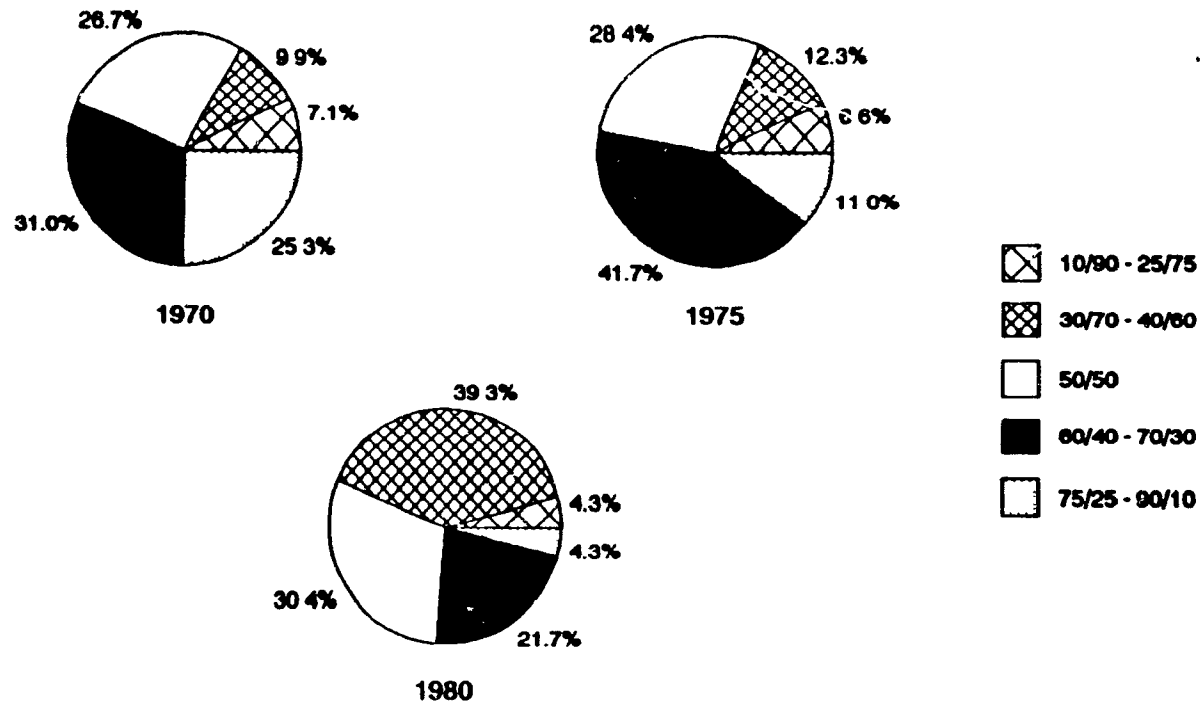
Source: Popular Photography Magazine

35mm Camera Advertisements: Ratios of Image to Text 1955 - 1965



Source: Popular Photography Magazine

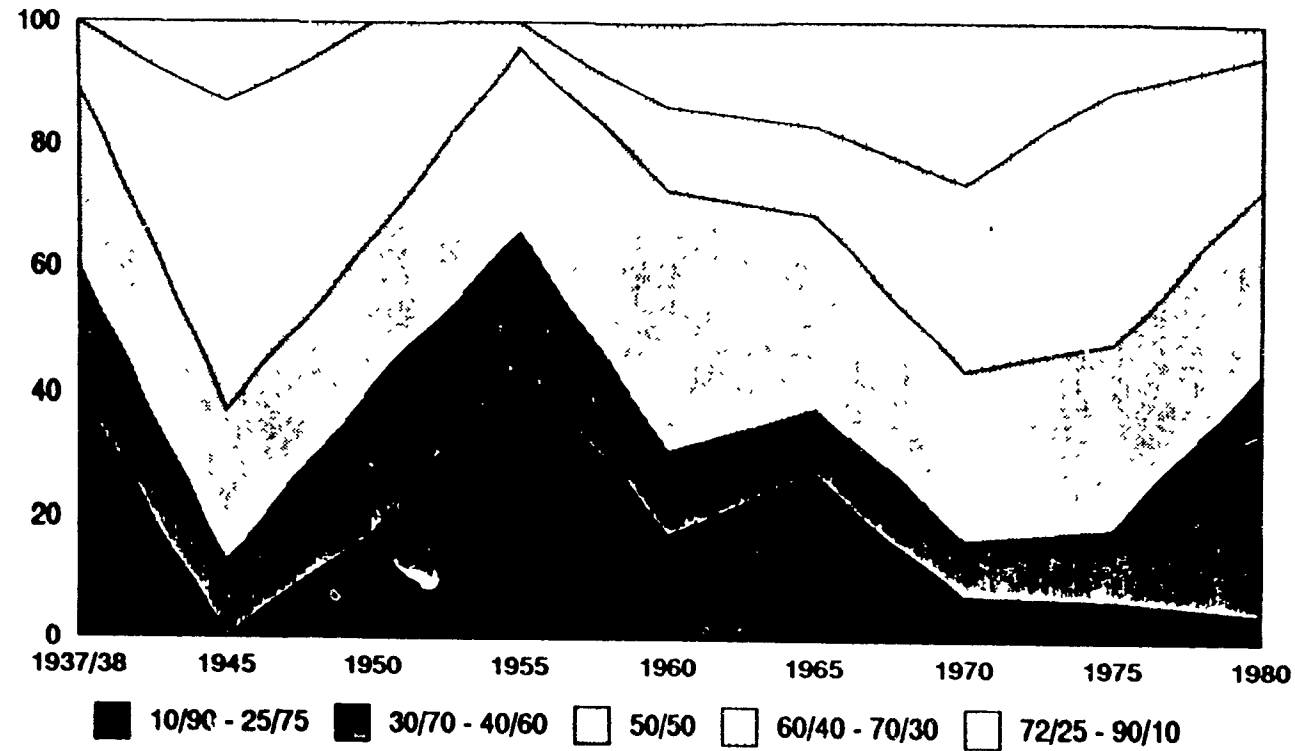
35mm Camera Advertisements: Ratios of Image to Text 1970 - 1980



Source: Popular Photography Magazine

Ratios of Image to Text 1937/38 - 1980

Percentages



Source: Popular Photography Magazine

The NEW BESELER C TOPCON

THE ONLY CAMERA DELIVERED
WITH
DOCUMENTED PROOF
OF PRECISION PERFORMANCE!



1. FILMSTRIP OF LENS QUALITY AND RESOLUTION TESTS

When you buy your new Beseler "C" Topcon you'll find packed with it a lens test strip exposed at every 1 stop of the Topcon lens on your camera. Documented proof of the precise resolution and quality characteristics of the Topcon lens on your camera.

2. CUSTOM SHUTTER CALIBRATION SPEED CHART

ASA Standards allow for an error of $\pm 25\%$ on shutter speeds. To achieve the greater precision needed for perfect color rendition, a shutter calibration chart records actual speed at every indicated setting. Documented proof of the shutter performance on your camera.

3. Plus TWO FREE PERFORMANCE CHECK-UP CERTIFICATES

You receive 2 certificates which entitle you to a free camera inspection, cleaning and shutter recalibration on the first and second anniversary of your purchase. Documented proof of continuing precision performance of your camera.

AS A FITTING MARK OF DISTINCTION, BECAUSE LIKE OTHER ACCOMPLISHED PHOTOGRAPHERS, YOU WILL BE PROUD TO BE RECOGNIZED BY THE CAMERA YOU WEAR, YOUR NAME IS ENGRAVED ON THE LENS CAP AT NO CHARGE!

WRITE FOR FREE BROCHURE



CHARLES BESELER COMPANY
615 S. 10th ST. EAST OAKLAND, N.J.

* BECAUSE THE NEW BESELER C TOPCON HAS BEEN DESIGNED PRIMARILY FOR THE SERIOUS PHOTOGRAPHER WHO MUST GET PRECISE RESULTS DAY AFTER DAY, YEAR AFTER YEAR, THE CHARLES BESELER COMPANY HAS INCLUDED THIS PROOF OF PRECISION PERFORMANCE. THE BESELER C TOPCON MAY BE SEEN ONLY AT BESELER FRANCHISED DEALERS.

What to expect in the Seventies

Whatever the shape of things to come, whatever the innovations, freedom will be an important ingredient.

Computers and laser beams—tools of industry and business—will facilitate every day living, even liberate housewives from tedious chores.

In the fashion world where women are always ready to shed the conventional, body ornaments are the coming thing (as if you hadn't noticed).

In photography, the challenge of the future has already been met. With the unconventional camera that liberates you from all cumbersome technical details. It's the Petri FT EE. It's fully automatic. It lets you concentrate on the beauty around you.

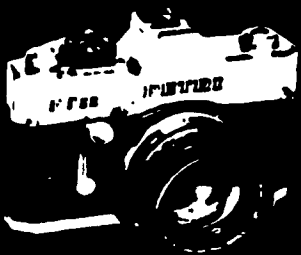
The Petri FT EE is really three SLR systems in one. On full automation, you'll never miss a shot. Just aim, focus, shoot.

Prefer to be the creative master? Use "think" options: match-needle system, or manual override.

There's everything you'll ever need: interchangeable optics, multi-range focusing, precision 30° angled shutter release (with automatic meter switch-off feature), speeds 1/2 to 1/2000 sec. plus B for ASA 25-800. And a full line of accessories.

With automatic 55mm F1.8 lens (that experts call "nothing short of fantastic") and leather carry case, under \$250.

The camera that gives you freedom of action when you want it.



Fully automatic

PETRI FT EE

You shouldn't expect less

PETRI OPTICS, INC., 1000 N. 10TH AVE., SUITE 100, DENVER, CO 80202

Copyright © 1970 Petri Optics, Inc.

IV-3

"I'LL NEVER SMILE AGAIN" Says ARTHUR MURRAY



See These Other
RICOH Beauties
at Your Dealer:



RICOH Diacord 'L'
Biggest 2 1/2 x 2 1/2. Re-
flex value! Built In
Meter. Speeds to
1/500. **\$65.00**
Diacord "G" without
meter. Speeds to
1/500. **\$40.00**



RICOH S10M
35mm with Built In
Meter. f1.9 Lens.
Speeds to 1/500
\$70.00
"300" 1/2" Lens.
2/500 Shutter Speeds
\$50.00



RICOHMATIC 225
Finest 2 1/2 x 2 1/2. Avail-
able Built In Meter.
Single-Stroke Wind-
ing. Built In 35mm
Adapter. Speeds to
1/500. **\$60.00**

At your camera store,
or write for the name
of your nearest dealer.

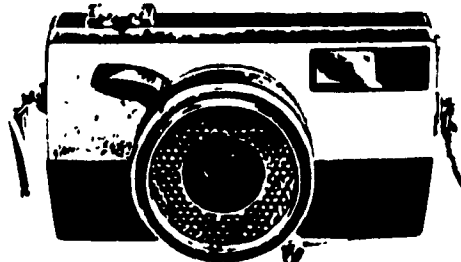
**ALLIED IMPEX
CORPORATION**
500 FOURTH AVE.
NEW YORK 10 N. Y.
CHICAGO 10 ILLINOIS 7.
LOS ANGELES 30

September 1960

...UNTIL You Snap Me With That Snappy New **RICOH AUTO '35'**

"I'm rather tired of posing for those
gadget cameras with dials and gears,
that tie a photographer up in knots. I
want the man to fuss over my picture,
not his camera."

Yes, you don't need an engineering de-
gree to get perfect 35mm pictures, every-
time, with this Ricoh! Ricoh's 'Auto-
matic Brain' has an electric eye that
measures available light, tells you
exactly when you're ready to shoot —
no adjustments needed. Brilliant color
prints or slides . . . and just as easy for
flash pictures! (Man-
ual shutter and dia-
phragm settings can
be set.) Price a mere



\$49.95

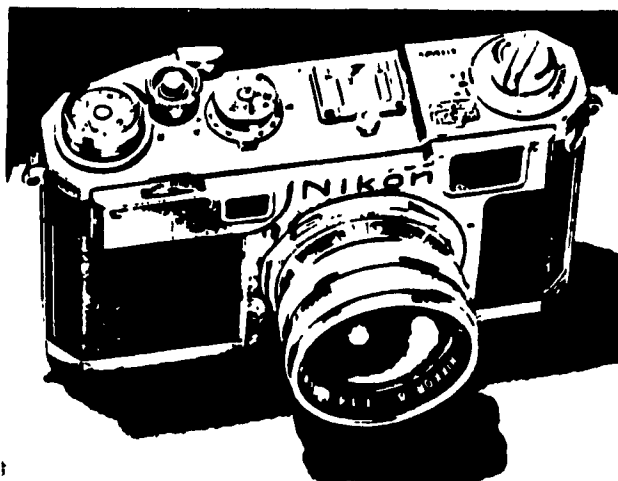
Sight, Snap! That's All!

**SOME days
you feel
ten feet tall.**



**Like that lucky day you shot a hole in one,
or the day the doctor shook your hand and said, "It's a boy,"
or the day they painted 'vice-president' on your door,
or the day you bought your Nikon F.**

Q. I want to ask you about people who are concerned about photography. I have taken pictures for show your wife or write Dept MPJ
A. Yes, I have. I have taken pictures for show your wife or write Dept MPJ



An Advertised Statement Summarizing the Features of the New Nikon S-2

The long awaited, new model Nikon, Model S2, has arrived. And it is quite evident that the manufacturer has gone to great lengths to make it the most complete 35mm camera of its kind. It does, in fact, combine more known 35mm camera features than any other of its type on the market.

Life-Size Rangefinder-Viewfinder

One of the outstanding improvements in the new Nikon S2 is in the finder. You feel as if you aren't looking through a camera finder at all, but rather that you are framing the subject itself in a luminous rectangle. The image is life size. The illusion of realism is so effective that you can actually use the finder with both eyes open. It is of the single eyepiece type and provides 1:1 magnification. And because it also incorporates the function of a long base coincident rangefinder, the advantage of this life size image applies to focusing as well as viewing — it is easier, more certain and more accurate.

Rapid Film Transport and Rewind

Two extremely useful features have been incorporated in the new Nikon S2 which have, for some reason, been overlooked by some of the other 35mm cameras. They are the Rapid Film Transport and Hi-Speed Rewind.

The Rapid Film Transport consists of a lever operated by the user's thumb. One short stroke advances the film to the next exposure and simultaneously winds the shutter. There is no danger of mal-

variant double or partial exposure. Yet, double exposures can be deliberately made without rewinding the film.

The Hi-Speed Rewind consists of a lever-crank on the rewind knob. It permits a completed, 36 exposure roll to be rewound in less than 20 seconds. When not in use, the lever crank folds and nests flush with the rewind knob.

Synchro Selector

A calibrated dial permits the shutter to be set for positive synchronization with all flash bulbs. Settings are possible for shutter speeds up to 1/1000th second. There is also provision for synchronization with speedlight units at 1/50th.

Other Desirable Features

Experience with 35mm photography during the last 25 years has demonstrated and established the desirability of certain camera construction features. The Nikon S2 has retained all of these, in addition to the new ones discussed, in an effort to develop the 35mm camera with "every feature you'd want".

All settings and adjustments, except lens aperture, are conveniently located at the top of the camera. Shutter speeds can be set either before or after the shutter is wound. And the range covers 12 speeds from 1 second to 1/1000th, each consecutive setting representing 1/2 of last exposure, plus Time and Bulb. It is significant that the shutter includes a 1/15 second exposure setting. This speed had been requested by professionals who

find it indispensable for available light photography under adverse light conditions.

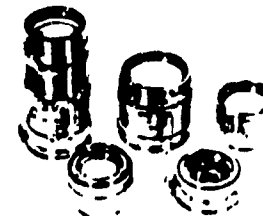
The focusing control for normal and wide angle lenses, also situated at the top of the camera body, is operated with the middle finger of the right hand while the forefinger rests on the shutter release, ready for the exposure. The left hand is free to support the camera without performing any other function. This is smoother and more certain than the early method of focusing by manipulating the camera mount directly.

Two other popular features have been retained on the new Nikon S2. The completely removable camera back and fixed take-up spool offer the advantage of utter simplicity in loading the camera, also insuring that the film is correctly aligned. Another welcome improvement is the location of the tripod socket, eliminating stress and strain in the camera base and back. In the new Nikon S2, the tripod socket is built directly into the body and is centered for better balance.

The main flash terminal has been so located as not to interfere with focusing, viewing and general handling of the camera. The bayonet lens mount has also been retained, thereby continuing a feature which has since been adopted by other camera manufacturers. In this way only is there absolute assurance of proper seating of the lens and its correct alignment with relation to the film plane. A quarter turn lock action permits quick and easy interchange of lenses.

An auxiliary flash terminal has been included in front of the camera accessory clip. It is expected that a special compact flash unit will be shortly announced, designed to slide into the accessory clip. Contact with the flash terminal will be made without the need for external wires.

Last, and certainly not least, is the fact that the Nikon camera is furnished with Nikkor lenses as standard equipment. This is quite natural inasmuch as both the Nikon camera and Nikkor lenses are made by the same manufacturer, under the same roof. However, because of the tremendous preference for Nikkor lenses expressed by so many users of other 35mm cameras, the availability of the Nikkor lenses with the Nikon S2 must be regarded as an important feature.



Prices are: Nikon S2 with 50mm Nikkor 1:2 lens \$299.50; Nikon S2 with 50mm Nikkor 1:1.4 lens \$345.00. Additional information may be obtained by writing to NIKON Incorporated, 277 Fifth Avenue, New York 16, N. Y.

Popular PHOTOGRAPHY

The Icarex 35 S challenge!

TWO NEW MODELS WITH TWO NEW PRICES.

Check this fact list of professional features in both the ICAREX 35 S-TM (with PRO all-black finish and universal thread mount, 42 x 1, Pentax type) and the ICAREX 35 S-BM (with breech-lock mount).

Their capabilities are outstanding and their costs amazingly low.

- CdS through-the-lens metering
- White-line meter indicator for quick adjustment, always staying bright even when the lens is stopped down
- Alternate waist-level adjustment of meter
- Instant return mirror
- Instant diaphragm return to full aperture
- Penta-prism with three-way focusing screen: (a) full ground glass, (b) microprism (c) unique cylindrical oblique rangefinder
- F-stop indicator in the viewfinder (for every lens)
- Reminder signal in viewfinder to advance film
- Focal plane shutter with speeds from 1/2 to 1/1000th second plus B and special flash setting
- Dual flash synchronization (FP and X)
- Self-timer
- Depth-of-field preview button with locking device
- Built-in dark slide in viewfinder to protect meter against stray light
- Meter range from 25

- to 1600 ASA
- Automatic resetting frame counter
- Dual battery cut-off for utmost saving of battery power
- A line of accessories including close-up bellows and extension tubes

AND FINALLY,
the following
superlative Zeiss lenses.

ICAREX 35 S-TM

Initially available Zeiss lenses

- Ultron f/1.8, 50mm-TM (reputed to be the finest in lens formulation)
- Skoparex f/3.4, 35mm-TM wide-angle
- Super Dynarex f/4 135mm-TM telephoto
- plus an almost unlimited number of thread mount lenses of other manufacturers

THE PRICE

With Ultron f/1.8 . . . less than \$250.00

ICAREX 35 S-BM

- Ultron f/1.8, 50mm
- Tessar f/2.8, 50mm
- Skoparex f/3.4, 35mm
- Dynarex f/3.4, 90mm
- Super Dynarex f/4, 135mm
- Super Dynarex 200mm
- Telomar 400mm
- Zoomar f/2.8, 36-82mm
- Monocular 8 x 30 B
- and five close-up lenses

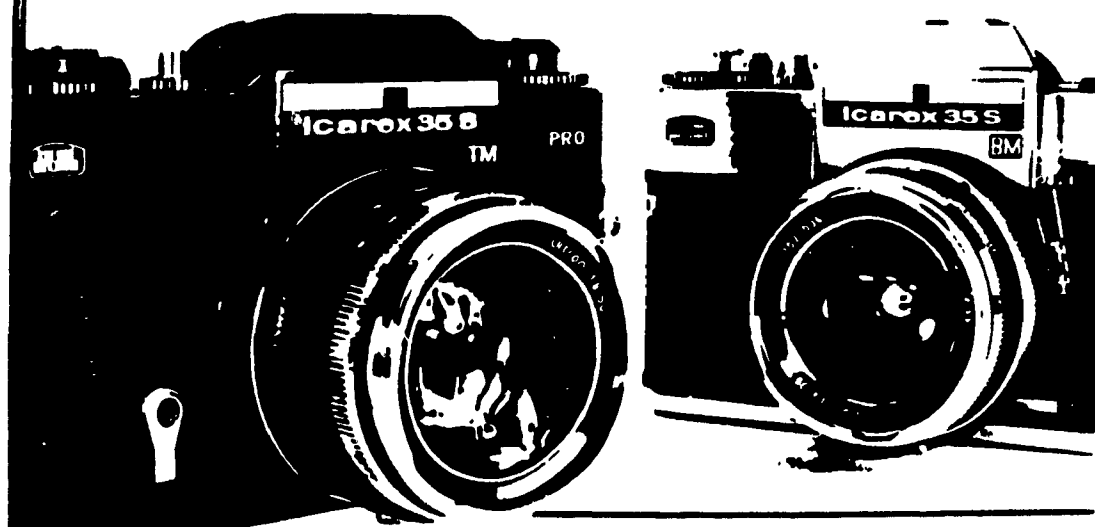
THE PRICE:

With Ultron f/1.8 . . . less than \$250.00
With Tessar f/2.8 . . . less than \$200.00

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THE FACTS, WE'D LIKE TO
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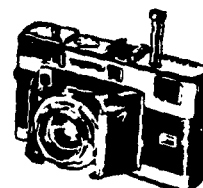
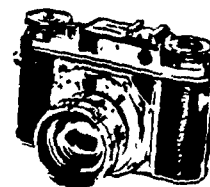
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with new Comput Shutter fully synchronized up to 1/500 sec. Range
finder with Automatic Coincidence Compensation (patented).
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Lens: \$ 157.50 with COLOR SKOPAR 1:3.5
\$ 220.00 with ULTRON 1:2
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\$ 12.50 Eveready Carrying Case

Simple to operate, reasonably priced, a camera to overcome all
photographic problems.

VOIGTLÄNDER VITESSA L 35 mm miniature camera with
world famous ULTRON 1:2 Light Value Comput Shutter and
built-in exposure meter realizes for the first time many revolution-
ary ideas in camera construction.
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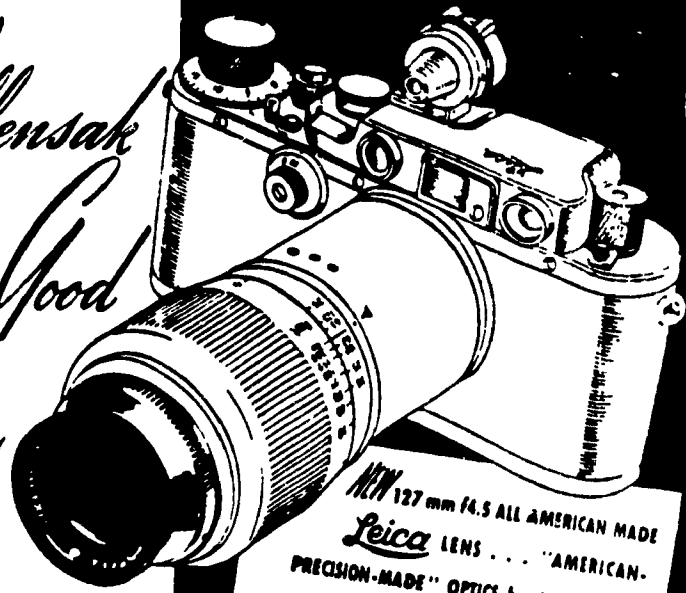
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because the lens is so good

NOW ON AMERICAN-MADE

*Wollensak
means Good
Lenses*



NEW 127 mm f4.5 ALL AMERICAN MADE
Leica LENS . . . "AMERICAN-
PRECISION-MADE" OPTICS by WOLLENSAK

• NOW — world famous Leica cameras and Leica projectors are being made in America and supplied with the Wollensak lenses — made by Wollensak's precision craftsmen to give you maximum efficiency from your Leica equipment

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• This new long focal length Wollensak lens, made for use on Leica cameras, gives images more than twice the size of those made by standard 50mm lenses — permits close ups of distant objects — usable with any model Leica having interchangeable lens mount. Helical focusing mount made by Leica American craftsmen couples directly with the built-in range finder on American made Leica cameras.

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He's still giving everything.

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BECAUSE HIS NEEDS COME FIRST you'll have to wait for minutes if the camera we promised you "soon" is worth waiting for—the camera was specially designed for him.

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Sieg Heil! War cannot bring our glorious heroes from their battle-front photographs show the advantage of a camera and instant film.



Die Front about to be executed for violating regulation against venturing guerrilla fire nests, grossly penalized for being shot for trying to save the situation.



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Sports-Type film used to capture the thrilling scene snapped from a speeding Valkyrie.

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means another bond
in the war effort
of Nazi Germany

Photography is our business, but we're working hard to hasten the day when it will be impossible to take photographs like those above.

Making high precision optical instruments for the Army and Navy is our job until the time when people everywhere can be photographed without interruption and without shame.



Popular PHOTOGRAPH

THE NIKON IMAGE

A magazine within a magazine devoted to today's great photographs and photographers and the camera they have in common.



FUSCO

I want to say as much
as possible about people
and what's in their heads
and hearts.



You and Rollei can capture the tranquility of the city

When you can concentrate on the photograph instead of the camera, you're a photographer! The Rolleiiflex SL35 lets you do exactly that. It's one of the simplest, lightest, purest single lens reflex cameras ever made.

And certainly one of the best. Its styling and features are functional and at your fingertips so that your eye never needs to leave the viewfinder while you make the adjustments necessary

to get a perfect exposure. Light measurement is read right through the lens. The lenses can be changed with one hand!

A short quarter-turn releases or sets a lens into the solid bayonet mount. The focal plane shutter provides speeds from 1 second to 1/1000 of a second. And with

Rollei's broad system of precision lenses and accessories, you can handle just about any specialized photographic situation. Stop into your Rollei Dealer and put this lightweight, precision dream machine into your hands.

Rollei and a little bit of you.

Photography by Peter Fink.
Camera by Rollei.



For more information on the Rolleiiflex SL35 write to Rollei America, Inc., Dept. 100, 100 University Drive, Fairport, New York 11731.

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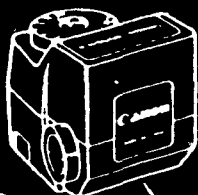


compare the advantages. FTb is the obvious choice.

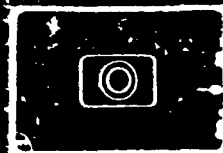
It's not that the FTb is the best camera in its class in the world. It earned this distinction for solid value. Meticulous construction and quality fit has the kind of refined performance, versatility and human engineering you'd expect from Canon. But don't take our word for it. Decide for yourself.



Flash Photography
The exclusive CAT (Canon Auto-Tuning) system for automatic electronic flash couples both to selected FD lenses and the camera's metering system. To use it, just focus and align meter needles as usual. Whatever you've focused on will be precisely exposed. Period.



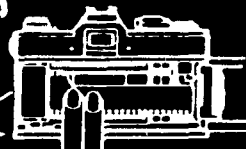
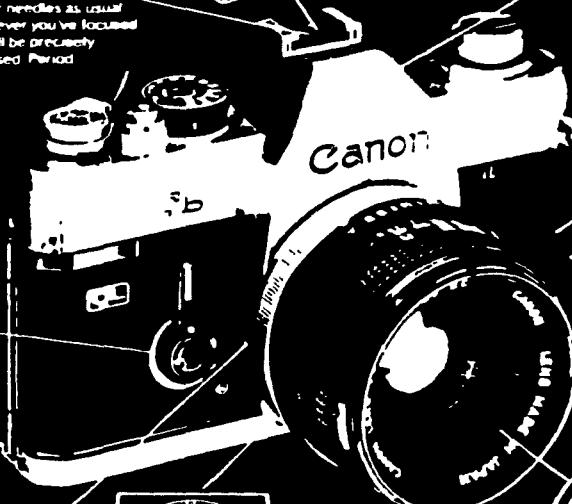
Versatility The unique FTb Booster lets the FTb read down to an exposure level of $1/125$ at 15 seconds with ASA 100 film (EV 3.5). This coupled with the host of Canon accessories for every job from photomicrography to astrophotography makes the FTb a camera a novice can grow with—or a pro can stick with.



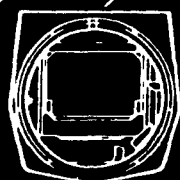
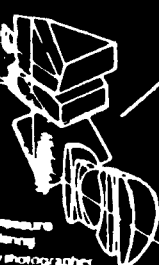
The Viewfinder The FTb's viewfinder has everything you need to stay in complete control. It shows shutter speeds, over- and under-exposure warning marks, a stopped-down metering index and meter needle and aperture indicator ring. The bright focusing screen has a microprism focusing aid, and the metering area is shaded, so you never have to guess what you're measuring.



Control Flexibility
The FTb's Stopped-Down/Off-Lever activates self-timer and stops view down for checking stop-of-film. Adjacent flash lock the shutter to lock up the



Film Loading The FTb incorporates Canon's exclusive Q11 quick film loading system. All you do is position the film leader, close the back and start winding. It saves time and prevents film waste.



Breach Lock Mount
The lens mount of the FTb and all Canon SLRs is the exclusive Breach Lock system. When you push on a lens, the breach lock ring automatically turns slightly. All you have to do for a secure fit is turn the ring a little more. And because there's no turning between lens mount and body, there's no wear to affect sharpness.



Lenses The FTb accepts all of the nearly forty superb Canon lenses, from 7.5mm Fisheye to 1200mm Super-Telephoto. These lenses are tops in sharpness, contrast and mechanical quality. They incorporate all of the latest optical refinements, including Spectra and Super Spectra Coating, the Canon Floating System and the most modern optical glasses.

...about precision in exposure, knows it's vital to understand the exact area of subject that the camera's metering. The metering system of the FTb measures the central 12% of the viewfinder area. In any exposure situation, you never have to doubt that your exposures will be

Canon FTb

Canon USA, Inc. 100 Corporate Drive, Lake Success, New York 11042
Canon USA, Inc. 4517 Foothill Avenue, Elmhurst, Illinois 60120
Canon USA, Inc. 1275 Phyllis Avenue East, Costa Mesa, California 92626
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McGregor's London Goods Jacket
- "Sard" color - copper - bronze
- green - blue - white - black
- "Sard" color - copper - bronze
- green - blue - white - black

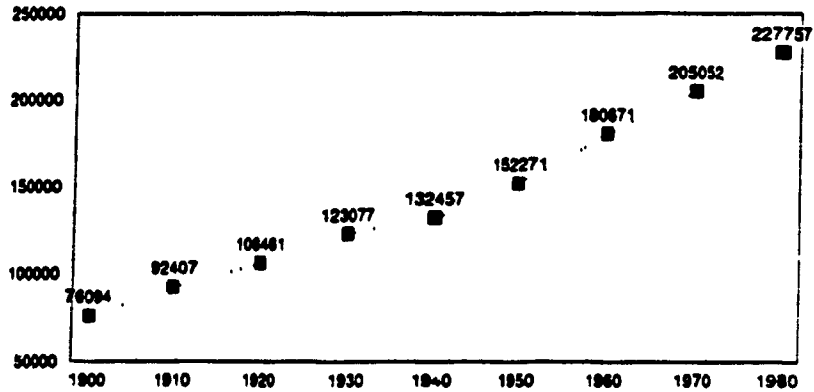
GREGOR*

Sportswear

Graphs V-1

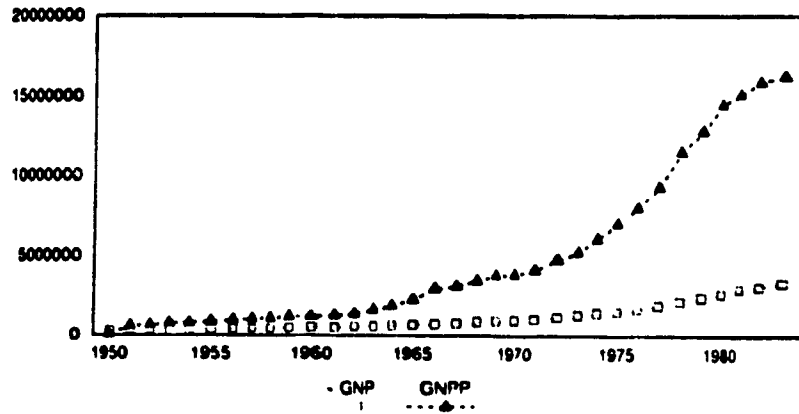
United States Population, 1900 - 1980

In Thousands



Source: Statistical Abstract of the United States. Numbers include armed forces stationed abroad. Alaska and Hawaii added in 1940.

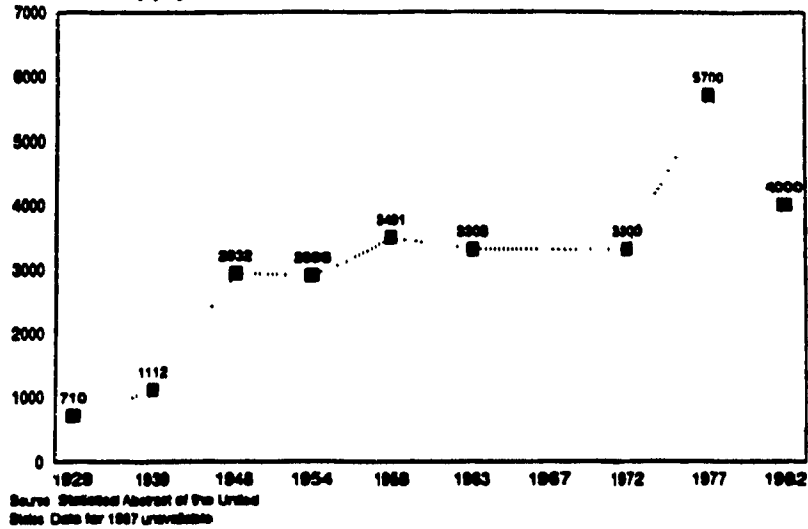
Gross National Product and Gross National Photographic Product 1950 to 1983



GNP = \$ x 1,000,000
GNPP = \$ x 1,000
GNPP is expressed as a percentage of GNP

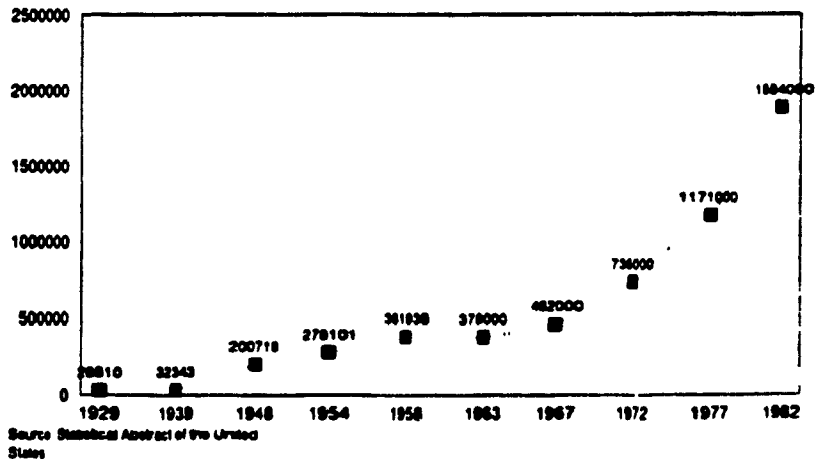
Graphs V-2

**Number of Retail Camera and Photographic
Supply Stores in the United States, 1929 - 1982**

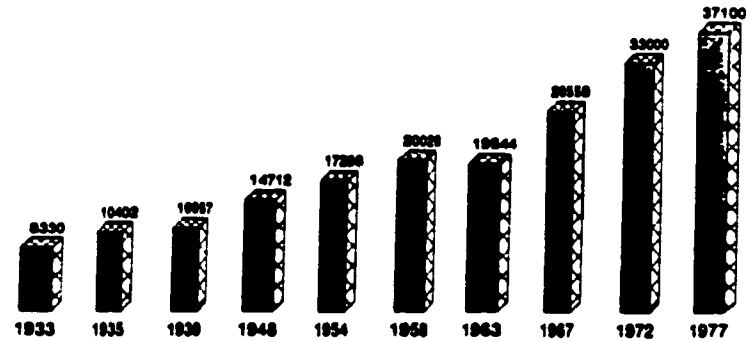


**Annual Sales, Retail Camera and Photographic
Supply Stores in the United States
1929 - 1982**

In Thousands of Dollars



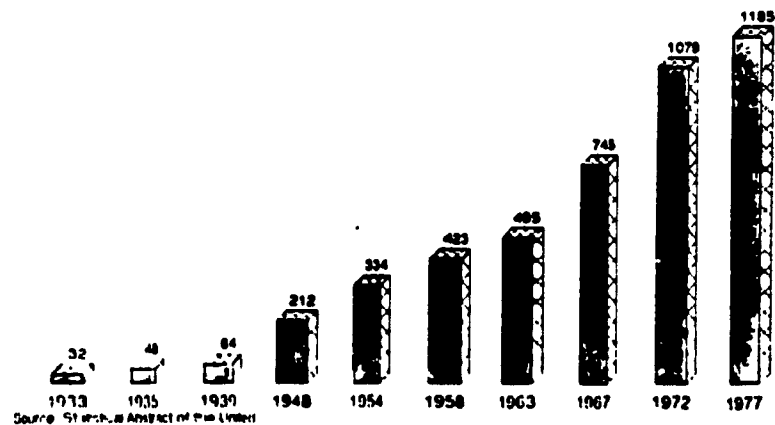
Number of Photographic Studios in the United States, 1933 - 1977



Source: Statistical Abstract of the United States

Annual Receipts of Photographic Studios in the United States, 1933 - 1977

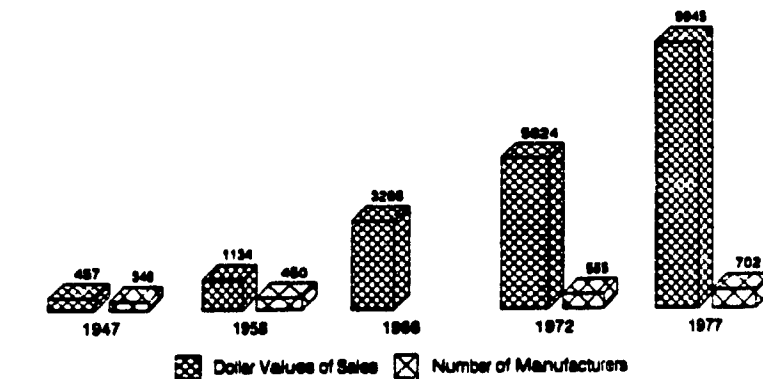
In Millions of Dollars



Source: Statistical Abstract of the United States

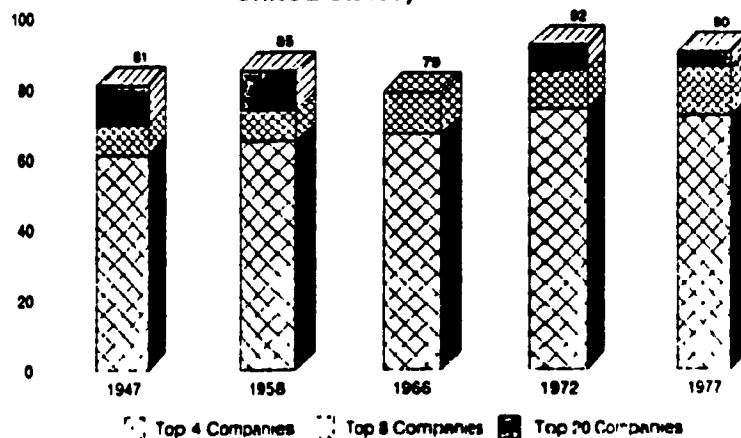
Annual Values of Manufactured Photographic Goods and Supplies in the United States 1947 - 1977

In Millions of Dollars



Number of Manufacturers in 1966 unavailable
Source: Statistical Abstract of the United States.

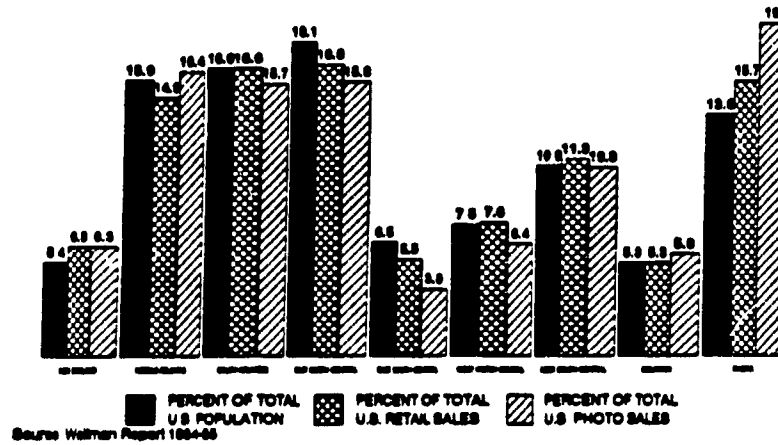
Percentages of Total Photographic Equipment Shipments Made By Largest Manufacturers United States, 1947 - 1977



Top 20 data for 1966 unavailable

Graphs V-5

Geographic Distribution of Photographic Sales 1984

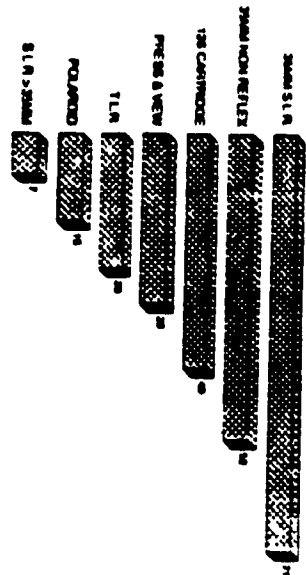


Definition of Terms: Geographical Distribution

NEW ENGLAND	Connecticut	Maine	Massachusetts	New Hampshire	Rhode Island	Vermont
MIDDLE ATLANTIC	New Jersey	New York	Pennsylvania			
SOUTH ATLANTIC	Delaware	Dist. of Columbia	Florida	Georgia	Maryland	N. & S. Carolina
EAST NORTH CENTRAL	Illinois	Indiana	Michigan	Ohio	Wisconsin	
EAST SOUTH CENTRAL	Alabama	Kentucky	Mississippi	Tennessee		
WEST NORTH CENTRAL	Iowa	Kansas	Minnesota	Missouri	Nebraska	North Dakota
WEST SOUTH CENTRAL	Arkansas	Louisiana	Oklahoma	Texas		
MOUNTAIN	Arizona	Colorado	Idaho	Montana	Nevada	New Mexico
PACIFIC	Alaska	California	Hawaii	Oregon	Washington	Utah
						Wyoming

Graphs V-6

Number of Camera Types on the Market
1973



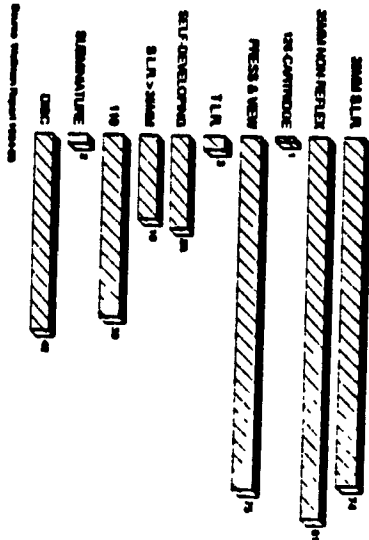
Source: Statistic Report 1973

Number of Camera Types on the Market
1977



Source: Statistic Report 1977-78

Number of Camera Types on the Market
1983

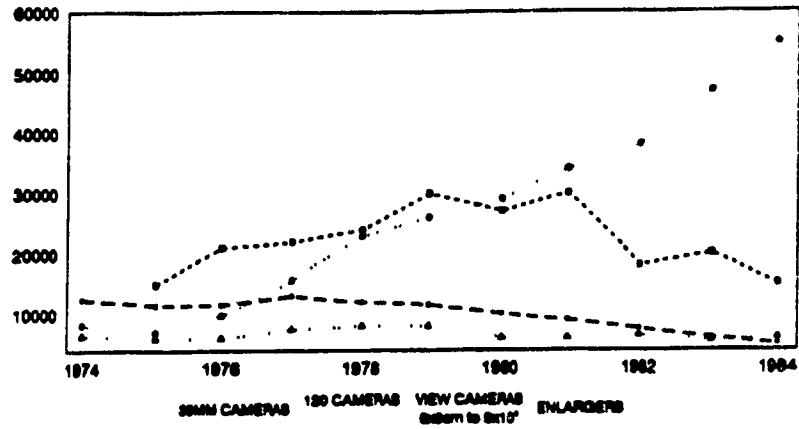


Source: Statistic Report 1983-84

Graphs V-7

Shipments of Photographic Equipment by Type 1974 - 1984

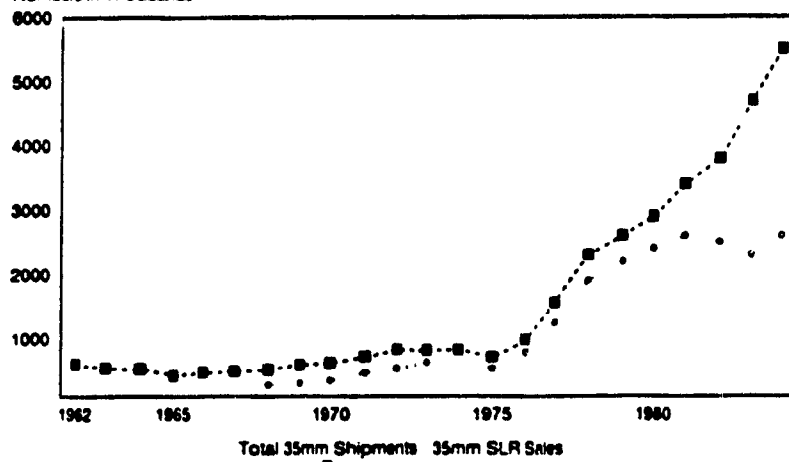
(MULTIPLY 35MM CAMERAS X 100, ENLARGERS X 10)



No Data Available for 135 Cameras for 1974
1984 Figures Extrapolated From First 9 Months
Source: Waltham Report 1984-85

Shipments of 35mm Cameras 1962 - 1984 and 35mm SLR Sales 1968 - 1984

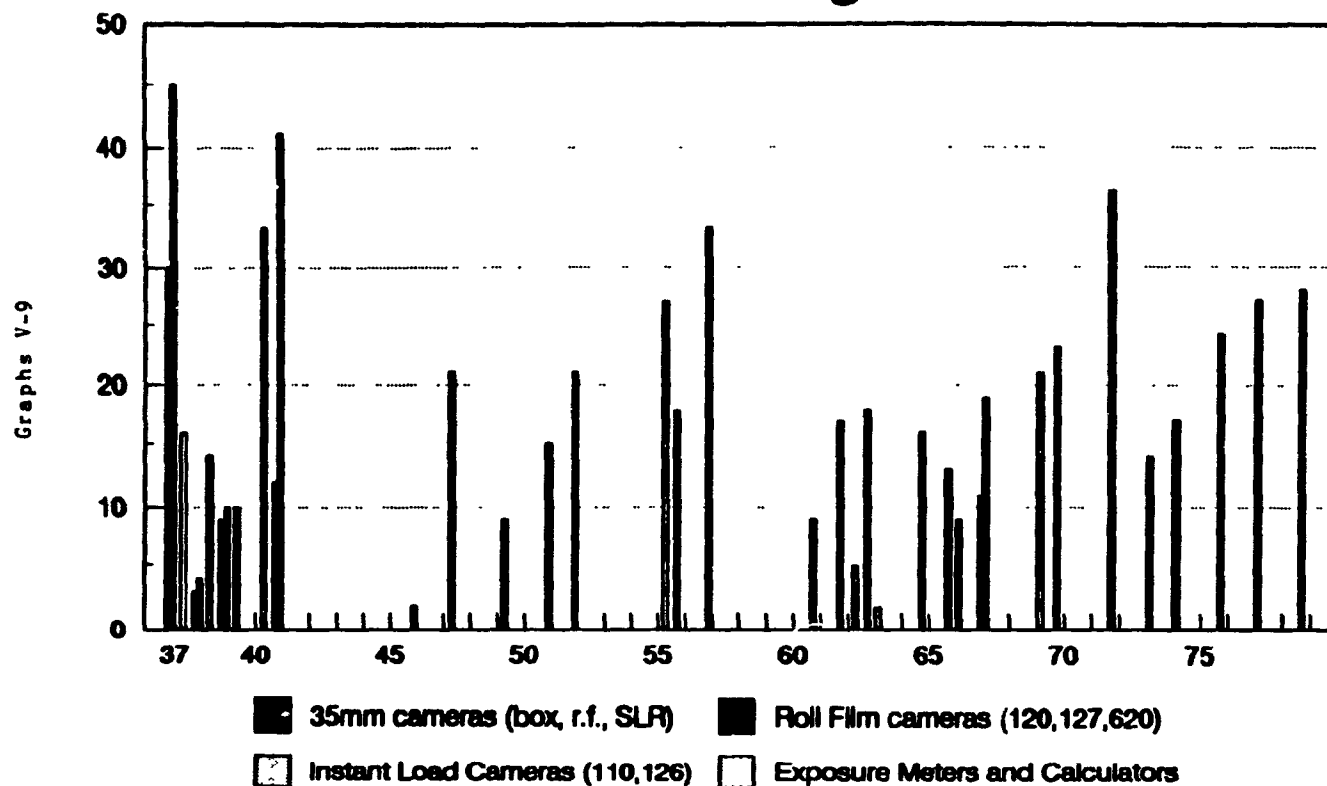
Numbers in Thousands



Units include Data Unavailable
Source: Waltham Report 1974-75, 1984-85

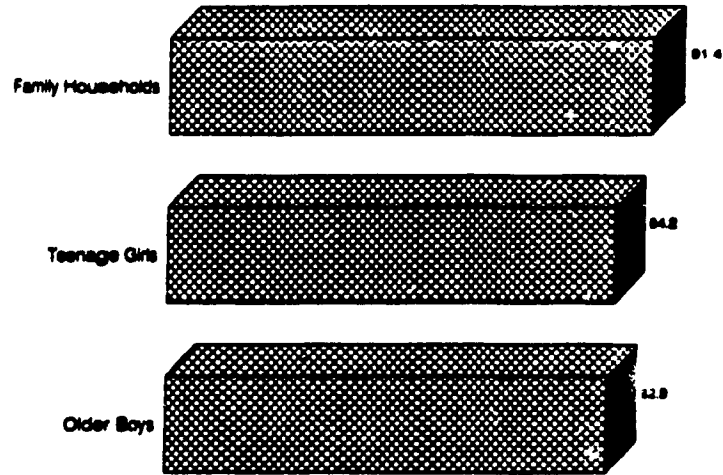
Photographic Product Reviews

CONSUMER REPORTS Magazine 1937 - 1980



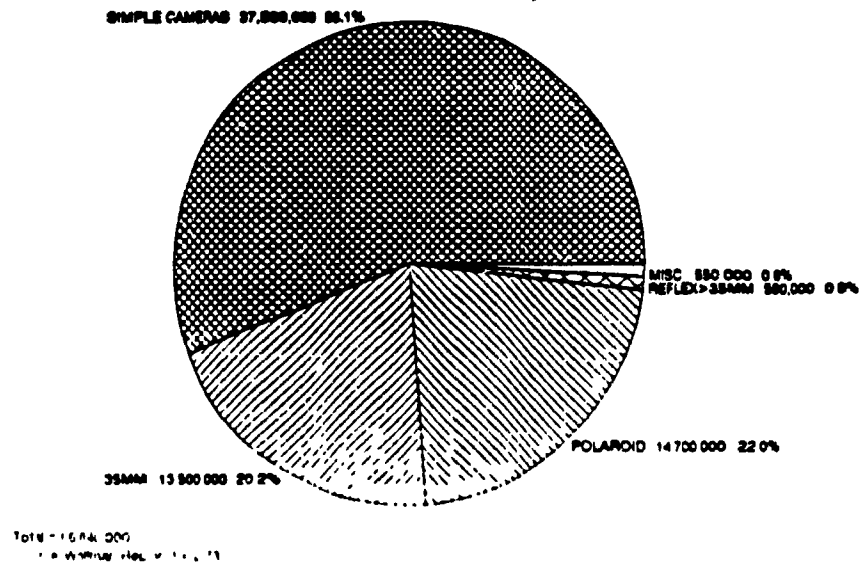
Graph V-10

Patterns in Camera Ownership 1975



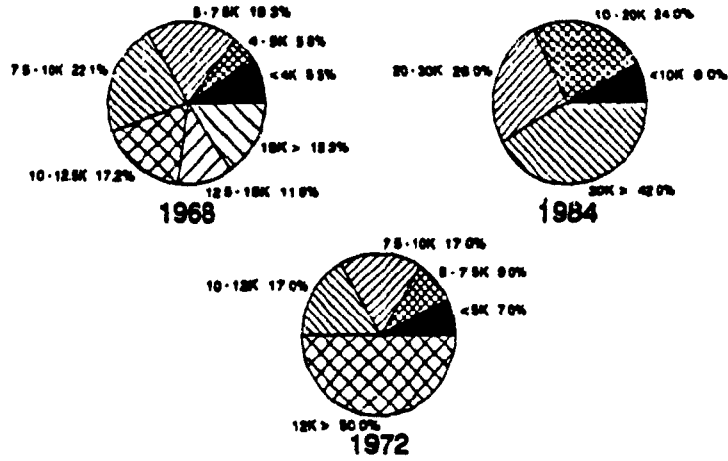
Source: Westman Report 1976-77

Still Cameras in Use, 1971



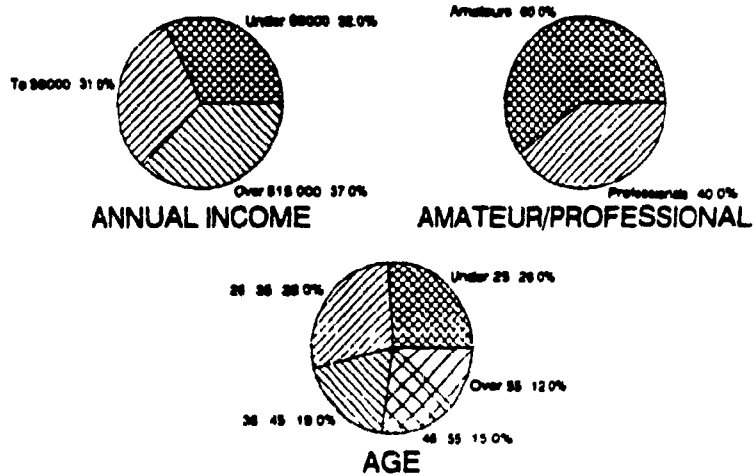
Graphs V-12

Purchasers of Still Cameras By Household Income, 1968, 1972, 1984



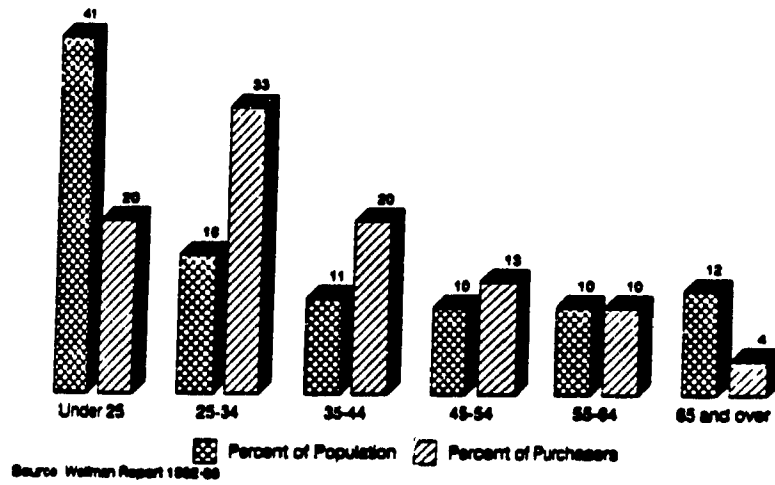
1984 figures for 35mm cameras only
Source: Wolfman Report 1968, 1972, 1984

Owner Characteristics, 35mm Cameras Costing More Than \$350

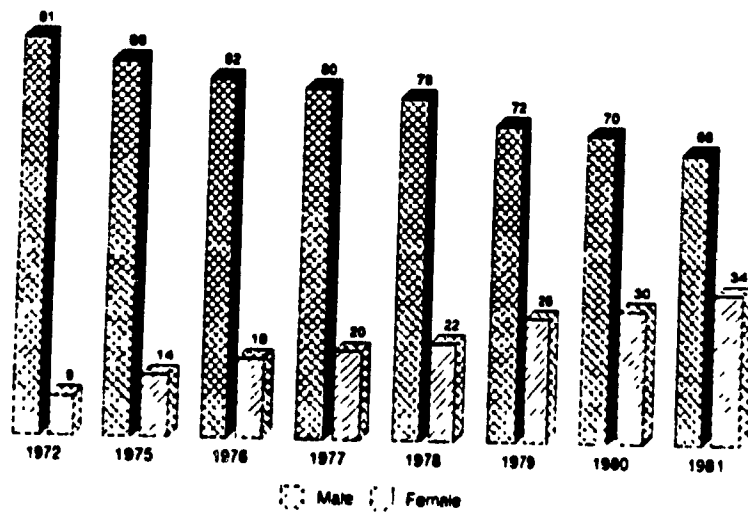


Source: Wolfman Report 1971

**Purchasers of Expensive S.L.R. Cameras:
Analysis By Age, 1981**



**35mm SLR Purchases By Gender
1972 - 1981**



Owner Characteristics, Low and Medium-Priced 35mm Cameras, 1984

James Madison, August 1800

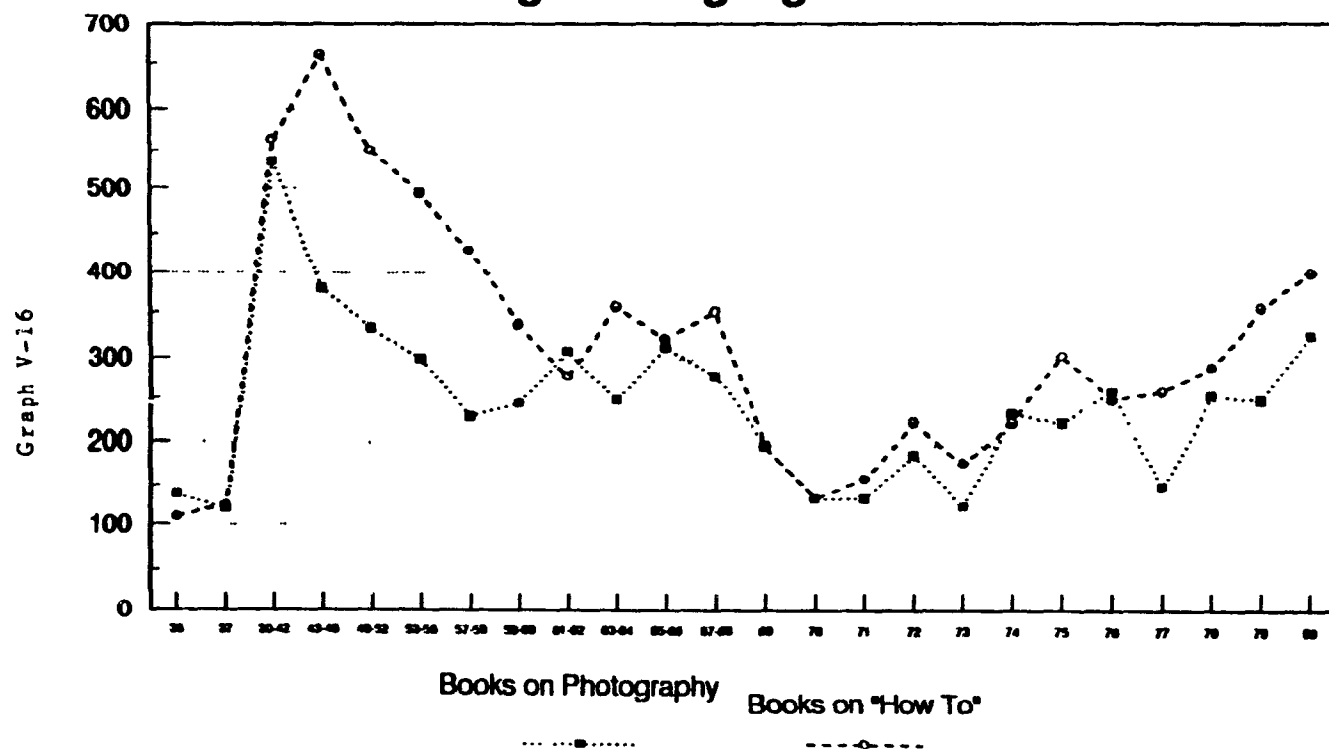
Business Information Report 1999-01

**Owner Characteristics, 35MM Lens/Shutter
Camera, 1964**

Age	Gender	Year	State	City	County	Zip	Phone	Address	Occupation	Education	Marital	Children	Religion	Political	Other
25-34	F	1990	CA	San Francisco	San Francisco	94102	415-555-1234	1234 Market St	Software Engineer	BS	M	2	Catholic	Dem	
35-44	M	1985	TX	Houston	Harris	77001	713-555-5678	5678 Main St	Teacher	MS	D	1	Protestant	Rep	
45-54	F	1978	NY	New York	Manhattan	10001	212-555-9012	9012 Broadway	Journalist	PhD	M	3	Jewish	Dem	
55-64	M	1970	IL	Chicago	Cook	60601	312-555-3456	3456 State St	Engineer	BS	M	1	Catholic	Rep	
65-74	F	1965	WA	Seattle	King	98101	206-555-7890	7890 First Ave	Retired	BA	D	0	Methodist	Dem	
75-84	M	1960	FL	Miami	Dade	33101	305-555-2345	2345 Ocean Dr	Retired	BA	M	0	Catholic	Rep	
85-94	F	1955	CA	San Diego	San Diego	92101	619-555-6789	6789 Hill St	Retired	BA	D	0	Protestant	Dem	
95-104	M	1950	TX	Austin	Cook	78701	512-555-0123	0123 Congress	Retired	BA	M	0	Catholic	Rep	

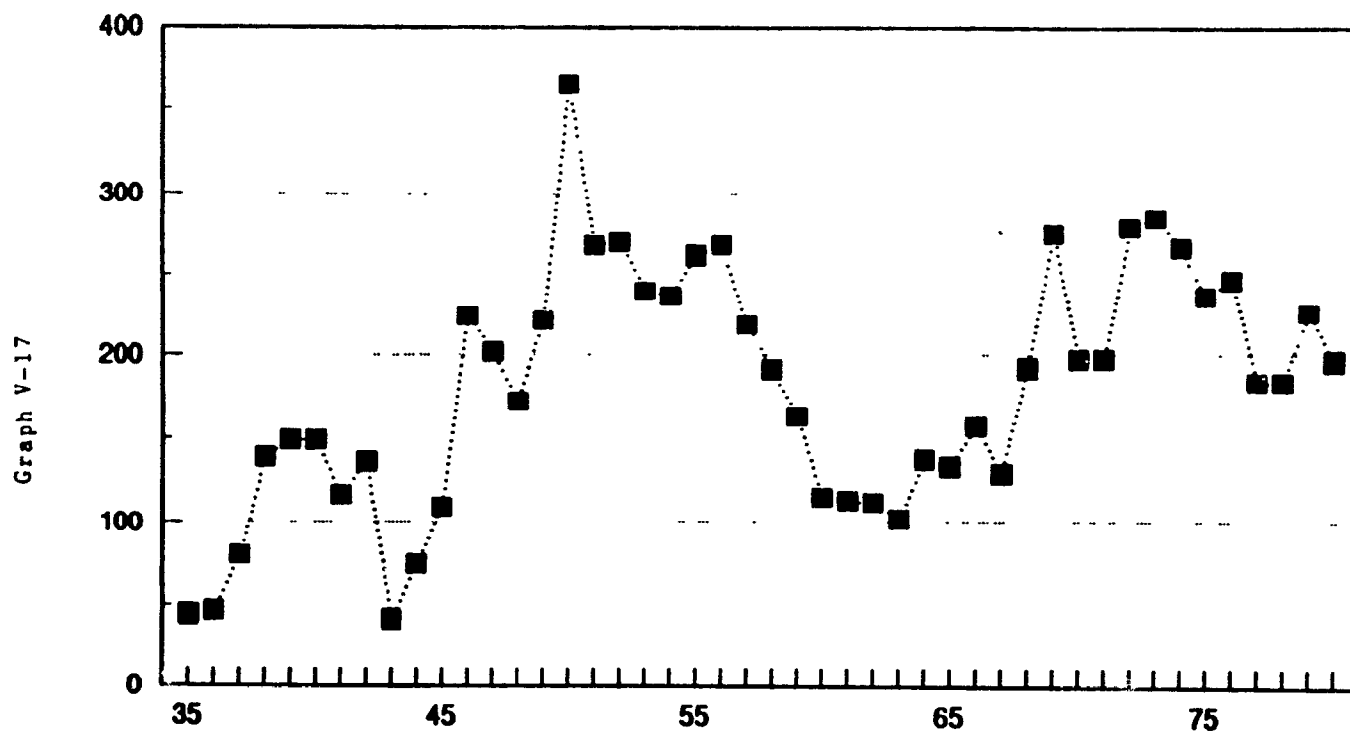
[illegible]

Books on Photography and "How To" Books In the English Language 1936 - 1980



Source: Cumulative Book Index

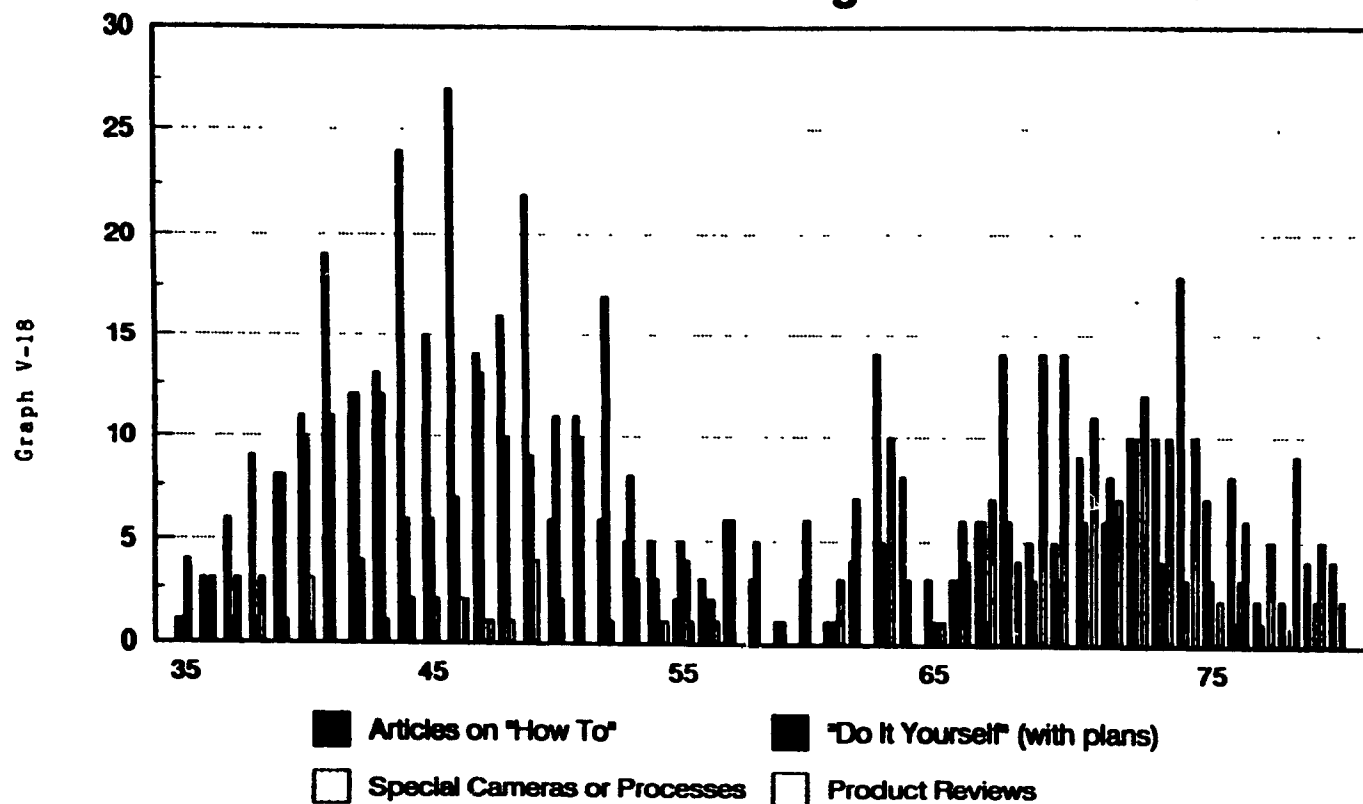
Number of Articles on Photography THE NEW YORK TIMES 1935 - 1980



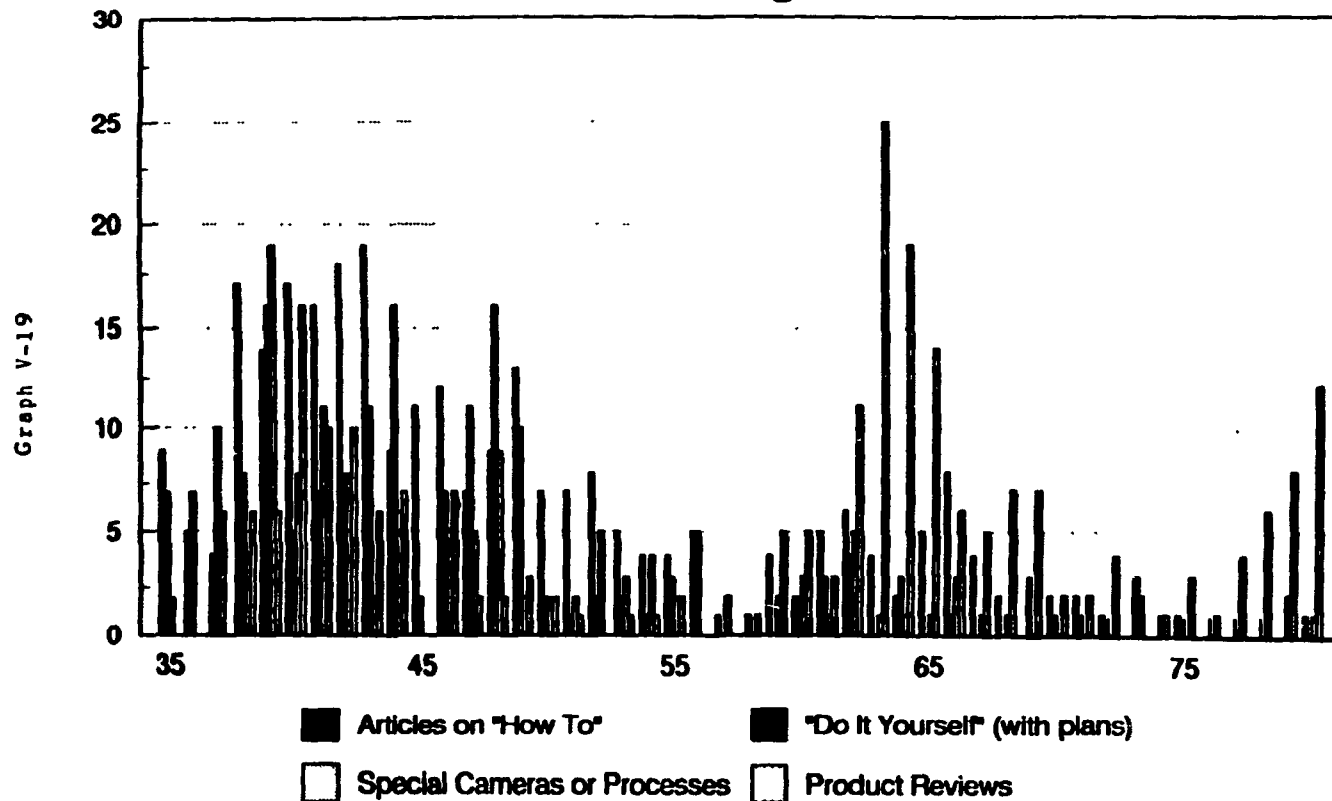
Articles counted are all those appearing under the headings "Photography" or "Photography and Photographic Equipment"

Full Page Articles on Photography

POPULAR MECHANICS Magazine 1935 - 1980

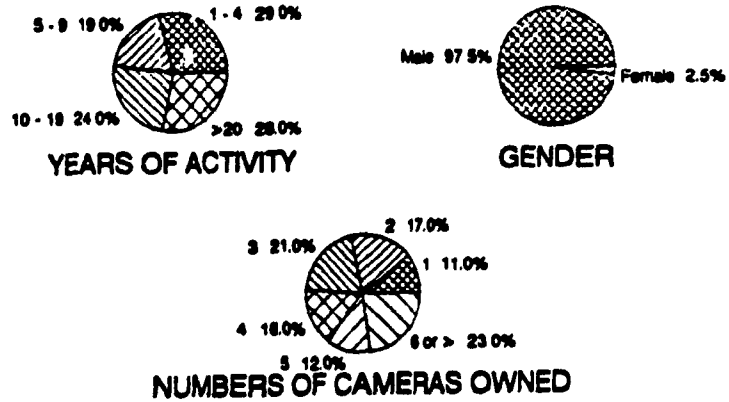


Full Page Articles on Photography **POPULAR SCIENCE Magazine 1935 - 1980**



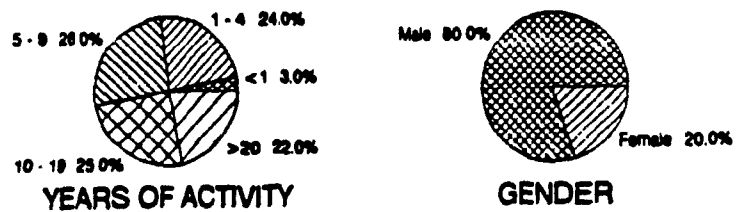
Graph V-20

"Photo Hobbyists - Activity"
1973



Number of Hobbyists = 2,750,000
 Number of Camera Owners = 1,550,000
 Source: Wetstein Report 1973 - 73

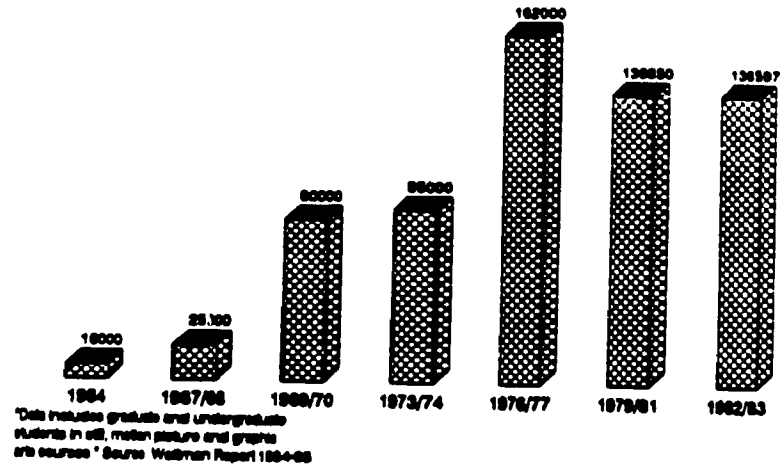
"Photo Hobbyists - Activity"
1984



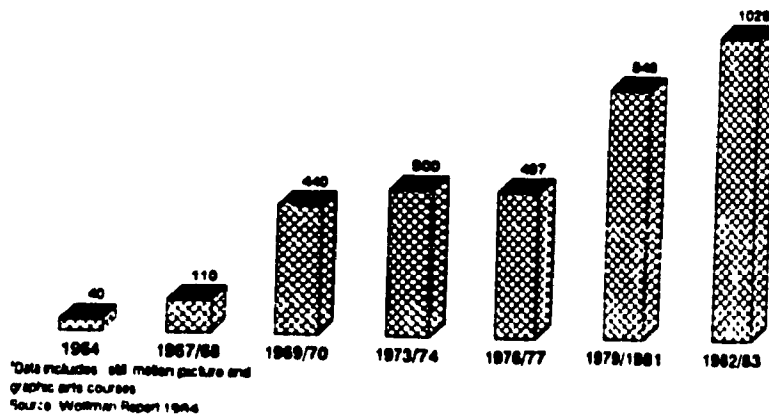
Estimated photo hobbyists = 4,400,000
 Estimated camera owners = 2,400,000

Graph V-21

Enrollment in University Photographic Courses 1964 - 1982/83

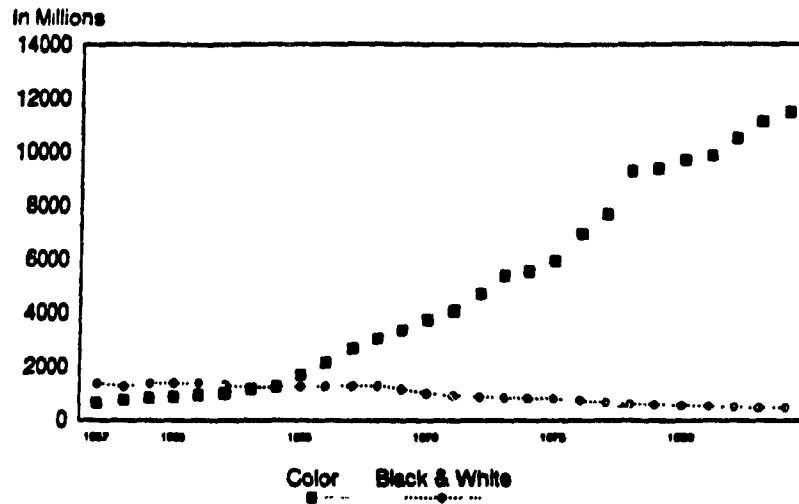


Number of Photography Departments 1964 - 1982/83



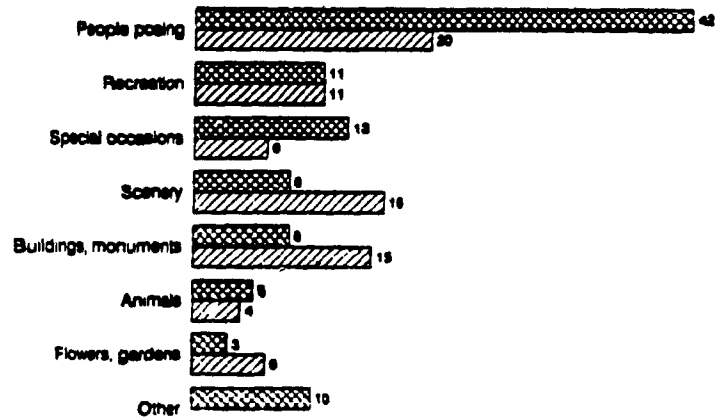
Graph V-22

Number of Still Photographs Taken by Amateurs 1957 - 1984



Source: Wolfman Report 1985, 1984-85

"Subjects of Amateur Still Pictures" EXPRESSED AS PERCENTAGES



Color Prints Color Slides

Source: Wolfman Report 1975, 76