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THE SWEDISH PUBLIC AND NUCLEAR ENERGY: THE REFERENDUM 1980

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Although not formally presented as a paper at the first meeting of the Alternative Ways of Life sub-project of the GPID Project, Cartigny, 12-14 April 1978, Hans Zetterberg's presentation was on technological aspects of dominant and alternative ways of life, a dilemma that was tested on the Swedish public two years later in a referendum.

Geneva, November 1980 Johan Galtung

A referendum is a multi-headed phenomenon. On the one hand, it is an attitudinal event and as such it can only be understood as a detail in the process of value development in a culture. On the other hand, it is a political event and as such it can only be understood as a detail in the political process of a nation. In the third place, these processes interact in a campaign and the resulting vote of the electorate can only be understood as part of a process of the formation of public opinion. We shall explore all these processes, not only with a view of explaining the outcome of the referendum, but also with the ambition to understand the nature of the processes.

This paper is divided into three sections. The first deals with the value systems of (modern) societies and describes how their configurations in Sweden in 1980 influenced the referendum on nuclear energy. The second section (which begins on page 29) considers nuclear energy and the referendum in the light of party politics. The third section (page 36) treats the formation of public opinion during the campaign that preceeded the referendum.

Presented at the seminar "Encuestas electorales, información y comportamiento electoral" in Madrid, November 27-29, 1980.

The paper is based on the various studies conducted at Sifo on the Swedish referendum on nuclear energy 1980. A series of studies was sponsored by IFO, an industry group promoting the full use of Sweden's nuclear investment. Another series of opinion measurements was sponsored by TV-Aktuellt, a news program chartered to be neutral, factual, and nonpartisan. Additional studies were sponsored by Reportage, a short-lived weekly whose editorial staff was anti-nuclear. The review of value change which comprises the first part of the paper was our own initiative and supported by Sifo's internal funds.

When no other source is given, the figures cited in this paper have been derived from the measurements obtained through Sifo's nationwide omnibus surveys. In these, 1,000 individuals 18-70 years of age are interviewed; new respondents are obtained for each survey through random sampling from a sampling frame with optimal stratification; the interviews are conducted in the respondents' homes. The number of selected respondents that could not be interviewed for whatever reason does not vary significantly from one survey to another, and remains at a level between 18 and 20 percent.

The Sifo research team on nuclear energy included Ingrid Berg, Karin Busch, Greta Frankel, and Hans L Zetterberg. The latter has formulated the views in this paper.

Part 1: NUCLEAR ENERGY IN THE VALUE PROCESS

The first official investigation of the peaceful uses of nuclear energy in Sweden got under way in 1945. Interest in nuclear energy was motivated both by a desire to avoid dependence on imported fuels and by a concern that Sweden would fall under the influence of the United States and the Soviet Union, the two superpowers who appeared to move toward a monopoly on atomic energy at the time. Nuclear energy seemed to be a most promising technological achievement that would provide cheap and ample fuel supplies. In 1954 the first experimental reactor was put into service. In 1972 the first commercial reactor was in commission at Oskarshamn.

The decision makers who introduced nuclear energy into Sweden viewed it primarily as an economical alternative or complement to water power, coal, and oil. But the end-consumers - the public at large - are primarily concerned with environmental and safety issues when assessing the comparative merits of different fuel sources. The cost factor is of much less weight. We asked: "What do you think is the most important requirement of an energy source - that it be cheap, that it be safe for the environment, that it be risk-free, or that it be available in the event of a crisis or war?" The answers and the resultant ratings are given in the table below.

		Most important	Next most important	Next least important	Least important	Average rating
Safe for the environment	1977	42%	28%	17%	5%	3.18
	1979	35%	33%	16%	6%	3.06
	1980	33%	34%	18%	7%	3.01
Risk-free	1977	28%	39%	18%	7%	2.96
	1979	33%	29%	19%	8%	2.97
	1980	32%	29%	23%	8%	2.93
Available in event of a crisis or war	1977	19%	12%	31%	29%	2.23
	1979	22%	12%	28%	27%	2.34
	1980	24%	14%	24%	28%	2.39
Cheap	1977	9%	15%	23%	46%	1.86
	1979	11%	16%	21%	44%	1.93
	1980	9%	15%	22%	45%	1.87

A harsher economic climate and the more unstable political situation in the Middle East did not change the public's ranking of desired criteria for different energy sources. However, the percentage that gave priority to environmental protection decreased slightly between 1977 and 1980.

The general public considers water power to be unquestionably the most favorable energy source from all viewpoints: it is least harmful to the environment, it entails the least dangers, it would be most available in the event of war, and it is the cheapest. Diagram 1 shows the assessments of water power, coal, oil, and nuclear energy in accordance with the four criteria. (The questions were as follows: "Given the fuel sources oil, coal, water power, and nuclear energy, which do you think is best, next best, next to worst, and worst? a) How safe are they for the environment? b) How expensive? c) How dangerous? d) How dependable would they be in the event of a crisis or war?") Coal was uniformly assigned second place, but one doesn't think it is very much safer for the environment than oil and nuclear energy. Nuclear energy and oil get the lowest ratings. Oil is considered to be the worst source, but it scores better than nuclear energy in respect to the element of danger. Assessments were relatively similar in 1977 and 1980. The only significant change was that prior to the referendum nuclear energy was considered to be a somewhat more economical fuel source than three years earlier.

But, as noted, values other than economic aspects dominate in the general public's assessment of energy forms. The economic criteria of decision makers clash with the environmental criteria of the voters. The contours of a conflict are evident: decision makers think the public at large is unrealistic, and the latter considers the decision makers unreasonable.

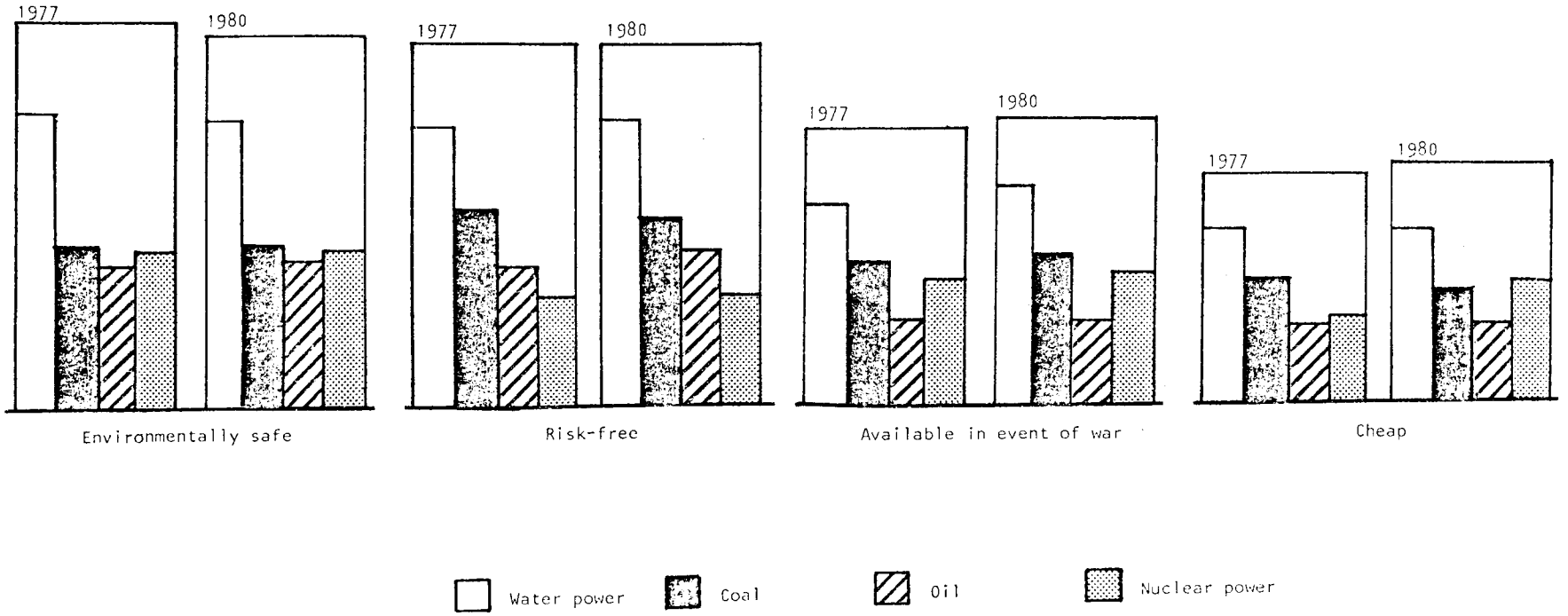


Diagram 1: The demands the general public places on energy sources (the large outer columns) and how well it believes fuel sources meet these demands (small inner columns).

Part 1: NUCLEAR ENERGY IN THE VALUE PROCESS

General Value Trends and Nuclear Opinion

In main, nuclear opinion can be understood - and in a sense also forecasted - in light of developments in the general climate of values. We will therefore summarize the latter.

The value systems that are the expressions of dominant motivations - "the vocabularies of motives," to use C Wright Mill's term - can roughly divide into three categories:

1. The Values of Sustenance - which relate to the basic necessities for survival: food, clothing, lodging, and some security in the event of illness and in old age. We shall refer to individuals who are dominated by the exigencies of survival and the need for security as Sustenance-oriented. Among their numbers in today's Swedish society we find the Subsistence-minded and the Security-minded. The former live just to get by, financially and/or physically, the latter live cautiously and guard the security they have attained. (There is another category for whom life-maintenance is more of a psychological than an economic problem, but we shall not treat this here.)

2. The Values of Production - which relate to the requisite elements for growing prosperity and level of living: among them, order, ambition, efficiency. Such values are shared by outward-oriented people. Their sustenance needs have been met and they have been able to attend to other needs. The criteria that these needs have been satisfied depend on external cues. Among their numbers we find the "Group-faithful," the "Status seeker," the "Mover." The Group-faithful live in a manner that does not deviate from group norms. The Status seekers try to live in a manner that mirrors the lifestyles of their idols. The Movers live to demonstrate achievement and success.

3. The Values of Reproduction - which relate to what is necessary for personal inner growth and quality of life. Here we find the intraceptive individual who is in touch with his own emotions and responds to the cues he receives from them; here too, we find the empathetic individual, who

Vår terminologi	Försörjningens värderingar		Produktionens värderingar			Reproduktionens värderingar		
	Hankare	Gnetare	Tillhörare	Efterbildare	Uträttare	Självuttryckare	Sökare	Skärskådare
Our terms in English	Values of sustenance		Values of production			Values of reproduction		
	Subsistence-minded	Security-minded	Group-faithful	Status-seekers	Movers	Self-faithful	Experience seekers	Reformers
MARX	Production					Reproduction		
YANKELOVICH [1]	Old-breed (Standard of living)					New-breed (Quality of life)		
INGELHART [2]	Materialist					Post-materialist		
TOFFLER [3]	First wave		Second wave			Third wave		
RIESMAN [4]	Inner-directed		Tradition directed	Outer directed		Autonomous		
MASLOW [5]	Survival	Security	Belonging	Esteem		Self-actualizing		
McGREGER [6]	Theory X			Theory Y		Theory Z		
MITCHELL [7]	Need-driven		Outer-directed			Inner-directed		
	Survivors	Sustainers	Belongers	Emulators	Achievers	I-am-me	Experiential	Socially conscious

1) Daniel Yankelovich, "Work, Values, and the New Breed", in Clark Kerr and Jerome Rosow (ed), Work in America: The Decade Ahead, forthcoming.

2) Ronald Ingelhart, The Silent Revolution: Changing Values and Political Styles Among Western Publics, Princeton University Press, Princeton 1977.

3) Alvin Toffler, The Third Wave, Collins, London 1980.

4) David Riesman et al, The Lonely Crowd, Yale University Press, New Haven 1953.

5) Abraham H Maslow, Motivation and Personality, Harper, New York 1954.

6) Douglas McGregor, The Human Side of Enterprise, McGraw-Hill, New York 1960.

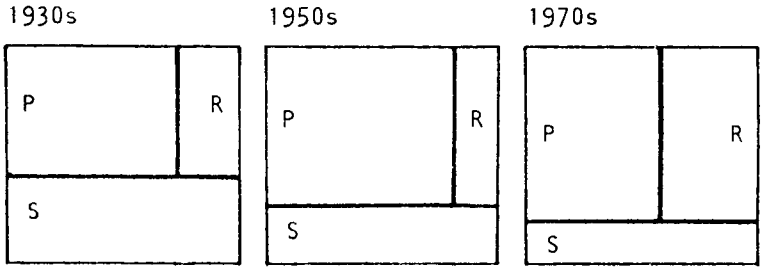
7) Arnold Mitchell, Social Change: Implications of Trends in Values and Lifestyles, Values and Lifestyle Program, Stanford Research Institute, 1979 (proprietory).

Diagram 2: Terminological comparison

is in touch with the emotions of others and responds to them. When such values are dominant, we speak of inward-oriented people. Their sustenance needs have also been met and they have been able to attend to their psychological needs. The criteria that these needs have been satisfied depend on internal cues. Among their numbers we find the "Self-faithful," the "Experience-seekers," and the "Reformers." The Self-faithful live to manifest their own personalities. The Experience-seeker lives for new inner experiences. The Reformer lives critically with a sense of mission.

We may note in passing that scholars in literature and the fine arts have been in custom of describing artists who are outward-oriented and expressing the values of production as "realists" and artists who are inward-oriented and expressing the values of reproduction as "Romantics." Our classification then is not original, nor is it a specialty of sociologists. In Diagram 2 we have noted some of the similar distinctions made by social scientists.

These three systems of values are nothing new under the sun. But their relative strength varies from time to time, from place to place, and with the demographic composition of populations. In the advanced countries of the West there has been a dramatic shift during the past half-century. The proportion of people stuck with the values of making a living has decreased since the 30s. The values of production rose to a peak in the 50s. In the 70s we saw a decline of the values of production and a rapid rise in the values of reproduction [1].



S = values of sustenance
P = values of production
R = values of reproduction

Diagram 3: The shift in the proportions of the population of Sweden that embrace the three types of values. The diagrams from the 1930s and 1950s are estimates; the earliest firm figures we have computed are from 1976.

Corresponding shifts can be documented in the United States, Canada, Western Europe, and Australia. The proportions vary, but the direction of the shifts is the same.

The ground-breaking decisions to develop nuclear energy and invest in it were made in Sweden during the 50s and 60s when the values of production were predominant. The decisions aroused little controversy. The issue did not become really controversial until the 70s, when the values of reproduction had become ascendant. The choice of sites for nuclear stations had been made in an earlier period when the values of production prevailed. Sweden did not therefore witness the battles over the location of reactor plants which gave a focus to anti-nuclear forces in countries that attempted to make their choice of sites after the values of reproduction had broken trhough.

By the time of the 1980 referendum six reactors were built and construction was begun on an additional six, four of which were ready or nearly ready at the time of the referendum [2)]. The nation's involvement with nuclear power had a 35-year-old history at the time of the referendum. Its per capita consumption of nuclear energy was then the highest in the world. The amount of electricity provided by nuclear energy was about 25 percent of the country's total consumption on Referendum Day, and this proportion was slated to rise to 40 percent within a few years - depending on the outcome of the voting. This long and heavy investment in nuclear energy had been initiated when the climate of opinion was dominated by the values of production. The anti-nuclear forces grow as values of reproduction became more widespread. They fought for and gained the opportunity for a nationwide referendum on Sweden's future use of nuclear energy.

The issue of nuclear energy is one of the sources of conflict between adherents of the values of production and adherents of the values of reproduction. In interviews conducted after the referendum a battery of 60 questions was put to respondents in order to distinguish between adherents of the different value systems; in addition, we asked the same respondents how they had voted in the referendum. The voting, as expected, proved highly correlated with the values of production and reproduction.

	Outward-oriented individuals, expressing the values of production	Inward-oriented individuals, expressing the values of reproduction
Vote in referendum:		
"Yes" to nuclear energy (Lines 1 and 2)	72%	36%
"No" to nuclear energy (Line 3)	25	61
Blank votes	3	2
	100%	100%
Non-voters	25%	25%
(Number of interviews)	(167)	(120)

We can draw the conclusion that supporters of the values of production generally voted in favor of nuclear energy and that opposition to nuclear energy to a large extent coincides with the values of reproduction. This is indeed a major cleavage in the controversy over nuclear energy, perhaps more important than cleavages of age, sex, class, region, et cetera.

Adherents of the values of production usually prefer a high-energy society, and those who follow the values of reproduction usually opt for a low-energy society. Women embrace the values of reproduction to a greater extent than men and more often than men chose a low-energy society without nuclear fuel sources.

The Typical Actors and Their Values

Values of sustenance, production and reproduction are too broad categories to identify the significant types that played different roles in the Swedish nuclear referendum. We shall, therefore, delineate some sub-categories and illustrate how they reason about nuclear power with excerpts from some 60 focused interviews conducted in the fall of 1979 and their referendum voting as reported in 347 interviews conducted two weeks after the referendum.

We begin by representatives of the values of production.

The Movers - a designation that is used here as in "movers and shakers" - are well attuned to the outside world. They are achievers who value fame and success. They are effective and a driving force in whatever field they are active, but also driven by their own ambition.

The Movers are self-confident and willing to take certain risks. They often assume leading positions, whether it be in business, in science, in trade unions, or in special interest organizations. They are interested in innovations in political and organizational spheres, but especially in those of a technical nature.

Movers give priority to productivity, efficiency, and economic growth. They consitute the bulwarks of industrial society, and they have a keen interest in the economic side of politics. They are conservative in the sense that they work within the framework of the existing system and strive for the rewards that the system offers.

As consumers they are connoisseurs of quality and sometimes choose luxury items that testify the success and accomplishment.

The Movers were strongly pro-nuclear. A representative voice is this male entrepreneur over 65 years of age, but still working:

> "Oil is just as dangerous, fumes from car exhausts too, and I believe that if this society is going to continue to grow we must have more energy. ... There can be no growth if there is no economic growth to begin with. ... There are certain heads of industry in Sweden that I have absolute confidence in - I

> could name two persons who say 'without nuclear energy we won't be able to manage.' Certainly they influence me enormously. ... Of course, there should be a referendum, but I personally don't believe in it. Most people won't be sufficiently familiar (with the issues). .... The nations that build up their nuclear energy supply, they will have very inexpensive fuel. How will we be able to compete with them? ... with an unlimited fuel supply Volvo could increase its automobile production by 100 percent. (Not increasing our nuclear fuel resources) would mean that many industries would not be able to expand. ... I think those who say we should build 10 nuclear stations but not 14 are very childish. If you build four (reactors) an accident may occur, if you build 14, you get experience. ... The dangers don't loom so large for me, it's a question of (the nation's) growth."

Many of the Movers were dissatisfied with the fact that all options in the referendum put some limit on nuclear development without allowing a bigger or unlimited nuclear alternative. As entrepreneurs they were, of course, prepared to launch whatever energy programs the country wanted, but most Movers did not seem to anticipate anything but a nuclear victory. The most prominent spokesmen were industrialist Hans Werthén, Chairman of Electrolux, and Tor Ragnar Gerholm, nuclear physicist at Stockholm university.

Out of 53 Movers from the general public interviewed two weeks after the referendum 87 percent had voted. Their votes were:

Yes-lines	73%
No-line	23
Blank vote	4

The Status seekers search for an identity through others, but not among their peers: they want to identify with some admired group or idol. The role models of young Swedish Status seekers change often, and are frequently American. As they grow slightly older, the Status seekers tend to pick their models among those who rank high on the social ladder. They seldom have direct knowledge about their heroes' actual thoughts, habits, and taste; they build their impressions on what people say about their idols or what they can read or observe in the media. For this reason their behaviour and purchases may be more ostentatious than those of their idols.

Status seekers are acutely aware of social and financial position; they are fashion-conscious and rather materialistic. They are also very competitive. They may appear to be somewhat meretricious since they usually strive to imitate others rather than be themselves.

In politics the Status seekers vote in accordance with the class they aspire to belong to. A young technician employed in a multinational corporation, who lives in an apartment with wife and child but plans to move to a single-family home, makes statements that seem like an echo of pronouncements his superiors might make:

> "How will we then be able to sell our products abroad, if we're a low-energy society? I can't imagine such a situation. Volvo wouldn't be able to sell its cars. It takes a lot of energy to make a car. I wouldn't work. In that case, some exceptions would have to be made, some would have to be allotted more energy-industries and so forth. ... Maybe I think most about my job ... I really like it, and I wouldn't be able to have my job if we had a low-energy society. .... I don't want to be taken care of by the state. ... I want to get along on my own strength."

The Status seekers took the most pride in the nuclear achievement of the nation. They emphasized that Sweden would fall behind other advanced nuclear countries if the country did not use its nuclear investment. As voters they followed the lead of the Movers.

We interviewed 63 Status seekers after the election and found that 70 percent had voted. Their votes:

Yes-lines	75%
No-line	21
Blank	4

The Group-faithfuls want most of all to blend inconspicuously into their social situations and not deviate from the norms of their group. They are reluctant to move from their home town, and they want to keep their jobs all their lives, if possible. They become the pillars within the organizations they belong to. They constitute the infantry in popular movements, be it the temperance movement or the workers' movement. They are family-oriented. Divorce hits them hard even if love has left the relationship. It is belonging to the group that is the key to their motivation.

In Sweden the Group-faithful often are steadfast believers in equality and solidarity. The Group-faithful would never stray from the party line at elections even if they disapproved of some party policies. In the nuclear issue they looked to their leaders, primarily their political leaders, for guidance. They decided late in the campaign. They did not relish the fact that the politicians turned over the issue to the electorate and tended to think that the referendum was unnecessary. For the blue-collar union members among the Group-faithful it became important to follow their leaders at LO (the Nation Organization of Trade Unions). Its Vice Chairman, Rune Molin, was an active and effective pro-nuclear model for them.

We interviewed 58 Group-faithful after the referendum. 72 percent had voted and their votes were divided in this way:

Yes-lines	66%
No-line	31
Blank vote	2

We turn to some types found among the values of reproduction.

The Reformers among our respondents say that to live with a sense of social responsibility is the main part of their catechism. They are convinced of the merits of their values and want to change society to correspond with their values, not adjust themselves to society. Today, they are often advocates of simplicity and conservation.

They want to maintain or enhance the quality of their daily lives. They do not rush through the day, but rather pace themselves in order to avoid stress.

As consumers Reformers are distrustful of advertising and critical of commercialism. In politics they emphasize global concerns, and they have actively supported many modern social and political causes: the Vietnam movement, conservation, disarmament, women's lib.

Let us quote a young woman who studies education at the University, works part-time helping the aged and handicapped with their household chores through the Department of Social Services. Like many Reformers, she had faith in the ability of alternative energy sources to meet the country's fuel needs. She is concerned about the environment and has a simple lifestyle that is not fuel consuming. She is concerned about the fate of humanity, of life on planet earth, and is completely convinced of the validity of her views.

> "If nuclear power is prohibited in this country I'm totally convinced that we would be able to develop alternative sources of energy in good time. ....There are, first of all, different ways of storing solar energy. I know there are. ... There is wind power too. ... It's possible we would have to change our society. I don't think we would have to lower our standard of living - at least I wouldn't have to lower my standard of living. Maybe we wouldn't have cars, not buy as many consumer products. So what? I'd be happy to get rid of them. ... There are no doubt things I could cut down on, but I don't think I'd need to, you don't need much energy for the interests I have. ... We will have to produce other goods. ... that yield more profit from a human point of view. ... They build nuclear stations without any consideration for nature. ... The biggest danger is a nuclear accident. ... It is so diffuse, so hard to put your finger on, there may be damage that one isn't aware of right away. ... It's a question of this planet as such ... not just human life, they destroy plant and animal life too."

After the referendum we asked 31 Reformers in interviews how they had voted but eight refused to tell. The others were divided in this way:

Yes-lines	34%
No-line	66

We had expected more no-votes here; however, the number of interviews is so small that the cited votes are a poor indication of the actual distribution.

There is little doubt, however, that the most articulate spearheads of the anti-nuclear movement were Reformers. Many were trained in other battles and had good channels to the media. Yet one cannot say that they gave the anti-nuclear movement a tight organization and a well-defined leadership. The leadership was everywhere and nowhere; there was no national hierarchy and no single person was indispensible to the effort. The formal and effective leader of the "No-movement," Lennart Daléus, rose to the chairmanship from relative obscurity as information secretary of the National Academy of Science; after the campaign he receded into the obscurity of another civil service job in environmental protection. The anti-nuclear movement is organized - less by design than happenstance - to be invulnerable to attack on or removal of its leadership.

The Experience seekers aim to develop their inner selves through direct, immediate experiences, intense involvement in relationships with other people and/or with nature. They desire a rich inner life. Emotion and intuition are meaningful words for them. They do not look askance at astrology or Zen, and would be willing to give meditation a try: they are, in short, receptive to everything that can open new doors to the inner self. Experience seekers therefore constitute a rather heterogeneous group. Some of them seek intense thrills in suspense and adventure.

Like the Reformers, Experience seekers are likely to be adherents of equality. They are often advocates of environmental protection. They tend to regard national politics as superficial and are more inclined to get involved in local issues. The nuclear energy issue became an exception and it engaged them very much.

An Experience seeker who is a 23-year-old musician said:

> "I'm not so interested in politics in general .... One can possibly vote against something, one can't vote for anything. .... We hear a lot about the radiation dangers connected with nuclear energy but not so much about the dangers nuclear energy would have for the whole political climate. There will be strict security controls and things like that. It can easily lead to a police state."

To most Experience seekers a nuclear society would impede rather than encourage their pursuits. Among other things they were more worried than others that the use of nuclear technology would foster a police state in which they would inadvertently suffer. Even among Seekers of a very conventional kind, such as youthful members of religous groups, anti-nuclear proponents were twice as common as in the population at large.

We interviewed 58 Experience seekers from the general population after the referendum and found that 82 percent had voted:

Yes-lines	33%
No-line	65
Blank	2

The motto of the Self-faithful is "I am I." They are flamboyant and eager to experiment, but are true to their predilections as long as their enthusiasm for them lasts. They have nothing against drawing attention to themselves, and their clothes are often eye-catching. In the 1970s the Self-faithful became so visible that the period was called the "me-decade." In politics they are drawn to action groups rather than to parties. They seem to prefer to pursue one issue at a time and to do so with total commitment. This does not mean that they were emotional and without analysis when the nuclear issue engaged them. A self-faithful woman, 19 years old and an art student, argued like this:

> "The thing is I think nuclear energy isn't safe. I don't have confidence in them. I don't think humans can manage nuclear energy. If you vote "No" - there will still be nuclear energy around but they will invest more time and money to try to develop something else. If you vote "Yes," they'll continue with nuclear energy out of sheer laziness."

The Self-faithfuls more than others sported campaign buttons: "Atomic power - No thanks." Fond of pop and rock, they dominated the many rallies against nuclear power that featured artists and poets. Gunnar Sträng, former minister of finance, himself a strong proponent of nuclear energy, observed astutely that "every devil with a guitar seems to be against nuclear power."

Out of 24 Self-faithful interviewed after the referendum we found these votes:

Yes-lines	38%
No-line	58
Blank	4

We have also two different types of people who are governed by the values of sustenance. There is nothing in their value system that predisposes them to be for or against nuclear energy.

Subsistence minded are penny pinchers who manage to get by in a society that regards them often as on the fringe. They usually view the world around them as threatening and hostile, and they are themselves quite suspicious of others. They have little hope for the future. They have scant interest in societal issues and do not use their franchise as often as other groups. A male pensioner can illustrate their hesitations when asked to vote in a referendum on nuclear energy:

> "I haven't really formed an opinion about how things should be. It's hard to say who is right at present. Nuclear energy is not as safe as one would wish. ... I think Fälldin has said some very good things about it, I think he comes closest to being on the right side today, as far as I can understand .... I don't think the ordinary man knows enough to determine whether we should have nuclear energy or not."

The Subsistence-minded were the most uninterested in the campaign. Out of 26 interviewed after the referendum 9 (or 37%) admitted that they had not voted. To the extent they lived off farming, fishing and forestry they shared some aversion to industry and large-scale production and were against nuclear power. To the extent they were pro-nuclear city dwellers they were most impressed by the argument that nuclear energy was the cheapest form of energy available.

The few post-referendum interviews we have with Subsistence-minded showed these votes:

Yes-lines	52%
No-line	45
Blank vote	3

The Security-minded clearly differ from the Subsistence-minded in their more active and safer way of living. Security is their lodestar. They live carefully and guard the security they have managed to achieve.

The mature welfare state is their ideal society. They are happy with the social security network that Swedish welfare provides. As voters they would never conceive of "voting away security." ("Don't vote security away" has been the central slogan of the Social Democrats since the 50s.)

The Security-minded are dutiful and loyal. "You must" and "You must not" are important words in their daily vocabulary. They are somewhat apprehensive about experimenting, and as consumers they are first and foremost cautious. They look at the price, but are also concerned about guarantees. "Consumer safety" is an idea that appeals to them.

A Security-minded woman who works as an assembler at ASEA in Västerås and has two children worries about the dual economic and physical threat of the nuclear alternatives:

> "It's the economy (that I'm most concerned about), it's a question of to be or not to be .... Society may just break down, one doesn't know .... There may be a great deal of poverty, for we can't all become farmers and live off the land. We have to have industry to manage to get by .... (What I'd like more information about is) the safety aspect, how it works, what can be done if something should happen, how quickly one would notice if something goes wrong."

The Security-minded worried about the economic hardships a nuclear moratorium would cause. Would the country then be able to afford its welfare system, the cradle-to-grave social security? They were also concerned about the sheer physical safety of nuclear plants. This dilemma of the Security-minded came to dominate the politics in formulating the questions for the referendum and conducting the campaigns.

After the referendum we interviewed 37 Security-minded out of which 34 had voted. Their voting showed that in the end they had been strongly pro-nuclear energy:

Yes-lines	69%
No-line	22
Blank votes	9

The pro-nuclear side apparently won over this important swing-group. Economic security in the end seems to have counted more in their minds than the physical hazards of nuclear electricity production.

The eight motivational types we have sketched had different opinions on nuclear energy per se, but what is more significant in this context - they offered different arguments to support their views.

The Hard Core of Reproductive Values

The nuclear debate revealing a clear dichotomy between outward-oriented population groups who supported the values of production and inward-oriented groups who supported the values of reproduction was also a battle between the sexes. Women represent the quintessence of the values of reproduction. While men voted 70-30 for use of the nuclear plants in the polls as well as in the referendum itself women voted about 50-50.

The connections between age and sex and attitudes toward nuclear power can be illustrated through the following percentages obtained in three

surveys Sifo conducted during the last quarter of 1979. All respondents were asked: "In the referendum we will probably choose between two alternatives: to use or to phase-out nuclear power. The usage line means increasing our capacity to twelve reactors, which will be used throughout their life-spans. The phase-out line means usage for the present of the existing six reactors but a gradual shut-down over a ten-year period. If the referendum were held today - would you vote for the usage line or the phase-out-line?"

	Usage line	Phase-out line	Don't know	
16-24 years of age October 1979 (N=803)				
Men	41	49	9	100%
Women	14	78	8	100%
25-59 years of age October-December 1979 (N=2347)				
Men	60	29	11	100%
Women	31	50	19	100%
60-75 years of age October-December 1979 (N=1007)				
Men	64	24	13	100%
Women	37	35	28	100%

Opposition to nuclear energy was less in the higher age group. The difference between this and other age groups may be in part as counted for by the pro-nuclear position of many older women in contrast to younger women. Opposition was strongest among younger women.

To some extent, the debate on nuclear energy became linked with the women's movement and coloured by its discontents. A vocal group of feminists accuse Swedish society of being male-dominated (no doubt with considerable justification) and a faction of these found in the referendum debates a target for several of their grievances.

In 753 interviews with women in October 1979 we attempted to distinguish between feminists and others. As feminists we counted those

who said that women's liberation was very important or rather important, and

who said that they personally were very much engaged or rather much engaged in the struggle for equality between men and women, and

who agreed that it is a true picture of reality to say that men suppress women.

In all, 11 percent of all Swedish women, 18-70, were designated as feminists by the application of these joint criteria.

Among the feminists we found a heavy concentration of nuclear resistance:

	Feminists	Other women
Opinion on nuclear energy [3]		
Yes, use	21%	35%
No, phase-out	64	47
Don't know	14	18

Those who aimed their vitriol at the oppressive male saw the male-dominated field of nuclear power as yet another example of the imposition of male technology on a defenseless population and on women in particular. They alleged that males dominated the nuclear-related professions, and that they were personally invested in safeguarding their careers in technology or industry.

They further contended that such men had an advantage in the debate inasmuch as they commanded an arsenal of technical information that many women felt they were ill-equipped to counter. When men pointed to indices

in the external world to buttress their arguments for nuclear energy, women often could voice only their strong anti-nuclear feeling - cues from their internal worlds - in rejoinder. But they could also insist that their cues from the inner world of experience had as much validity as cues from the outer world of financial charts and power plants.

In one of the in-depth interviews on the nuclear issue that we conducted in the autumn of 1979, a young woman expressed scepticism that feelings would be respected as facts in their own right:

> ".... it's (considered) improper to have an opinion without statistics to back it up these days. Therefore people prefer to say: I don't know. But no one can condemn a feeling. It's mine. Most probably men will then say: these women, they just talk about feelings and therefore we can ignore them, they can't come with any concrete answers."

Here we notice the usual claim of inwardly oriented people in their controversies with outwardly oriented: feelings are facts!

When some feminists were joined by factions supporting leftist leanings the pro-nuclear force to be combatted assumed a still more formidable guise. The dragon to be slain now had two heads: one was a male-dominated technocracy that was insensitive to the values of a person-oriented society, the other was male-dominated capitalism that was also impervious to the values of a reproductive society.

To rally women from all walks of life to join against this menace some factions of the women's anti-nuclear movement appealed to women's unique function as females - their reproductive capacity as the bearers of human life. The contest between the pro- and anti-nuclear camps was sometimes reduced in the Swedish debate to an oversimplification: was one "for" or "against" life.

In the October poll of 753 women we wanted concrete evidence of women's fears and asked the open-ended question:

> "What injuries do you think might arise among those living near the Harrisburg nuclear power plant after the accident?"

The same question was asked in December 1979/January 1980.

Distribution of answers:

	October 1979	December 1979/ January 1980
Cancer	48%	43%
Genetic damage	34%	32
Injury to fetus	25%	22
Birth defects	17%	15
Miscarriage	8%	9
Other	36%	35

We also asked about radioactivity: "Which do you find to be the most horrible property of radiation?"

Not knowing how many years later injuries may appear	20%
Invisible damages	15%
Genetic damage	12%
Not knowing if you have been injured	11%
Carcinogenic	10%
It penetrates and damages without any means of stopping it	9%
Other	12%
Don't know	20%

The most repellent qualities of radiation are the least controllable and discernible: not knowing if and when a possible injury develops (not even in which generation it appears); being injured without seeing or feeling it.

In-depth interviews also revealed that women - particularly young women - to a considerably greater degree than men were troubled by the possible damages of radiation on child-bearing capacities and on the genes that would be transmitted to future generations. That radiation was invisible and intangible (unlike oil slicks and smog, for example) made the threat it posed seem all the more sinister.

Women's own unique productive center, her organs of reproduction, has been described by psychoanalyst Erik Homburger Erikson [4], as her "inner space." Erikson suggested that this inner space is fundamental to women's perceptions of themselves and to their modalities of relating to the world. It is, in short, fundamental to her psychological make-up. A threat to her physiological integrity through radiation that could damage her inner space could therefore represent an attack on her psychological integrity as well. Perhaps that is why the fears of radiation loomed particularly large among many of the women: Nuclear energy was like rape: uninvited radiation produced by male technology penetrated the woman's inner space and destroyed her reproductive capacity. In any event, nuclear energy was decidedly viewed by many women as men's way of safeguarding or increasing material production by endangering the very core of reproduction, today and for generations to come. The literary critic Maria Bergom-Larsson wrote in Dagens Nyheter August 26, 1979: "What we do here and now will affect future generations ... while men just live their own lives in the present, the reproductive capacities of women will suffer. Pollution and radiation threaten our physiological integrity."

While more women were impressed by economic and welfare arguments than by genetic arguments, there is little doubt that most women thought they had more of a long-range view of nuclear energy than men. We asked them:

"When women think of our using or abolishing nuclear power, do they mostly think of what might happen in the future to grandchildren and their children, or do they mostly think of what might happen here and now?"

Then they were asked to give their idea about how men answer the same question:

"When men think of our using or abolishing nuclear power, do they mostly think of what might happen in the future to grandchildren and their children, or do they mostly think of what might happen here and now?"

Distribution of answers:

	Women on women's perspective	Women on men's perspective
Think mostly about what might happen in the future	69%	28%
Think mostly about what might happen here and now	10	39
Both/and	18	18
Don't know	3	15

This hints at another central difference embedded in the values of production and reproduction: the production perspective is more short-term than the reproduction perspective.

A Value Shift?

In Sweden we have not recorded any significant increase in the values of reproduction since 1978. It would carry us too far into value trend research to document this in detail. Out of the Sifo battery of 50 questions that discriminate between inner world and outer world people we select the two that have been asked the longest, i.e., since 1967.

Both are answered on a five-point scale:

> It is more important to have a rich emotional life than success in life.
>
> One should not dwell upon one's troubles but push them out of one's mind and think about something else.

Responses of agree to the former item and disagree to the latter item help us identify the persons who embrace the inward-oriented values of reproduction. We obtain the index values shown in the following diagram for the population aged 18-60.

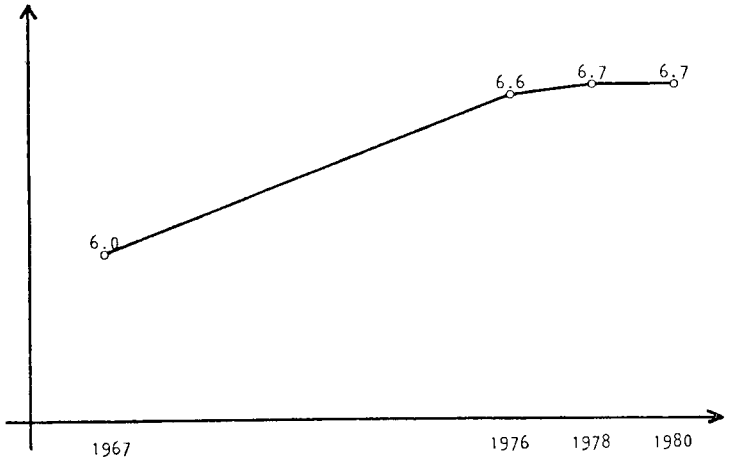


Diagram 4: Acceptance of certain values of reproduction.

We do not know yet whether the growth in reproductive values has been arrested more permanently, or if the arrest is temporary. However, the arrest came at a very opportune point in time for the proponents of nuclear power in Sweden.

The shadow of the atom bomb?

The large proportion of Swedish women who believed that the TMI accident would prove with time to have devastatingly harmful effects (see table on page 23) will very likely baffle future historians if - as now seems probable - it turns out that such injuries are minimal or negligible. The dearth of trustworthy information in this area from TMI was a greater misfortune than the technical breakdown itself, particularly for inward-oriented people.

But historians of the future - and let us assume they will exist - may still contend that the women who voiced their fears were on the right track. An exaggerated fear of the breakdown of a nuclear plant may be based on another fear, on the realistic fear that our planet will be laid waste by a nuclear war that fundamentally changes the conditions of existence for life on earth.

A singular slant on the study of the relation between nuclear weaponry and nuclear energy was provided by a set of interviews done with 35-year-old Swedes who were born on August 6, 1945, the day that the United States dropped the bomb on Hiroshima. Public records revealed that 353 individuals had been born on that day in Sweden; during the period January 29 - February 5, 1980 we were able to contact 229 of them by phone. These children of the atomic age had been reminded by the media on every one of their birthdays of the significance of the date. As a control group we took the 632 persons between 30 and 39 years of age who were interviewed through visits in the home in our regular omnibus surveys between January 9 and March 11, 1980. This is how the two groups voted in the referendum:

	Individuals born on August 6, 1945		Other individuals 30-39 years of age	
Line 1	17%	47%	21%	52%
Line 2	30		31	
Line 3	46		38	
Blank	7		10	

The difference between these groups may depend to some extent on the number of individuals in the sample who could not be reached, on the

broader age range of the control group, and on the time the interviews were done; the differences may also be connected with the fact that one group was interviewed by phone (those born August 6, 1945) and the other group was interviewed through personal home visits.

Yet the difference, with its slight significance, was what we had expected: individuals who had been led to reflect on the atom bomb on their birthdays included as a group a greater number of nuclear opponents than individuals in the group that had not been confronted with pictures of a mushroom cloud on every birthday. This finding should be replicated by research in other countries before it can be used as a basis for tempting but questionable inferences. In any event, it seems evident that nuclear weaponry casts some kind of snadow on the peaceful uses of nuclear energy.

Part 2: NUCLEAR ENERGY IN THE POLITICAL PROCESS

The Political Background of the Referendum

Most of the referendums in the world have dealt with constitutional or quasiconstitutional issues. Shall one adopt or reject a new constitution, shall province X be granted self-government, shall the nation join in economic market Y, shall a certain region Z belong to A or to B? Questions such as these constitute the lion's share of the issues that fill the catalogues of the world's referendums.

Sweden's referendums have not concerned questions of borders, constitutions or markets. The question whether the Baltic island of Åland should belong to Sweden or to Finland was decided in 1921 by the International Court at the Hague, not by a referendum. In the 1960s Sweden adopted a new constitution without a referendum and decided without a referendum to stay outside the Common Market. Sweden's referendums have dealt with these policy matters:

Prohibition	1921
Right-or-left-hand traffic	1955
General pension increments	1957
Nuclear energy	1980

A characteristic common to these issues was that they did not lend themselves rapidly to solutions through the ordinary political decision-making machinery. They became vital concerns among large groups of the citizenry but did not follow the right-left alignments that the Swedish political system is equipped to handle. The vote on prohibition divided the nation according to moral positions on alcohol, the vote on right- or left-hand traffic divided the nation between ethnocentrics and internationalists. The vote on pension increments opened a generation gap in as much as it meant that younger people would have to work to pay for the pensions of the older population. As we have seen, the debate on nuclear energy divided the nation in a new way: the proponents of production and the proponents of reproduction became the antagonists. The customary methods of forming a majority to arrive at a decision proved inapplicable, and the politicians were obliged to resort to a referendum.

In the 50s and 60s nuclear power belonged to consensus politics in Sweden. The first serious political clash over nuclear energy was joined in 1973, when a minority within the Center party and the Left Communists voted for a proposal to postpone further expansion of nuclear power for at least a year. Then came the oil crisis and soaring fuel costs. The Social Democrats, supported by the Conservatives, approved construction of thirteen reactors; the Liberals wanted eleven reactors. In May 1975, the Riksdag voted for thirteen reactor blocks.

Nuclear power was one of the main issues in the 1976 election campaign. Thorbjörn Fälldin, leader of the Center party, categorically opposed nuclear power. Through his emphatic stand against nuclear power in the 1976 election campaign Fälldin succeeded in breaking the long rule of the Social Democrats. The Conservatives, Liberals, and industrial leaders who really wanted nuclear energy did not protest against Fälldin's attacks on nuclear power in 1976. Voting out Palme and the Social Democrats was for the time being considered more important than defending nuclear power. For the first time in 44 years the Social Democrats lost the government, and the Center party formed a coalition cabinet together with the other two nonsocialist parties, the Liberals and Conservatives. A Royal Commission on Energy was appointed to work out a new consensus on energy policy, but in the end it could not reach agreement. The coalition was sundered in 1978 by differences concerning disposal of nuclear waste, and Fälldin's government resigned. The Liberal administration that succeeded him had the backing of the Social Democrats when it put forth a proposal to expand Sweden's nuclear capacity to twelve reactors.

By now, the anti-nuclear movement had united and was collecting signatures demanding a popular referendum. Then came the accident of Three Mile Island, which probably had a greater impact on Sweden than on the state of Pennsylvania. The Social Democratic leader Olof Palme changed course and joined the Communists and the Center party in a demand for a referendum. The Conservatives and Liberals allied themselves with this demand. In 1979 in a closely fought rematch of the 1976 election Fälldin's coalition again defeated the Social Democrats and returned to power, but with a parliamentary majority of only one vote. Nuclear energy was not a major issue in the election since the special referendum had been

agreed upon. As in Austria, the politicians had moved the nuclear issue out of election politics.

We see that the political system tried the following devices before it turned to a referendum -

- a general election (1976) in which nuclear power was a major issue and which produced a government divided on the issue;
- a royal commission (1977-78) of parliamentarians and experts which failed to deliver a consensus;
- a government reshuffle (1978) in which the party most opposed to nuclear power was excluded from the government, which, however, withdrew its energy proposal after TMI.

The referendum of 1980 was clearly a last resort when other political mechanisms had failed.

The Party Politics of the Referendum

Although the political parties had failed to solve the energy issue through normal mechanisms they did not remain neutral in the referendum. Far from it. The referendum did not represent a break with party politics, only a break with the usual line-up of the parties.

The debate on nuclear energy split the usual class-based opinion blocks in Swedish politics. One nonsocialist party, the Centerites, was anti-nuclear energy, as was a socialist party, the Left Communists. Two non-socialist parties, the Conservatives and the Liberals, wanted to use the completed and on-going investments in nuclear energy, as did the Social Democrats. The Social Democrats did not want to leave the voters without some distinctions of party lines, and managed to provide voters with two alternative ways of voting for use of the nation's nuclear investment: The Conservatives' Line 1 and the Social Democrats' Line 2. The Liberal leadership also supported Line 2.

At the time, six reactors were in use, four were ready to be put into commission, and two were under construction.

The three alternatives for the voters were formulated by the party leaders on December 15, 1979 and later authorized by Parliament. They were designated as Lines 1, 2, and 3. A brief summary of their intent is presented below. Their exact wording is given in the Appendix.

> Line 1: Retain use of the six reactors already in service, commission the four reactors that are ready and finish building the remaining two under construction. No further expansion of nuclear power once twelve reactors are in service.
>
> Line 2: Same as Line 1, with the provision that the main responsibility for the production and distribution of electric power is to be socialized, that is, vested in national and local authorities.
>
> Line 3: The six reactors now in use are to be phased out over a ten-year period; the four that are ready are not to be put into commission and construction on the remaining two is to be stopped.

Blank voting slips were available.

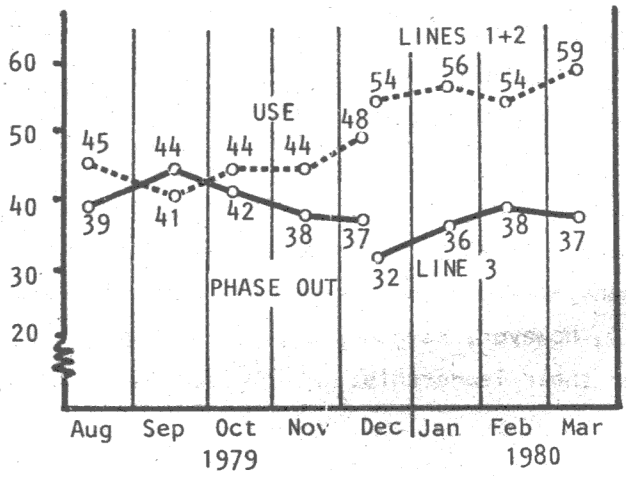
Lines 1 and 2 were referred to as the "Yes lines" - pro-nuclear power. Line 3 was referred to as the "No line" - anti-nuclear power. We see that political semantics play a part: those who want to use the nuclear investment nevertheless bill themselves on the ballot as phasing-out nuclear power. Those who say "No" to nuclear power still agree to use some of the nuclear capacity for ten years. These blurrings were concessions to the large minorities in each party that were known to deviate from the leadership line. But they also gave the referendum a trait of different drummers with the same basic beat. All contenders accepted a limit to the expansion of nuclear energy in the nation and agreed that no entirely new construction of nuclear reactors would take place. If you take the alternative wordings literally and formally, whichever of the alternatives won, nuclear power was to be a parenthesis in the history of Sweden's energy supply. This defeat for the nuclear power industry was administered not by the voters, but by the politicians who formulated the alternatives for the voters.

The issue of socialization was a formal difference between Lines 1 and 2, but in reality this difference is minor inasmuch as 80 percent of

Sweden's reactors were already under the ownership of the state or local government. However, the tenor of Line 1, as conveyed in public appearances, on TV, and in publications, was somewhat more pro-nuclear power. From the common wording on the ballot Line 1 chose to emphasize the use of nuclear energy ("Energy for Sweden" was its main slogan) and Line 2 chose to emphasize that no new reactors would be built after the 12 ("Phase out Nuclear Energy with Sense").

The public was annoyed at being presented with three alternatives. The week after they were decided upon, a Sifo poll asked: "Do you think it is a good or bad idea that we have three ballots?" Good, assumed 18 percent; bad said 66 percent; and 16 percent had no opinion.

But the politics of the two yes-alternatives worked as intended. Between August and mid-December 1979 Sifo used a two-alternative wording in its interviews and after mid-December it used the three alternatives decided upon by the politicians. The gap between yes and no doubled from 11 percentage points in interviews done between November 28 and December 11, to 22 percentage points in interviews done December 18-19. This large shift is due primarily to the technical factor of the number of alternatives [5]. It gave the Yes-side an initial advantage.



In August-December 1979 Sifo asked:

"In the referendum we will probably choose between two alternatives: to use or to phase-out nuclear power. The usage line means increasing our capacity to twelve reactors, which will be used throughout their life-spans. The phase-out line means usage for the present of the existing six reactors but a gradual shut-down over a ten-year period. If the referendum were held today - would you vote for the usage line or the phase-out line?"

In December 1979 - March 1980 Sifo asked:

"If the referendum were held today, which alternative would you choose: 1, 2, or 3?"

The division of the Yes-line into a Conservative and a Socialist ballot also saved the politicians of these opposing parties from the embarrassment of appearing on the same platform. In all, it probably contributed to a somewhat more rigorous Yes-campaign and gave the pro-nuclear forces a continued boost.

The Center Party, which appeared on the same anti-nuclear platform (Line 3) as the Communist party, suffered some of its electoral standing in the process. The Communists, however, benefited from the campaign through the lifting of their usual political isolation.

To sum up, Line 1 was sponsored by the Conservative party (m); Line 2 was sponsored by the Social Democrats (s) and Liberals (fp); Line 3 was sponsored by the Centerites (c) and the Communists (vpk). The extent to which these parties could mobilize their adherents as election day approached is shown in this table:

	Jan	Feb	March
Share of m-adherents for Line 1	54%	60%	59%
Share of fp-adherents for Line 2	32%	31%	33%
Share of s-adherents for Line 2	50%	60%	67%
Share of c-adherents for Line 3	74%	86%	78%
Share of vpk-adherents for Line 3	76%	78%	80%

We see that party loyalty was substantial - particularly within c and vpk - and generally grew during the campaign, particularly within s. The Liberals, however, remained divided with only a minority supporting the stand of their leadership.

It is instructive to compare the votes in the general election in September 1979 with the votes in the referendum in March 1980.

	Election September 1979	Referendum March 1980
(m) or Line 1	20.3%	18.9%
(s) + (fp) or Line 2	53.8	39.1
(c) + (vpk) or Line 3	23.7	38.1

Line 3 attracted more votes than its sponsoring parties, Line 1 about the same number of votes, and Line 2 considerably fewer votes than its sponsoring parties.

Had the nuclear issue been part of the general election rather than relegated to a referendum, the Social Democrats and Liberals would have received lower election results, and the Centerites and Communists higher results. It thus turns out to have been politically astute of the Socialist leader Olof Palme to accept the c + vpk demand for a referendum. The decision was not enough to bring him victory in the 1979 general election. In the last few days before the referendum, however, his Line 2 became larger than Line 3.

Part 3: THE CAMPAIGN AND THE PROCESS OF OPINION FORMATION

The Externals of the Campaign

Prospective voters were deluged with information to help them take a stand in the referendum and to influence their choice. To make sure that vasted money interests did not rule the outcome of the referendum the government - as is customary in Sweden - allocated money for campaign funds: Lines 1 and 2 received 8 million crowns each; Line 3 received 16 million crowns. (Which other Western country would allow Communists to share government money to attack government policy?) The results of two government reports, one covering safety conditions at the country's nuclear power blocks and one assessing the practical and economic consequences of phasing out nuclear power, were made available to the public through the media. Newspapers and magazines carried ads, pamphlets streamed into mailboxes, signs and posters abounded in the subways, on buses, buildings, trees, everywhere. The government-financed news magazine for immigrants disseminated information in twelve languages to the half-million voters who are non-Swedish speaking. Not a day passed without a radio or TV program dealing with the issue, often in debate form. Information centers were set up by different groups, study groups formed at workplaces, soap box debates and demonstrations flourished. Hospitals and nursing homes made special arrangements to permit their patients to vote. It was virtually impossible for anyone living in Sweden January - March 1980 not to have been aware of the referendum.

A special pro-nuclear campaign was carried out by industry through a well-financed ad hoc group, IFO. It was launched in October 1979; the campaigns of the three official lines did not start until January 1980. The Yes-side could thus disseminate print ads and posters without much competition from the opposing side through the last quarter of 1979. A glance at the poll chart from Sifo (p 33) shows that the Yes-side gained during this period - from 41 percent in September to 48 in December - and that the No-side declined from 44 to 37 in the same period.

The details of the progress of the three lines during the official campaign are shown in the second poll chart below from Sifo. Its curves end with interviews conducted March 18-19 and published March 20. The referendum results from March 23 are shown by the numbers underlined. The turnout was 75.7 percent.

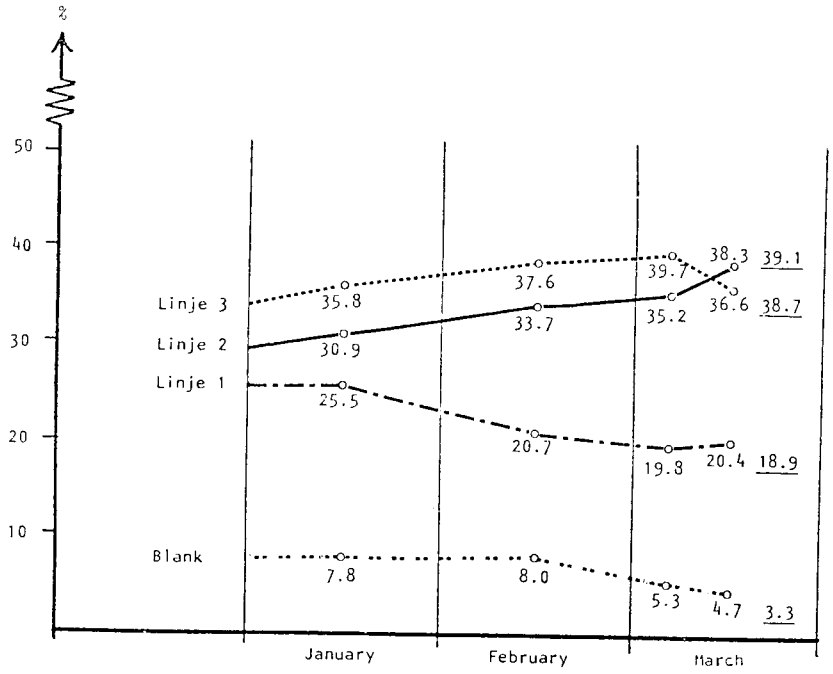


Diagram 6: Short-term poll trends 1980.

During the official campaign the number who were undecided or contemplated a blank vote declined. Line 1 experienced a declining trend as the public battle shaped up primarily between Lines 2 and 3. In the end Line 2 prevailed, which made it easier to interpret the result of the referendum as a victory for the Yes-side. Had Line 3 maintained its lead, the combined strength of Lines 1 and 2 would have to be invoked to claim a Yes-victory, a procedure that undoubtedly would have been disputed in certain quarters of Line 3.

The Information Need

Already in 1976 election studies showed that the Swedish electorate was reasonably well-informed about nuclear energy and thus able to make a rational voting decision[6]. Still a majority wanted to know more when the referendum was called. We asked repeatedly: "Do you think you know enough about nuclear energy in the face of the referendum, or do you want to know more in order to be able to vote?" The number who felt they did not know enough declined during the half-year that preceded the voting. The chart shows the percentage answering that they need more information to vote.

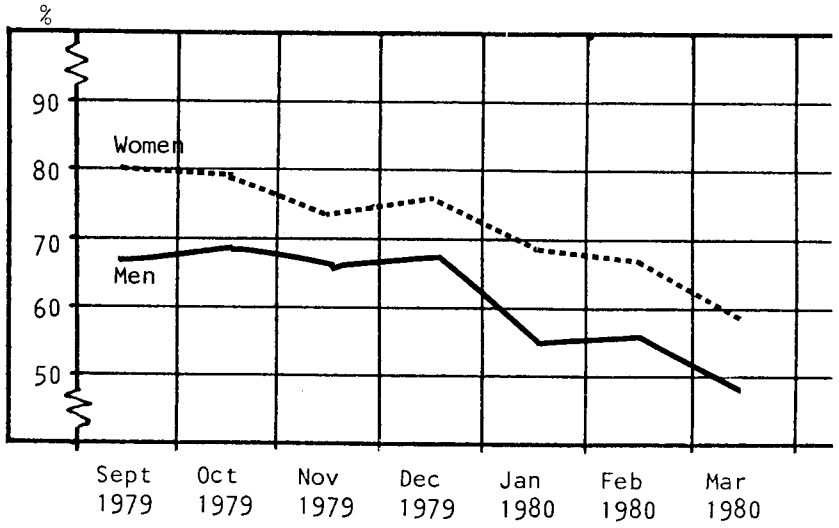


Diagram 7: Percentage answering that they needed more information to vote.

About half the electorate report that they knew enough about the nuclear issue to be able to vote on it. The figure dispels the idea that the public despairs about such complex matters. But the chart also shows that it takes much larger time for the public to "work through" a complex issue such as nuclear energy than is usually allotted a parliament.

The public knew more arguments against use of nuclear power than for the use of nuclear power. This is due to the fact that Torbjörn Fälldin had dramatized the issue of the disposal of nuclear waste in the 1976 election campaign and that TMI had dramatized the operating risks of nuclear power plants.

The Arguments

The formation of public opinion before a referendum or an election is a long-term effort and can scarcely be compared with an advertising campaign aimed at launching a product and encouraging trial purchases. People need a much longer time to grasp and evaluate the arguments and to test them in conversations with others before they are ready to take a position politically.

For all intents and purposes the voters' positions on nuclear energy in the spring of 1980 were decided by arguments that had already gained some currency in the autumn of 1979. Proponents of phase-out had an advantage in Fälldin's well-publicized warnings in 1976 and 1978 about the unsolved problem of waste disposal and because of the enormous amount of publicity concerning operational difficulties that was generated by the TMI accident in the winter of 1979.

In three waves - October 1979, November 1979, and January 1980 - Sifo asked the public at large these questions:

> "Which arguments - that is, ones you heard, read or saw - are in favor of nuclear energy?"
>
> "Which of the ones you just mentioned do you think is the strongest argument for nuclear energy?"
>
> "Which of the arguments you mentioned do you yourself agree with?"

"Which arguments - that is, ones you have heard, read or seen - are opposed to nuclear energy?"

"Which of the ones you just mentioned do you think is the strongest argument against nuclear energy?"

"Which arguments do you yourself agree with?"

In October 1979, 83 percent of Sweden's adult population (18-70 years of age) were able to name one or more arguments they had heard for nuclear energy and 91 percent could name arguments against nuclear energy without any help from the interviewer. As a basis for comparison, 47 percent could name one or more arguments for oil as a fuel source and all (100 percent) could cite some arguments against the use of oil. The percentage that could cite some argument in favor of nuclear energy was thus sizable.

The most common argument for nuclear power was that it would enable us to maintain our standard of living and reduce our dependence on oil. Next came arguments along the line that nuclear energy is cheap and clean. Here is a list of the arguments for nuclear energy that had been noted at each of the three surveys:

	October 1979	November 1979	January 1980
We can keep our standard of living	27%	27%	28%
Decreased dependence on oil	26	24	29
A comparatively cheap fuel source	24	19	22
A clean fuel source that doesn't harm the environment	22	18	19
We need energy	21	20	15
Needed to maintain employment	11	10	10
Have already invested so much in nuclear energy	9	9	10
The most dependable source of energy	8	6	6

We notice that no one argument is cited by more than one-fourth of the respondents.

To have heard of or otherwise taken notice of an argument is one thing, to agree with it another, and to rank an argument as the strongest is still another matter. During the period preceding the referendum pro-nuclear arguments became more established in people's minds and those who leaned toward certain arguments did so more strongly. On the other hand we did not register any increase in the dissemination of various arguments to a broader base in the population.

	Have heard of argument			Of which: Agree with argument			Think it is the strongest argument		
	Oct %	Nov %	Jan %	Oct %	Nov %	Jan %	Oct %	Nov %	Jan %
We can keep our standard of living	27	27	28	57	57	54	58	62	58
Decreased dependence on oil	26	24	29	60	73	70	57	57	58
A comparatively cheap fuel source	24	19	22	47	45	47	30	26	31
A clean fuel source that doesn't harm the environment	22	18	19	61	68	72	44	45	49
We need energy	21	20	15	60	67	68	63	69	67
Needed to maintain employment	11	10	10	46	52	60	53	56	60

This compilation shows that in the course of the campaign period increasing numbers agreed with and thought the arguments "decreased dependence on oil," "a clean fuel source that doesn't harm the environment," and "needed to maintain empoyment" were strong reasons favoring nuclear energy.

Anti-nuclear arguments were more well-known.

	Have heard of argument			Of which: Agree with argument			Think it is the strongest argument		
	Oct %	Nov %	Jan %	Oct %	Nov %	Jan %	Oct %	Nov %	Jan %
No waste disposal available	59	61	61	68	70	70	39	37	36
Danger of leakages and radiation	57	49	52	64	71	66	29	30	28
Genetic damage	20	17	17	65	63	63	37	34	37
Danger of attacks on plants	9	8	7	41	48	53	15	14	11
Spreads nuclear weapon	8	7	10	53	58	44	15	13	20
Dangerous, dangerous to life	8	7	3	*	*	*	*	*	*
Dangers of explosions, accidents	8	12	11	*	*	*	*	*	*
Safety problems not solved	7	9	6	*	*	*	*	*	*
Dangerous to the environment	5	4	3	*	*	*	*	*	*
We can manage without it	2	2	3	*	*	*	*	*	*

* = No information

The problems of waste disposal, long a subject of discussion in Swedish politics, and radiation dangers, which sprang dramatically to the fore following TMI, were known to more than half of the respondents. The step between these familiar arguments and other reasons for opposing nuclear energy was very steep, and no significant change could be observed during the campaign prior to the referendum.

Many persons, particularly many young persons, found it easy to reject nuclear energy because of their great confidence in the technical feasibility of alternative energy sources. We asked 15-24 year olds: "What kinds of energy do you think we should use in the near future?"

(Those who mentioned more than three kinds were asked to indicate which three should be primarily used.) The question was asked before and during the campaign.

	October 1979	January 1980
Current conventional energy sources		
Oil	32%	32%
Water power	33	44
Coal	5	4
Nuclear	36	46
Alternative energy sources		
Sun	51%	47%
Wind	44	41
Wood, peat	14	17
Thermal energy	6	4
Energy forests	4	4
(Number of interviews)	(803)	(802)

The campaign produced no significant change in young people's confidence in alternative energies but the proportion who saw a future for nuclear energy and water power increased.

Credibility

Despite the fact that as far as the general public was concerned, the nuclear issue centered around broad questions such as environmental concerns and various physical dangers rather than on purely economic and technical matters, the people believed that scientists and technicians were by far the most credible sources of information on the nuclear issue.

Confidence in technicians and in public authorities gained somewhat during the campaign. Sifo posed this question on three occasions: "Many groups dispense information on the nuclear issue - for example, environmentalists, industrialists, technicians, and scientists, public authorities, politicians, journalists, writers, women's groups, and trade unions. Would you name one or two whom you consider most reliable?"

	October 1979	November 1979	January 1980
Technicians	67%	66%	75%
Environmentalists	25	23	29
Public authorities	9	10	17
Politicians	7	7	8
Industrialists	4	4	7
Journalists and writers	5	4	5
Women's groups	4	3	5
Trade unions	2	3	4
Don't know	15	15	6

Confidence in technicians was largest among the supporters of the three lines (January 1979).

	Line 1	Line 2	Line 3
Technicians	85%	85%	61%
Environmentalists	13	19	53
Public authorities	21	23	10
Politicians	6	13	5
Industrialists	16	4	3
Journalists and writers	2	3	11
Women's groups	1	1	10
Trade unions	3	7	3
Don't know	6	3	5

Environmental groups enjoy much credibility within Line 3, but even Line 3 supporters thought technicians to be as or more reliable sources. The campaign illustrated in many ways the enourmous amount of confidence that Swedes vested in technical experts. The Yes-side believed that technicians would be able to solve the remaining problems posed by nuclear energy, and the No-side believed that technicians would soon provide the nation with alternative energy sources based on sun and wind power.

During the 70s the credibility of politicians diminished among voters. Many thought that technical experts rather than politicians should play the key role in decisions about nuclear energy. We asked: "Who do you think should make the final decisions about the Swedish nuclear energy program - the politicians or technical experts?"

	1977	October 1979	November 1979	January 1980
Politicians	17%	19%	19%	28%
Technical experts	31	39	39	31
Both together	44	36	35	36
Uncertain, don't know	8	6	7	4

At the end of the campaign period, when the three alternatives to be voted on in the referendum had been laid down by politicians, people were generally more willing than previously to let them have a decisive role in the nuclear energy question.

The Thrusts of No and Yes

The thrust of the No-side can be summed up in its big poster "Nuclear Power is Dangerous to Life", displayed in February and March 1980. It also carried the text "A Reactor Accident can Kill Thousands by Radiation and Tens of Thousands in Cancer." As the source of this information the poster mentioned the National Institute of Radiation Protection. It is not unreasonable to assume that considerable fear vibrated through the nation when this poster appeared all over the country in February 1980.

The impact of the argument can be ascertained in answers to Sifo's poll question: "Does it happen that you get worried when you think of nuclear energy?" The chart below sums up the combined answers "very often" and "rather often".

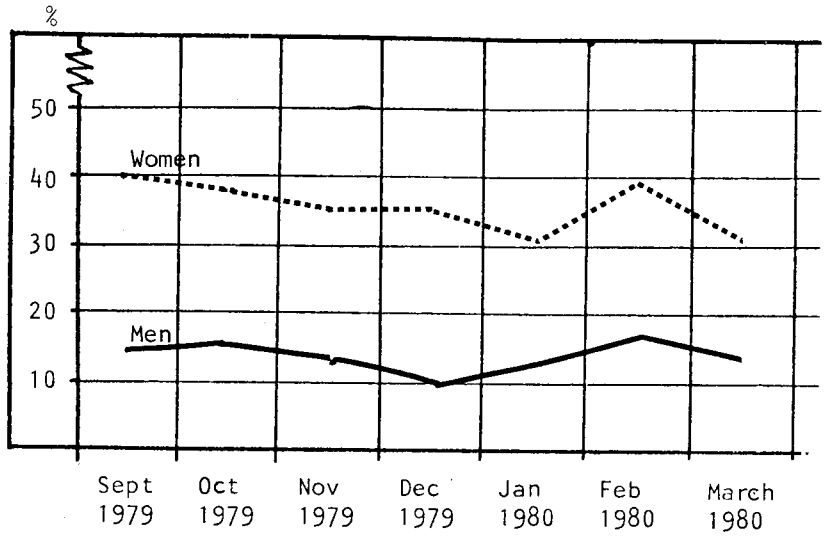


Diagram 8: Percentages of men and women who worried about nuclear energy and whose anxiety was very or rather strong.

The number of men who expressed worry over nuclear power varied between 10 and 17 percent and the number of women between 31 and 40 percent. The worries declined during the last quarter of 1979 but a trend break occured in February 1980. At this point the gap between the Yes-and No-lines narrowed and Line 3 had seemed to be gaining. However, the trend was broken by the introduction of party loyalty into the campaign (as mentioned above on page 28) and by a new outspokenness from the Yes-adherents (see below, page 36).

The thrust of the Yes-side can be summed up in slogans such as "Sweden Needs Energy" (Line 1) and "Don't Make the 80s More Difficult" (Line 2). The argument was essentially to keep or expand the present type of society with a high level of energy consumption as the backbone of prosperity and welfare. We checked the progress of this argument by presenting this choice in monthly polls:

"If you had to choose, which society would you prefer -

a society where we consume less energy than now, by using less transportation, curtailing the use of automobiles, using products that are less energy-consuming, living in smaller, fuel-saving homes, and where we concentrate on manufacturing and refining industries rather than on the energy-demanding production of raw materials

or

a society where we consume as much or more energy than now, and where we can have comfortable homes and automobiles, travel about as much as we do at present, use as many machines as we wish, and where we would also concentrate on the energy-demanding production of raw materials?"

The proportion of the electorate that preferred a high-energy society is shown in this chart

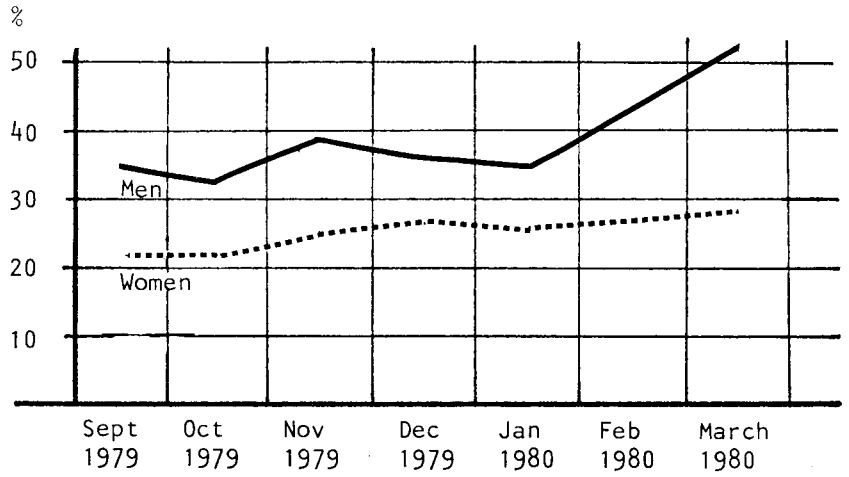


Diagram 9: Proportion of men and women that preferred a high-energy society.

The proportion of men who chose a high-energy society rose from 35 percent in September 1979 to 52 percent in March 1980. The rise was particularly sharp during the official campaign. The proportion of women prefering the high-energy option rose slowly, from 21 percent in September to 28 percent in March. There was no trend break in the underlying momentum of the Yes-side.

The Media

Otherswill study the media treatment of the campaign in detail. In our national polls between January and March 1980 we randomly encountered 48 persons engaged in media, media arts, and advertising. They were considerably more negative to nuclear energy on practically all questions than the general public. Their voting preference was -

Line 1	15%
Line 2	20
Line 3	41

Most journalistic accounts undoubtedly mirrored the news sources, not the private opinions among the reporters. There were, however, some journalists who felt morally obliged to assist the anti-nuclear cause. Many gate-keepers also seemed to have lowered their guards in regard to newsunfavorable to the use of nuclear energy. There were, for example, uncritically reported stories of hypothyroidism in the Harrisburg area after the TMI accident. Nuclear energy was clearly taxing on the professionalism of Swedish journalists. If the media had not given extensive coverage to the public opinion polls, they would perhaps have conveyed the impression that the No-side held the upper hand.

Expressed and Silent Opinions

There are two kinds of public opinion - opinions we must express to show we belong to a certain group and the opinions we may express without being rejected by the group. One may have an opinion but keep quiet about it so as not to deviate from a majority; in so doing one joins the body of silent opinion.

It is important to bear in mind the body of silent opinion regarding the issue of nuclear power. Sweden evidenced a wide discrepancy in the expression of opinion - between a silent majority who favored nuclear energy and a manifest minority who opposed it.

In interviews between February 20 and March 11 1980, Sifo asked "Do you have a strong or weak conviction on the nuclear issue?" The answers show that Line 2 had significantly fewer strongly convinced adherents and that supporters of Line 3 had the strongest convictions:

	Line 1	Line 2	Line 3
Very strong	29%	15%	35%
Rather strong	41	35	29
Rather weak	22	36	19
Very weak	4	6	7
Don't know	5	8	10

The stronger grass-root convictions on the No-side affected the campaign, particularly the earlier phases.

Line 3 enjoyed the active support of volunteer workers and the expressd sympathies of visible population groups. It is likely that social pressure in this situation made proponents of nuclear power hesitant to speak their minds in public. But published opinion measurements can encourage and accelerate the expression of private opinion when they support it. Many adherents of Lines 1 and 2 apparently spoke up clearer and louder as they discovered that their opinion had an edge in the polls. Another type of support to speak up was given Line 1 and Line 2 by the political father figures that joined the debate as it drew to a close. Former prime minister Tage Erlander and his wife Aina, a natural science teacher, came out effectively for Line 2. Conservative party leader, Gösta Bohman, the most popular of the Swedish politicians, spoke vigorously for Line 1. A more long-term effort in industry's pro-nuclear campaign had the running head: "Dare to ask!" This phrase had been coined to signal a new openness of industry to public scrutiny, but it also acted to break the silence of the nuclear supporters.

During the campaign the Yes-opinion moved from being timid to becoming outspoken. As an indication we may cite the number of people who displayed campaign buttons:

	Jan	Feb	March
Yes-buttons	1.4%	3.3%	4.3%
No-buttons	3.0	4.7	5.4

The dominance of No in January paved the way for the increase in No-votes in February, and the increase in the visibility of Yes in February prepared for the increase in the Yes-votes in March.

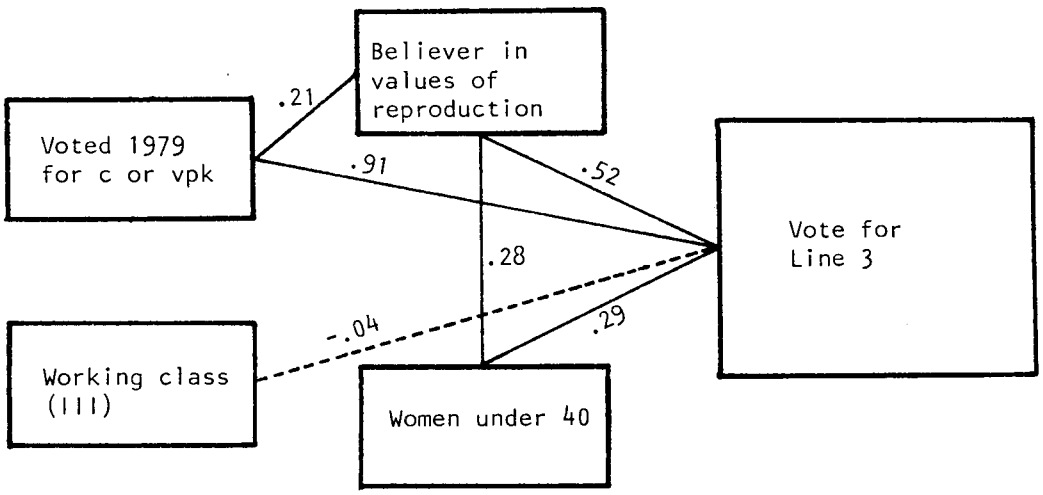
The above process of opinion formation is well known in opinion research: unless you can command visibility of your opinions, they fade in a "spiral of silence," to use the term coined by Elisabeth Noelle-Neumann [7].

When the campaign was over it became evident that the No-Line had not been as active as it had aspired to be. Its proclaimed goal had been to carry Line 3's message to every household through personal visits. When Sifo interviewed 1,010 persons between March 5 and March 25, it turned out that only 19 percent of households in major cities, 11 percent of households in smaller cities, and 9 percent of households in rural non-urban areas had received such a visit.

CONCLUSION

A Kind of Summary

There is no simple way of summarizing our discussion of the Swedish nuclear referendum. The chart below might serve as a reminder of the major forces and their weights. It emanates from an analysis by the ECTA method and is based on the previously cited interviews with 18-70 year olds in which information on value preferences was recorded. The link between anti-nuclear votes and class position is nil. However there is a clear link between values of reproduction and the anti-nuclear vote and that this relation is reinforced by women under 40, the childbearing group. A still stronger determinant of anti-nuclear voting is located in the loyalty shown the anti-nuclear parties by their regular voters.



(The coefficients have been made comparable by the method proposed in J A Davis, The Goodman Log Linear System for Assessing Effects in Multivariate Contingency Tables, Chicago, National Opinion Research Center, 1972.)

Commentary: The referendum as a spell breaker

The conflicts that arise because of the different ways in which outward- and inward-oriented people interpret events may sometimes be resolved by the latter through a phenomenon reminiscent of the breaking of a spell to banish something dreaded.

The referendum served the purpose of a spell breaker that seemed to lessen the dread of nuclear energy. We obtained marked differences before and after the referendum when we posed the open question "What do you think are the hazards of nuclear energy?" The percentages who gave answers such as "radioactive material that leaks out and causes disease, death, and genetic damage" are shown below:

Prior to the referendum:	June 1979	58%
	October-November 1979	62%
	January 1980	63%
After the referendum:	April 1980	47%

Nothing about nuclear energy itself had changed between January and April. Yet, we learned through the solemn rituals of voting that a large majority of Swedes accepted nuclear energy. Their dread had evidently dissipated. Thorbjörn Fälldin, who had been in such throes about nuclear power, seems less anguished today, and continues to govern a nuclear society. Reactors are put into service without protests. The once so lively opposition appears to have lost its verve.

But no one knows how long the specter will remain at bay.

The Swedish referendum on nuclear power was made when the atomic age - starting with the Hiroshima bomb in World War II - had lasted for 35 years. This is a very short period of time in which to integrate an entirely new factor in a culture. By way of comparison, man has possessed fire for about 500,000 years. We have learned more and more satisfying methods of separating it from everything alive, we have learned how to

transport it, we have learned to keep it under constant watch and control. In many religions fire became a messenger between man and the gods. In practical life fire became the servant of humanity in cooking, in clearing land for agriculture, in heating, in lighting caves, in pottery making, in metal production, in transportation. Of course, fire also destroyed: in 64 A.D. Rome burned for eight days, and 70 percent of the city was destroyed. In 1106, London burned in "the Great Fire; in 1751, Stockholm burned, and in 1906 San Francisco burned after an earthquake. Nearly all places man has inhabited can record devastating fires. Consequently, all places have fire protection, and legislation on fire has grown detailed. Since the Great Fire of London in 1660 there has also developed a system of fire insurance. Fire was non-problematic by 1980, nuclear power was not and will not be in the predictible future.

We shall not speculate on what a referendum on the use of fire would have shown about 500,000 years ago when fire had been in use for 35 years. But it seems absurd to expect that our attitude to nuclear power should be resolved in 1980.

NOTES

1) A more comprehensive account of the shift in values and how it can be measured will be presented within the framework of the project "Jobs in the 80s".

2) Sweden has four reactor sites: Oskarshamn, Ringhals, Barsebäck, and Forsmark. Here are some specifics on the reactors:

Plant	Owner	Supplier	Type	Effect	First year in operation
Oskarshamn 1	OKG	Asea-Atom	BWR	440 MW	1972
Oskarshamn 2	OKG	Asea-Atom	BWR	580 MW	1974
Oskarshamn 3	OKG	Asea-Atom	BWR	1060 MW	1986
Ringhals 1	Vattenfall	Asea-Atom	BWR	760 MW	1976
Ringhals 2	Vattenfall	Westinghouse	PWR	820 MW	1975
Ringhals 3	Vattenfall	Westinghouse	PWR	900 MW	1980
Ringhals 4	Vattenfall	Westinghouse	PWR	900 MW	1980
Barsebäck 1	Sydkraft	Asea-Atom	BWR	580 MW	1975
Barsebäck 2	Sydkraft	Asea-Atom	BWR	580 MW	1977
Forsmark 1	FKA	Asea-Atom	BWR	900 MW	1980
Forsmark 2	FKA	Asea-Atom	BWR	900 MW	1980
Forsmark 3	FKA	Asea-Atom	BWR	1060 MW	1984

3) The exact wording of the question is given below Diagram 5 on page 33.

4) Erik Homburger Erikson, Ungdomens identitetskriser, Natur och Kultur, Stockholm 1979, pp 225 - 252.

5) This conclusion is supported by the turnover table between two and three alternatives included in Sifo's release 1979-12-21 "Utgångsläget är jämnt mellan linjerna".

6) Sören Holmberg, Jörgen Westerståhl och Karl Branzén, Väljarna och kärnkraften, Liber 1977.

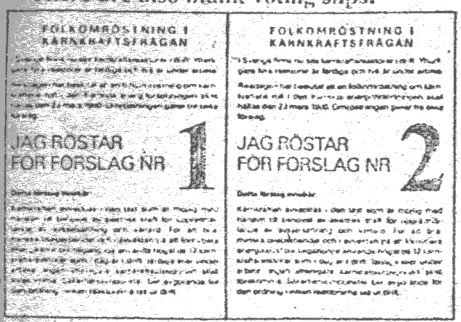
7) Elisabeth Noelle-Neumann, "The Spiral of Silence: A Theory of Public Opinion", Journal of Communication, Vol 24, 1974, pp 43-51. Elisabeth Noelle-Neumann, "Public Opinion and the Classical Tradition: A Re-evaluation", Public Opinion Quarterly, Vol 43, 1979, pp 143-156.

APPENDIX

This is what it says on the voting slips

The following is a translation of the text heading the three voting slips. "There are six nuclear reactors in service in Sweden today. Another four reactors have been completed and two more are being constructed. The Riksdag has resolved that a referendum concerning the role of nuclear power in future energy supplies is to be held on 23rd March 1980. Voters are asked to choose between three proposals."

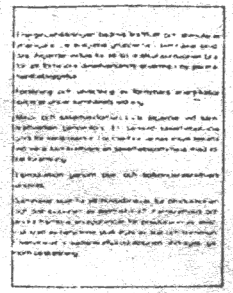
There are also blank voting slips.



The voting slips for Alternative 1 and 2 have the same front page text.

Nuclear power is to be phased out at the rate which is possible with due regard to the need for electric power to maintain employment and prosperity. In order among other things to reduce dependence on oil, and pending the availability of renewable energy sources, use will be made of not more than the twelve nuclear reactors which today are in operation, ready for commissioning or under construction. There is to be no further expansion of the nuclear power sector. Safety considerations will decide the order in which the reactors are to be taken out of service.

The reverse side of the voting slip for Alternative 2 reads as follows. Energy conservation is to be vigorously prosecuted and given further encouragement. The most disadvantaged groups in society are to be protected. Measures are to be taken to steer the consumption of electricity with the aim, among other things, of preventing direct-acting electrical heating in new permanent building development.



Research and development activities concerning renewable energy sources are to be stepped up under public auspices.

Measures to improve environmental standards and safety standards are to be taken at nuclear power stations. A special safety study is to be carried out for each reactor. A safety committee including local representatives is to be appointed at every nuclear power station for purposes of public supervision.

Electricity production in oil-based and coal-based condensation power stations is to be avoided.

Principal responsibility for the production and distribution of electrical power is to be vested in society. Nuclear power stations and other future facilities of importance for the production of electricity are to be owned by national and local authorities. Excess profits accruing from hydro-electric power production are to be sequestrated by means of taxation.

The front of the Alternative 3 voting slip reads as follows: No further expansion of nuclear power.

Closure within not more than ten years of the six reactors now in service. A conservation plan for the reduction of dependence on oil is to be based on

continued and intensified energy economization

greatly increased efforts to develop renewable energy sources.

Stricter safety requirements are to be imposed on operational reactors. No unactivated reactors are to be commissioned.

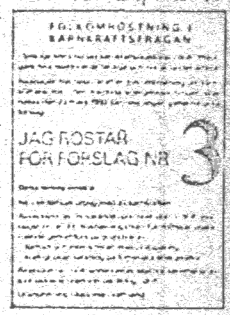
No uranium extraction is to be permitted in Sweden.

The reverse side of the voting slip for Alternative 3 reads as follows.

If current or future safety analyses so require, this Alternative naturally implies an immediate shut-down.

The campaign against nuclear weapons and their proliferation is to continue. No fuel reprocessing is to be allowed. Exports of reactors and reactor technology are to be discontinued.

Employment to be boosted by means of alternative energy production, more efficient energy management and more extensive upgrading of raw materials.



The above text is the translation of the alternatives prepared by the National Tax Board published in the English version of the government-funded magazine for immigrants.