(*17*) states that "winged ants stayed close to the nests and never flew in numbers. . . ," and she concludes that ". . . contrary to the procedure for *Lasius* and *Prenolepis*" (in which she had reported conspicuous mating flights) "*Myrmica* produced more females than males."
19. A female-biased sex ratio has been reported for *M. pharaonis* (range between nests is 1 : 1.1 to 1 : 5.3) by A. D. Peacock, *Entomol. Mon. Mag.* **87**, 185 (1951).
20. W. D. Hamilton, *Annu. Rev. Ecol. Syst.* **3**, 204 (footnote) (1972).
21. We attempted to compute the investment ratio for *Monomorium pharaonis*, a species in which brothers likely compete with each other for mates (*10*, pp. 40–41; see also *18*, *19*). We used a mean sex ratio of 1 : 2.19 (*19*). We did not have specimens to weigh, nor could we find published weights for reproductives of this species. Therefore, we used the body length ratio given by D. W. Hall and I. C. Smith [*Entomol. Mon. Mag.* **87**, 217 (1951)] as an indicator of the difference in size between males and females; this ratio is 1 : 1.39. Taken together, these data yielding a probable inverse investment ratio near 4.43 (5.84, using body lengths cubed), figures well within the range of many species listed by Trivers and Hare in Table 2 (*3*). Because *Monomorium pharaonis* founds nests by swarming (*10*), the actual investment in females is somewhat higher (if one regards workers accompanying a new queen as part of the investment in her).
22. G. Borgia, in preparation. M. J. West Eberhard has pointed out to us that LMC may have promoted evolution of eusociality in haplodiploid species because female biases within broods would increase the average relationship between an incipient worker and her siblings. Similarly, LMC may reduce numbers of laying workers by devaluing males.
23. K. V. Krombein, *Trap-nesting Wasps and Bees: Life Histories, Nests and Associates* (Smithsonian Institution Press, Washington, D.C., 1967).
24. Wilson (*10*, p. 324) states that "We also understand very little of the adaptive significance of polygyny, and, more importantly, the degree of kinship of queens that live together in polygynous colonies. A definitive judgment cannot be made until more data are available on these subjects."
25. See *3*, footnote 60, p. 262; D. H. Janzen, *J. Anim. Ecol.* **42**, 727 (1973); *10*, pp. 51–55.
26. G. W. Elmes, *Oecologia (Berlin)* **15**, 337 (1974).
27. M. V. Brian, *Ekol. Pol.* **20**, 43 (1972).
28. L. G. Wesson, Jr., *Trans. Am. Entomol. Soc. (Philadelphia)* **65**, 97 (1939).
29. N. Lin and C. D. Michener, *Q. Rev. Biol.* **47**, 131 (1972).
30. M. Talbot, *Ecology* **24**, 31 (1943).
31. E. D. Rothman, personal communication.
32. R. R. Sokal and F. J. Rohlf, *Biometry* (Freeman, San Francisco, 1969), pp. 526–532. In our analysis, the ordinate (I_f) = number of females × mean female weight, abscissa (I_m) = number of males × mean male weight; investment ratios are I_f/I_m. Since a logarithmic transformation of both I_f and I_m is necessary to produce normality, I_f/I_m is the antilogarithm of the intercept for the first principal component line, with the origin at ($\bar{I}_m$, $\bar{I}_m$). Confidence intervals are found from the intersections of the ordinate with the 95 percent confidence elipse for the bivariate mean.
33. C. Zmarlicki and R. A. Morse, *J. Apic. Res.* **2**, 64 (1963); G. E. Strang, *J. Econ. Entomol.* **63**, 641 (1970).
34. I. Franklin and R. C. Lewontin, *Genetics* **65**, 707 (1970); E. Mayr, *Biol. Zentralbl.* **94**, 377 (1975).
35. R. C. Lewontin, *Annu. Rev. Ecol. Syst.* **1**, 1 (1970).
36. We thank David P. Cowan for permission to use unpublished information and Robert K. Colwell for generous assistance with statistical interpretations. We also thank Gerald Borgia, Kent L. Fiala, R. Glenn Ford, Katharine M. Noonan, George F. Oster, and Edward D. Rothman for assistance. The Miller Foundation at the University of California, Berkeley, supported P.W.S.

The Elusive Rise in the American Birthrate

Although fertility is now very low, a substantial increase in the near future appears unlikely.

Campbell Gibson

In an article published in *Science* in 1975 (*1*), Sklar and Berkov concluded "that the American birth rate may have bottomed out and that the country is likely to see a rise in reproduction." Their analysis was based on fertility trends in California (through 1974) and in four other states (through 1973) where legal abortion is also readily available, and on selected national data on marriage (through 1974), fertility (through 1973), and family-size expectations (through 1974).

Fertility in the United States continued to decline through 1976 (Table 1), although at a lower rate after 1973 than in the three preceding years (*2*, *3*). In view of the continued decline, the purpose of this article is to review Sklar and Berkov's interpretations and to examine data pertinent to more recent fertility trends (*4*). More specifically, this article addresses three issues: (i) the implications of survey data about the family-size expectations of young wives for fertility trends during the next few years; (ii) the usefulness of fertility trends in California as an indicator of national fertility trends; (iii) the possible role of economic factors in determining recent trends in fertility.

Family-Size Expectations and Fertility

With regard to the prospects for an increase in fertility over the next several years, Sklar and Berkov cited recent survey data showing that a high proportion of young married women were childless, that most Americans have an aversion to childlessness and to the one-child family, and that only a small proportion of married women under 30 expected to bear fewer than two children in their lifetimes (*1*, p. 695). Their conclusion follows (*1*, p. 696): "If these young women are to realize their desires and expectations with respect to family size, they cannot postpone childbearing much longer. Within the next few years many will have to begin 'making up' the births they delayed in previous years."

More recent data on child spacing and first-order birthrates support the conclusion that there has been some postponement of childbearing in recent years (*5*, *6*). For purposes of this analysis, it is assumed that the postponed childbearing of young married women will be made up and that, in the aggregate, the family-size expectations of these women will be realized, although it should be noted that such expectations are subject to error and to change (*7*).

Sklar and Berkov pointed out that only 16 percent of married women under 30 in 1974 expected to have fewer than two children (*1*, p. 695). However, those same data suggested also that all women 18 to 29 years old in 1974 (the birth cohorts of 1945 to 1956) will complete childbearing with an average of only 2.1 births (*8*, pp. 23, 122). The explanation of this apparent inconsistency is twofold: first, married women under 30 expected an average of only 2.25 births, in part because only 10 percent expected four or more births (*9*); second, generalization of the expectations to all women requires a downward adjustment to allow for the fact that women who have not yet married or who will never marry will have lower average fertility than currently married women (*8*, p. 23; *9*, p. 33).

If lifetime fertility rates are projected for these cohorts consistent with their

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Table 1. General and total fertility rates in the United States, 1970 to 1976. The general fertility rate is the number of births in the given year per 1000 women 15 to 44 years old. The total fertility rate is the implied completed fertility rate—that is, the number of births 1000 women would have during their lifetimes if the age-specific rates of the given year were maintained. [Data from (*2*, pp. 8, 10; *3*, p. 1)]

Year	General fertility rate		Total fertility rate	
	Rate	Change from preceding year (%)	Rate	Change from preceding year (%)
1970	87.9		2480	
1971	81.8	−6.9	2275	−8.3
1972	73.4	−10.3	2022	−11.1
1973	69.2	−5.7	1896	−6.2
1974	68.4	−1.2	1857	−2.1
1975	66.7	−2.5	1799	−3.1
1976*	65.6	−1.6	1760†	−2.2

*Provisional. †Estimate based on indirect standardization using age-specific birthrates for 1975.

expectations in 1974, does it follow that there needs to be an immediate increase in annual fertility or a substantial increase in annual fertility in the next few years? The answer clearly is no. For the married women among them to realize their family-size expectations and to do so without pronounced delays in childbearing, only a moderate increase in the annual total fertility rate (to roughly 2000 in the year 1980 and 2100 in 1985) would be required over the next decade (Table 2, series II). If movement toward a significantly later timing of childbearing were to occur, the same expectations could be realized with virtually no increase in the annual total fertility rate during the next decade (Table 2, series II-L) (*10*).

In brief, the time within which young wives could fulfill their lifetime fertility expectations is at present too variable to permit the conclusion that a sizable increase in annual fertility is likely to occur in the next few years. Therefore, any prediction of an upturn in annual fertility now must depend primarily on the most recent trends in fertility and in the factors underlying them.

Upturn in California Fertility

As an indicator of when an increase in national fertility might occur, Sklar and Berkov relied heavily on the 1973 to 1974 upturn in California, where the general fertility rate increased by 2.3 percent following annual declines of 11.2 percent, 9.2 percent, and 5.0 percent in the three preceding years (*1*, p. 695). Their analysis did not include any data on actual fertility since 1973 in states other than California or in the nation as a whole. Thus it is important to determine the usefulness of California's fertility trends in forecasting national fertility trends.

In the present context, there are two conditions under which annual fertility trends in a state could provide a useful indicator of annual fertility trends at the national level: (i) past trends in annual fertility in the state and in the nation have been extremely similar, and data for the state for a particular year become available before data for the nation for the same year; (ii) data for the state and the nation become available about the same time, but past trends in annual fertility in the state have been subsequently repeated at the national level with a time lag of one or more years (*11*).

The first condition is not satisfied. While fertility data for 1974 by legitimacy status, race, age, and birth order were available to Sklar and Berkov for California well before they were available for the nation (*12*), data on the general fertility rate were available at about the same time for the nation as for California. These data showed a continued drop in the national general fertility rate from 69.2 in 1973 to 68.4 in 1974 (*13*).

The second condition also is not satisfied. Table 3 shows the annual percent change in general fertility rates in California and the remainder of the United States from 1960 to 1973. (Annual data are not available for earlier years.) The strongest relation between the two sets of figures occurs when no time lag is introduced (r^2 = .82). The second strongest relation occurs when the figures for California lead those for the remainder of the United States by 1 year (r^2 = .42). These computations are based on small samples, so it is possible that the model with no time lag would not always be superior; however, for present purposes the crucial point is that the evidence offers no support for selection of a model with a time lag (*14*).

It may be noted that the annual trends in general fertility rates diverged most from 1970 to 1971, when the decline in California was 4.7 percentage points more than in the remainder of the United States (Table 3). This differential was due in part to the earlier availability of legal abortion in California than in the nation as a whole (*15*). In the following 3 years, from 1971 to 1974, the differential was reversed, presumably in part because of the increased availability of legal abortion throughout the United States. For the 1970 to 1974 period as a whole, the declines in the general fertility rate in California (21.6 percent) and in the remainder of the United States (22.3 percent) were nearly identical (*1*, p. 695; *13*, *16*).

Table 2. Census Bureau projections of total fertility rates (per 1000 women) in the United States, 1975 to 1980 and 1985. For both series II and series II-L it is assumed that the completed cohort fertility rate will drop to between 2000 and 2100 for women born in the early 1950's (as suggested by recent survey data on family-size expectations) and then will move toward an ultimate level of 2100. The ultimate mean age of childbearing is assumed to be 26.0 in series II, 28.0 in series II-L. [Data from (*8*, pp. 126, 137)]

Year	Series II		Series II-L	
	Total fertility rate	Mean age of childbearing	Total fertility rate	Mean age of childbearing
1975	1823	25.7	1814	25.9
1976	1847	25.7	1814	26.0
1977	1887	25.7	1816	26.1
1978	1929	25.8	1819	26.2
1979	1972	25.8	1821	26.4
1980	2010	25.8	1824	26.5
1985	2081	26.0	1837	27.1

Table 3. Annual change in general fertility rates in California and in the remainder of the United States, 1960 to 1973. [Data from (*1*, p. 695; *16*)]

Year	Change from preceding year (%)	
	California	Remainder of the United States*
1961	−1.0	−0.6
1962	−4.4	−4.3
1963	−3.5	−3.3
1964	−4.7	−3.0
1965	−7.9	−8.1
1966	−6.9	−5.4
1967	−2.8	−4.1
1968	−1.4	−2.3
1969	+1.5	+0.9
1970	+0.8	+1.7
1971	−11.2	−6.5
1972	−9.2	−10.4
1973	−5.0	−5.8

*Data are shown for the remainder of the United States rather than for the entire United States so that the independent variable will not be represented in the dependent variable in calculations of the coefficient of determination (r^2). Since the remainder of the United States includes about 90 percent of the female population 15 to 44 years old in the United States, trends in general fertility rates for the two areas are nearly identical.

Economic Conditions and Fertility

Sklar and Berkov's analysis of conditions pertinent to future fertility trends

Table 4. Unemployment rates, 1969 to 1976, and median family income 1969 to 1975, in the United States. [Data from *(23)*]

Year	Percent of labor force unemployed				Median family income, in thousands of 1975 dollars						
	Total, both sexes	Males, by age			All families	Age of family head					
		20–24	25–29	30–34		Under 25	25–34	35–44	45–54	55–64	65 and over
1969	3.5	5.1	2.2	1.5	13.8	9.8	13.9	16.1	17.0	14.2	7.1
1970	4.9	8.4	4.0	2.8	13.7	9.8	13.7	15.8	16.8	14.4	7.0
1971	5.9	10.3	5.0	3.6	13.7	9.2	13.6	15.8	17.1	14.6	7.2
1972	5.6	9.2	4.4	2.9	14.3	9.6	14.4	16.9	18.1	15.0	7.7
1973	4.9	7.3	4.0	2.4	14.6	9.7	14.8	17.3	18.4	15.5	7.8
1974	5.6	8.7	4.6	3.2	14.1	9.4	14.1	16.7	18.1	14.9	8.2
1975	8.5	14.3	8.0	5.8	13.7	8.8	13.7	15.9	17.6	14.9	8.1
1976	7.7	12.0	7.1	5.0							

was based primarily on social and demographic factors and the status of legal abortion. In contrast, their discussion of economic factors was very brief. With regard to California, they noted that the increase in fertility in 1974 occurred despite unfavorable economic conditions (*1*, pp. 693, 695). With regard to the nation as a whole, they noted that an upturn in fertility could be tempered by adverse economic conditions but concluded that such conditions probably would not have a significant effect on future fertility trends (*1*, p. 697).

It is not known to what extent economic factors or any of the other factors frequently mentioned in conjunction with fertility trends have contributed to the decline in annual fertility in the United States since 1970 (*6*), but given the economic trends of the past several years, and in view of recent research on the influence of economic factors on fertility (*17*), the subject merits some attention. The purpose here is not to suggest that trends in fertility are determined primarily by economic trends or that the effects of changing economic conditions on fertility are symmetrical (that is, that equal increases and decreases in economic levels would cause equal increases and decreases in fertility). The more modest purpose of this brief investigation is to suggest that a substantial increase in fertility in the face of adverse economic conditions is unlikely.

Table 4 presents data for 1969 to 1976 on two indicators of economic conditions. The unemployment rate rose sharply from 3.5 percent in 1969 to 5.9 percent in 1971, after having declined from 6.7 percent in 1961 (*18*). Median family income (in 1975 dollars) remained virtually unchanged at about $13,700 between 1969 and 1971, after having increased quite steadily from about $9500 in 1958 (*19*). Between 1969 and 1971, trends in unemployment for young adult males and in income for young families (which account for the majority of childbearing) appear to have been especially unfavorable.

The total fertility rate declined sharply from 1970 to 1973 (Table 1) after having leveled off between 1968 and 1970 (*2*). With a time lag to allow for the possible effects of economic conditions to be manifested in reproductive behavior (either in a postponement of childbearing or in a reduction in lifetime fertility), the onset of unfavorable economic conditions and the onset of the sharp decline in fertility appear to have been correlated (*20*).

Economic conditions improved from 1971 to 1973 as the unemployment rate dropped to 4.9 percent and median family income increased to about $14,600. The total fertility rate, which had fallen 11 percent from 1971 to 1972 and 6 percent from 1972 to 1973, declined by only 2 percent from 1973 to 1974.

Economic conditions worsened again from 1973 to 1975. The unemployment rate rose to a post-World War II peak of 8.5 percent (*18*, p. 218), and median family income dropped to about $13,700. As from 1969 to 1971, economic trends from 1973 to 1975 appear to have been particularly unfavorable for families in the prime childbearing ages. The total fertility rate had appeared to be leveling off through 1974; however, it declined by 3 percent from 1974 to 1975, and it is estimated to have declined by another 2 percent from 1975 to 1976 (Table 1).

From 1975 to 1976 the unemployment rate dropped to 7.7 percent. Data on median family income for 1976 are not yet available; however, a reasonable estimate (in 1975 dollars) is $13,900 (*21*). Although economic conditions thus improved slightly from 1975 to 1976, the unemployment rate was still extremely high, and median family income was below the 1973 figure.

It is unlikely that any further decline in annual fertility would be as pronounced as the sharp decline from 1971 to 1973, because the current level of fertility is lower and because a substantial decrease would have to occur in the face of some accumulated postponement of childbearing. However, in view of recent trends in economic conditions and fertility, it also seems unlikely that there will be a substantial rise in annual fertility until the effects of recent adverse economic conditions have been offset by a more prosperous economic milieu (*22*). When this might occur is extremely difficult to foresee, because economic forecasts are about as precarious as demographic forecasts.

Summary

In summary, (i) neither an immediate nor a dramatic increase in fertility will be required during the next few years for young married women to realize their family-size expectations; (ii) annual fertility trends in California do not provide a useful indicator of annual fertility trends at the national level; (iii) recent economic trends appear to merit considerable attention in an assessment of future fertility prospects. An examination of recent economic conditions suggests that a substantial increase in annual fertility is unlikely to occur immediately. It would be more likely to occur when the current unfavorable economic conditions have been eliminated.

References and Notes

1. J. Sklar and B. Berkov, *Science* **189**, 699 (1975).
2. National Center for Health Statistics, *Monthly Vital Statistics Report*, vol. 25, No. 6, suppl. (December 1976).
3. *Ibid.*, No. 12 (March 1977).
4. Sklar and Berkov included data from a report released 28 February 1975 (*9*); hence it is assumed that their analysis could have included data published through February 1975.
5. Bureau of the Census, *Current Population Reports, Series P-20*, No. 288 (January 1976), pp. 10–15.
6. C. Gibson, *Fam. Plann. Perspect.* **8**, 249 (1976).
7. The expectations data are subject to error because sterility or subfecundity (which may not be known to a young couple) can produce "deficit" fertility and because nonuse or failure of contraception can produce "excess" fertility. At the aggregate level the error is less than at the individual level because instances of deficit and

excess fertility are counteracting. The family-size expectations of young wives are subject to change upward or downward as they and their husbands pass through the childbearing ages and experience changes in factors influencing their thinking about family size.

8. Bureau of the Census, *Current Population Reports, Series P-25*, No. 601 (October 1975).
9. _____, *Current Population Reports, Series P-20*, No. 277 (February 1975), pp. 14–15, 17. The distribution of married women under 30 by total number of children expected is as follows: none—4.8 percent; one—10.8 percent; two—53.8 percent; three—20.8 percent; four—6.7 percent; five or six—2.6 percent; seven or more—0.4 percent.
10. Regarding the relation between lifetime and annual trends in fertility, two points merit notice. First, a substantial increase in annual fertility could be a short-term fluctuation (as was the sharp drop during the early 1970's) that would not necessarily imply an increase in lifetime fertility. Second, if a certain level of lifetime fertility is assumed for the long term and movement toward later timing of fertility is assumed for women now in the childbearing ages, a subsequent increase in annual fertility would occur only if there were a return to an earlier timing pattern by women in later cohorts.
11. In one instance Sklar and Berkov noted the similarity between fertility trends in California and in the nation generally (*1*, p. 693). In another instance their discussion of recent fertility trends in states with high abortion rates and states with low abortion rates suggested that the trends have been similar but with a short time lag in the low abortion states (*1*, p. 697).
12. National Center for Health Statistics, *Monthly Vital Statistics Report*, vol. 24, No. 11, suppl. 2 (February 1976).
13. *Ibid.*, vol. 23, No. 12 (February 1975), p. 1.
14. For the model with no time lag, $N = 13$ and $r = .904$. For the model with a 1-year lag, $N = 12$ and $r = .647$. Values of r^2 are given in the text to show the proportion of variance accounted for in each case.
15. The effects of legal abortion on fertility cannot be determined precisely because the number of pregnancies that would have been aborted illegally in the absence of legal abortion is not known. Center for Disease Control, *Abortion Surveillance*, annual reports, 1970 to 1974; J. Sklar and B. Berkov, *Science* **185**, 909 (1974); C. Tietze, *Fam. Plann. Perspect.* **7**, 123 (1975).
16. California Department of Public Health, *Vital Statistics of California, 1970* (1973), pp. 8, 14; _____, unpublished data; National Center for Health Statistics, *Vital Statistics of the United States, 1969*, vol. 1, *Natality* (1974), section 1, p. 6; _____, *Monthly Vital Statistics Report*, vol. 23, No. 11, suppl. (January 1975), p. 6.
17. See especially R. Easterlin, in *Family Economic Behavior*, E. B. Sheldon, Ed. (Lippincott, Philadelphia, 1973), pp. 170–223.
18. Council of Economic Advisers, *Economic Report of the President* (Government Printing Office, Washington, D.C., 1977), p. 218.
19. Bureau of the Census, *Current Population Reports, Series P-60*, No. 101 (January 1976), p. 21, and No. 103 (September 1976), p. 16.
20. Although legal abortion was increasingly available after 1970, it did not account for most of the subsequent sizable decline in fertility (*12*, p. 6; *15*).
21. Trends in average personal income per household and in median family income have been similar in recent years. In constant dollars, each declined 2.5 percent from 1973 to 1974 and 3.6 percent from 1974 to 1975. The estimate of $13,900 reflects the 1.6 percent increase in personal income per household from 1975 to 1976. Sources of data: Table 4; Bureau of the Census, *Current Population Reports, Series P-20*, No. 296 (September 1976), p. 6; (*18*, pp. 212, 241); Bureau of Economic Analysis, *Survey of Current Business*, vol. 57, No. 1 (January 1977), p. S-8.
22. The focus here has been on the recent economic experience of young families; however, the "relative economic status" of young families as conceptualized by Easterlin (*17*)—that is, their economic experience relative to that of their families of orientation—has also been unfavorable in recent years. Easterlin defined relative economic status with a ratio of moving averages of family income and linked the result to fertility about 3 years later (*17*, pp. 181–187). The following figures update table 12, columns 5 and 6, in Easterlin's paper. Sources of data: (*18*, p. 241); Bureau of the Census, *Technical Paper No. 17* (1967); _____, *Current Population Reports, Series P-60*, Nos. 47, 51, 53, 59, 66, 75, 80, 85, 90, 97, 101, 103 (1965–1976).

Relative economic status	Fertility year
66.5	1970
67.2	1971
66.5	1972
64.4	1973
62.1	1974
60.2	1975
58.2	1976
56.0	1977
53.7	1978

23. Bureau of Labor Statistics, *Employment and Earnings*, vols. 16 to 22, No. 7, and vol. 24, No. 1 (January 1970–1977); Bureau of the Census, *Current Population Reports, Series P-60*, Nos. 75, 80, 85, 90, 97, 101, 103 (1970 to 1976).
24. I thank Mary Lynn Allen and Pauline B. Shell for assistance in the preparation of this article, and colleagues at the Census Bureau and elsewhere for their comments on earlier drafts.

NEWS AND COMMENT

Antarctic Problems: Tiny Krill to Usher in New Resource Era

The 12 nations* that are signatories to the 1961 Antarctic Treaty, which dedicates their activities on that continent to scientific, peaceful ones, are moving toward a new treaty to manage Antarctica's living resources. These consist primarily of a species of 3-inch long crustacean found teeming in offshore waters, which also happens to be one of mankind's newest and richest sources of food.

The effort to achieve such a treaty, which has been urged by environmental groups for some time, has broad international significance. Other nations of the world have been eyeing Antarctica's resources—its presumed minerals such as iron and gold and its possible wealth of offshore oil and gas. But the resource most likely to be exploited soon is the krill (*Euphausia superba*). Krill abound in such huge swarms in surface waters that recently a West German ship, using a new technique likely to find wide application, is reported to have scooped up 8 to 12 tons in a single hour!

The sudden move by the Treaty nations signals a growing realization by the 12 governments, and by the scientist-diplomats who specialize in the arcane field of Antarctic policy, that, as one says: "People are realizing that Antarctica is a huge bank of resources that may have to be tapped, that it is something more than an oddity in the earth's crust."

J. H. Zumberge, chairman of the National Academy of Sciences' Polar Research Board, goes on to say, "The idea that Antarctica can be held forever as a scientific laboratory is losing ground." The group of 12 who have had Antarctica more or less to themselves for nearly 20 years, will recognize this new interest formally, soon, when they admit their 13th member, Poland, a nation frankly interested in krill fishing as well as in Antarctic research.

The Antarctic Treaty does not discuss resource exploitation, and thus does not expressly prohibit its signers—or anyone else—from exploiting the region's wealth. At present, any nation, exercising its high-seas freedoms, can fish for Antarctic krill. Likewise any nation could prospect for minerals or drill for offshore oil—although both would be highly impractical at this time. However, the Treaty does obligate its signers to conserve the continent's resources and protect its environment, and because of this obligation, the Treaty nations seek a new agreement on krill.

Therefore, at the recent meeting in London from 14 to 18 March, the Treaty powers moved to address the problem of managing the krill. The thinking among diplomats there, according to U.S. and Western sources, was that an agreement to manage the krill would be relatively easy to achieve. It could set a useful precedent for addressing the more difficult problem of oil, gas, and mineral exploitation. Such a treaty, some diplomats admit, could stave off the periodic rumblings at the turbulent, 120-nation law of the sea conference about including Antarctica's riches within its purview.

So it has fallen to the humble krill, which has gone almost unnoticed in the

*The 12 countries are Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, Union of South Africa, Soviet Union, United States, and United Kingdom. Seven other nations have acceded to the treaty but have no say in deliberations. These are Brazil, Czechoslovakia, Denmark, East Germany, Netherlands, Poland, and Romania.