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DESIGNING INSTITUTIONS

1-1 From *The Logic of Collective Action*

Mancur Olson Jr.

*With the publication of *The Logic of Collective Action* in 1965, Mancur Olson Jr. introduced the fundamental dilemma of collective action to all who study politics. When members of a group agree to work together to achieve a collective goal, each member as an individual faces powerful disincentives, Olson showed, that can frustrate the efforts of the group as a whole. For example, when each can foresee that his or her relatively small contribution to a collective enterprise will not affect its overall success, many will fail to contribute—a phenomenon known as free riding—and leave to everyone else the burden of supplying the collective good. As a consequence, collective enterprises based on cooperation, and supported by the entire collectivity, nevertheless often fail.*

It is often taken for granted, at least where economic objectives are involved, that groups of individuals with common interests usually attempt to further those common interests. Groups of individuals with common interests are expected to act on behalf of their common interests much as single individuals are often expected to act on behalf of their personal interests. This opinion about group behavior is frequently found not only in popular discussions but also in scholarly writings. Many economists of diverse methodological and ideological traditions have implicitly or explicitly accepted it. This view has, for example, been important in many theories of labor unions, in Marxian theories of class action, in concepts of “countervailing power,” and in various discussions of economic institutions. It has, in addition, occupied a prominent place in political

science, at least in the United States, where the study of pressure groups has been dominated by a celebrated “group theory” based on the idea that groups will act when necessary to further their common or group goals. Finally, it has played a significant role in many well-known sociological studies.

The view that groups act to serve their interests presumably is based upon the assumption that the individuals in groups act out of self-interest. If the individuals in a group altruistically disregarded their personal welfare, it would not be very likely that collectively they would seek some selfish common or group objective. Such altruism is, however, considered exceptional, and self-interested behavior is usually thought to be the rule, at least when economic issues are at stake; no one is surprised when individual businessmen seek higher profits, when individual

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workers seek higher wages, or when individual consumers seek lower prices. The idea that groups tend to act in support of their group interests is supposed to follow logically from this widely accepted premise of rational, self-interested behavior. In other words, if the members of some group have a common interest or objective, and if they would all be better off if that objective were achieved, it has been thought to follow logically that the individuals in that group would, if they were rational and self-interested, act to achieve that objective.

But it is *not* in fact true that the idea that groups will act in their self-interest follows logically from the premise of rational and self-interested behavior. It does *not* follow . . . that they would act to achieve that objective, even if they were all rational and self-interested. Indeed, unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, *rational, self-interested individuals will not act to achieve their common or group interests*. In other words, even if all of the individuals in a large group are rational and self-interested, and would gain if, as a group, they acted to achieve their common interest or objective, they will still not voluntarily act to achieve that common or group interest. The notion that groups of individuals will act to achieve their common or group interests, far from being a logical implication of the assumption that the individuals in a group will rationally further their individual interests, is in fact inconsistent with that assumption. . . .

A THEORY OF GROUPS AND ORGANIZATIONS

The Purpose of Organization

Since most (though by no means all) of the action taken by or on behalf of groups of individuals is taken through organizations, it will be helpful to consider organizations in a general or theoretical way.¹ The logical place to begin any systematic study of organizations is with their purpose. But there are all types and shapes and sizes of organizations, even of economic organizations, and there is then some

question whether there is any single purpose that would be characteristic of organizations generally. One purpose that is nonetheless characteristic of most organizations, and surely of practically all organizations with an important economic aspect, is the furtherance of the interests of their members. That would seem obvious, at least from the economist's perspective. To be sure, some organizations may out of ignorance fail to further their members' interests, and others may be enticed into serving only the ends of the leadership.² But organizations often perish if they do nothing to further the interests of their members, and this factor must severely limit the number of organizations that fail to serve their members.

The idea that organizations or associations exist to further the interests of their members is hardly novel, nor peculiar to economics; it goes back at least to Aristotle, who wrote, "Men journey together with a view to particular advantage, and by way of providing some particular thing needed for the purposes of life, and similarly the political association seems to have come together originally, and to continue in existence, for the sake of the *general* advantages it brings."³ More recently Professor Leon Festinger, a social psychologist, pointed out that "the attraction of group membership is not so much in sheer belonging, but rather in attaining something by means of this membership."⁴ The late Harold Laski, a political scientist, took it for granted that "associations exist to fulfill purposes which a group of men have in common."⁵

The kinds of organizations that are the focus of this study are *expected* to further the interests of their members.⁶ Labor unions are expected to strive for higher wages and better working conditions for their members; farm organizations are expected to strive for favorable legislation for their members; cartels are expected to strive for higher prices for participating firms; the corporation is expected to further the interests of its stockholders;⁷ and the state is expected to further the common interests of its citizens (though in this nationalistic age the state often has interests and ambitions apart from those of its citizens).

Notice that the interests that all of these diverse types of organizations are expected to further are for the most part *common* interests: the union members'

common interest in higher wages, the farmers' common interest in favorable legislation, the cartel members' common interest in higher prices, the stockholders' common interest in higher dividends and stock prices, the citizens' common interest in good government. It is not an accident that the diverse types of organizations listed are all supposed to work primarily for the *common* interests of their members. Purely personal or individual interests can be advanced, and usually advanced most efficiently, by individual, unorganized action. There is obviously no purpose in having an organization when individual, unorganized action can serve the interests of the individual as well as or better than an organization; there would, for example, be no point in forming an organization simply to play solitaire. But when a number of individuals have a common or collective interest—when they share a single purpose or objective—individual, unorganized action (as we shall soon see) will either not be able to advance that common interest at all, or will not be able to advance that interest adequately. Organizations can therefore perform a function when there are common or group interests, and though organizations often also serve purely personal, individual interests, their characteristic and primary function is to advance the common interests of groups of individuals.

The assumption that organizations typically exist to further the common interests of groups of people is implicit in most of the literature about organizations, and two of the writers already cited make this assumption explicit: Harold Laski emphasized that organizations exist to achieve purposes or interests which “a group of men have in common,” and Aristotle apparently had a similar notion in mind when he argued that political associations are created and maintained because of the “general advantages” they bring. . . . As Arthur Bentley, the founder of the “group theory” of modern political science, put it, “there is no group without its interest.”⁸ The social psychologist Raymond Cattell was equally explicit, and stated that “every group has its interest.”⁹ This is also the way the word “group” will be used here.

Just as those who belong to an organization or a group can be presumed to have a common interest,¹⁰ so they obviously also have purely individual interests,

different from those of the others in the organization or group. All of the members of a labor union, for example, have a common interest in higher wages, but at the same time each worker has a unique interest in his personal income, which depends not only on the rate of wages but also on the length of time that he works.

Public Goods and Large Groups

The combination of individual interests and common interests in an organization suggests an analogy with a competitive market. The firms in a perfectly competitive industry, for example, have a common interest in a higher price for the industry's product. Since a uniform price must prevail in such a market, a firm cannot expect a higher price for itself unless all of the other firms in the industry also have this higher price. But a firm in a competitive market also has an interest in selling as much as it can, until the cost of producing another unit exceeds the price of that unit. In this there is no common interest; each firm's interest is directly opposed to that of every other firm, for the more other firms sell, the lower the price and income for any given firm. In short, while all firms have a common interest in a higher price, they have antagonistic interests where output is concerned. . . .

For these reasons it is now generally understood that if the firms in an industry are maximizing profits, the profits for the industry as a whole will be less than they might otherwise be.¹¹ And almost everyone would agree that this theoretical conclusion fits the facts for markets characterized by pure competition. The important point is that this is true because, though all the firms have a common interest in a higher price for the industry's product, it is in the interest of each firm that the other firms pay the cost—in terms of the necessary reduction in output—needed to obtain a higher price.

About the only thing that keeps prices from falling in accordance with the process just described in perfectly competitive markets is outside intervention. Government price supports, tariffs, cartel agreements, and the like may keep the firms in a competitive market from acting contrary to their interests. Such aid or intervention is quite common.

It is then important to ask how it comes about. How does a competitive industry obtain government assistance in maintaining the price of its product?

Consider a hypothetical, competitive industry, and suppose that most of the producers in that industry desire a tariff, a price-support program, or some other government intervention to increase the price for their product. To obtain any such assistance from the government, the producers in this industry will presumably have to organize a lobbying organization; they will have to become an active pressure group.¹² This lobbying organization may have to conduct a considerable campaign. If significant resistance is encountered, a great amount of money will be required.¹³ Public relations experts will be needed to influence the newspapers, and some advertising may be necessary. Professional organizers will probably be needed to organize “spontaneous grass roots” meetings among the distressed producers in the industry, and to get those in the industry to write letters to their congressmen.¹⁴ The campaign for the government assistance will take the time of some of the producers in the industry, as well as their money.

There is a striking parallel between the problem the perfectly competitive industry faces as it strives to obtain government assistance, and the problem it faces in the marketplace when the firms increase output and bring about a fall in price. *Just as it was not rational for a particular producer to restrict his output in order that there might be a higher price for the product of his industry, so it would not be rational for him to sacrifice his time and money to support a lobbying organization to obtain government assistance for the industry. In neither case would it be in the interest of the individual producer to assume any of the costs himself. A lobbying organization, or indeed a labor union or any other organization, working in the interest of a large group of firms or workers in some industry, would get no assistance from the rational, self-interested individuals in that industry.* This would be true even if everyone in the industry were absolutely convinced that the proposed program was in their interest (though in fact some might think otherwise and make the organization’s task yet more difficult).

Although the lobbying organization is only one example of the logical analogy between the

organization and the market, it is of some practical importance. There are many powerful and well-financed lobbies with mass support in existence now, but these lobbying organizations do not get that support because of their legislative achievements. . . .

Some critics may argue that the rational person will, indeed, support a large organization, like a lobbying organization, that works in his interest, because he knows that if he does not, others will not do so either, and then the organization will fail, and he will be without the benefit that the organization could have provided. This argument shows the need for the analogy with the perfectly competitive market. For it would be quite as reasonable to argue that prices will never fall below the levels a monopoly would have charged in a perfectly competitive market, because if one firm increased its output, other firms would also, and the price would fall; but each firm could foresee this, so it would not start a chain of price-destroying increases in output. In fact, it does not work out this way in a competitive market; nor in a large organization. When the number of firms involved is large, no one will notice the effect on price if one firm increases its output, and so no one will change his plans because of it. Similarly, in a large organization, the loss of one dues payer will not noticeably increase the burden for any other one dues payer, and so a rational person would not believe that if he were to withdraw from an organization he would drive others to do so.

The foregoing argument must at the least have some relevance to economic organizations that are mainly means through which individuals attempt to obtain the same things they obtain through their activities in the market. Labor unions, for example, are organizations through which workers strive to get the same things they get with their individual efforts in the market—higher wages, better working conditions, and the like. It would be strange indeed if the workers did not confront some of the same problems in the union that they meet in the market, since their efforts in both places have some of the same purposes.

However similar the purposes may be, critics may object that attitudes in organizations are not at all like those in markets. In organizations, an emotional or ideological element is often also involved.

Does this make the argument offered here practically irrelevant?

A most important type of organization—the national state—will serve to test this objection. Patriotism is probably the strongest non-economic motive for organizational allegiance in modern times. This age is sometimes called the age of nationalism. Many nations draw additional strength and unity from some powerful ideology, such as democracy or communism, as well as from a common religion, language, or cultural inheritance. The state not only has many such powerful sources of support; it also is very important economically. Almost any government is economically beneficial to its citizens, in that the law and order it provides is a prerequisite of all civilized economic activity. But despite the force of patriotism, the appeal of the national ideology, the bond of a common culture, and the indispensability of the system of law and order, no major state in modern history has been able to support itself through voluntary dues or contributions. Philanthropic contributions are not even a significant source of revenue for most countries. Taxes, *compulsory* payments by definition, are needed. Indeed, as the old saying indicates, their necessity is as certain as death itself.

If the state, with all of the emotional resources at its command, cannot finance its most basic and vital activities without resort to compulsion, it would seem that large private organizations might also have difficulty in getting the individuals in the groups whose interests they attempt to advance to make the necessary contributions voluntarily.¹⁵

The reason the state cannot survive on voluntary dues or payments, but must rely on taxation, is that the most fundamental services a nation-state provides are, in one important respect, like the higher price in a competitive market: they must be available to everyone if they are available to anyone. The basic and most elementary goods or services provided by government, like defense and police protection, and the system of law and order generally, are such that they go to everyone or practically everyone in the nation. It would obviously not be feasible, if indeed it were possible, to deny the protection provided by the military services, the police, and the courts to those who did not voluntarily pay their share of the

costs of government, and taxation is accordingly necessary. The common or collective benefits provided by governments are usually called “public goods” by economists, and the concept of public goods is one of the oldest and most important ideas in the study of public finance. A common, collective, or public good is here defined as any good such that, if any person X_i in a group $X_1, \dots, X_i, \dots, X_n$ consumes it, it cannot feasibly be withheld from the others in that group.¹⁶ In other words, those who do not purchase or pay for any of the public or collective good cannot be excluded or kept from sharing in the consumption of the good, as they can where noncollective goods are concerned.

Students of public finance have, however, neglected the fact that the achievement of any common goal or the satisfaction of any common interest means that a public or collective good has been provided for that group.¹⁷ The very fact that a goal or purpose is common to a group means that no one in the group is excluded from the benefit or satisfaction brought about by its achievement. As the opening paragraphs of this chapter indicated, almost all groups and organizations have the purpose of serving the common interests of their members. As R. M. MacIver puts it, “Persons . . . have common interests in the degree to which they participate in a cause . . . which indivisibly embraces them all.”¹⁸ It is of the essence of an organization that it provides an inseparable, generalized benefit. It follows that the provision of public or collective goods is the fundamental function of organizations generally. A state is first of all an organization that provides public goods for its members, the citizens; and other types of organizations similarly provide collective goods for their members.

And just as a state cannot support itself by voluntary contributions, or by selling its basic services on the market, neither can other large organizations support themselves without providing some sanction, or some attraction distinct from the public good itself, that will lead individuals to help bear the burdens of maintaining the organization. The individual member of the typical large organization is in a position analogous to that of the firm in a perfectly competitive market, or the taxpayer in the state: his own efforts will not have a noticeable effect on the

situation of his organization, and he can enjoy any improvements brought about by others whether or not he has worked in support of his organization.

There is no suggestion here that states or other organizations provide *only* public or collective goods. Governments often provide noncollective goods like electric power, for example, and they usually sell such goods on the market much as private firms would do. Moreover . . . large

organizations that are not able to make membership compulsory *must also* provide some noncollective goods in order to give potential members an incentive to join. Still, collective goods are the characteristic organizational goods, for ordinary noncollective goods can always be provided by individual action, and only where common purposes or collective goods are concerned is organization or group action ever indispensable.¹⁹

NOTES

1. Economists have for the most part neglected to develop theories of organizations, but there are a few works from an economic point of view on the subject. See, for example, three papers by Jacob Marschak, "Elements for a Theory of Teams," *Management Science*, I (January 1955), 127–137, "Towards an Economic Theory of Organization and Information," in *Decision Processes*, ed. R. M. Thrall, C. H. Combs, and R. L. Davis (New York: John Wiley, 1954), pp. 187–220, and "Efficient and Viable Organization Forms," in *Modern Organization Theory*, ed. Mason Haire (New York: John Wiley, 1959), pp. 307–320; two papers by R. Radner, "Application of Linear Programming to Team Decision Problems," *Management Science*, V (January 1959), 143–150, and "Team Decision Problems," *Annals of Mathematical Statistics*, XXXIII (September 1962), 857–881; C. B. McGuire, "Some Team Models of a Sales Organization," *Management Science*, VII (January 1961), 101–130; Oskar Morgenstern, *Prolegomena to a Theory of Organization* (Santa Monica, Calif.: RAND Research Memorandum 734, 1951); James G. March and Herbert A. Simon, *Organizations* (New York: John Wiley, 1958); Kenneth Boulding, *The Organizational Revolution* (New York: Harper, 1953).
2. Max Weber called attention to the case where an organization continues to exist for some time after it has become meaningless because some official is making a living out of it. See his *Theory of Social and Economic Organization*, trans. Talcott Parsons and A. M. Henderson (New York: Oxford University Press, 1947), p. 318.
3. *Ethics* viii.9.1160a.
4. Leon Festinger, "Group Attraction and Membership," in *Group Dynamics*, ed. Dorwin Cartwright and Alvin Zander (Evanston, Ill.: Row, Peterson, 1953), p. 93.
5. *A Grammar of Politics*, 4th ed. (London: George Allen & Unwin, 1939), p. 67.
6. Philanthropic and religious organizations are not necessarily expected to serve only the interests of their members; such organizations have other purposes that are considered more important, however much their members "need" to belong, or are improved or helped by belonging. But the complexity of such organizations need not be debated at length here, because this study will focus on organizations with a significant economic aspect. The emphasis here will have something in common with what Max Weber called the "associative group"; he called a group associative if "the orientation of social action with it rests on a rationally motivated agreement." Weber contrasted his "associative group" with the "communal group," which was centered on personal affection, erotic relationships, etc., like the family. (See Weber, pp. 136–139, and Grace Coyle, *Social Process in Organized Groups*, New York: Richard Smith, Inc., 1930, pp. 7–9.) The logic of the theory developed here can be extended to cover communal, religious, and philanthropic organizations, but the theory is not particularly useful in studying such groups. See Olson, pp. 61n17, 159–162.
7. That is, its members. This study does not follow the terminological usage of those organization theorists who describe employees as "members" of the organization for which they work. Here it is more convenient to follow the language of everyday usage instead, and to distinguish the members of, say, a union from the employees of that union. Similarly, the members of the union will be considered employees of the corporation for which they work.

8. Arthur Bentley, *The Process of Government* (Evanston, Ill.: Principia Press, 1949), p. 211. David B. Truman takes a similar approach; see his *The Governmental Process* (New York: Alfred A. Knopf, 1958), pp. 33–35. See also Sidney Verba, *Small Groups and Political Behavior* (Princeton, N.J.: Princeton University Press, 1961), pp. 12–13.
9. Raymond Cattell, “Concepts and Methods in the Measurement of Group Syntality,” in *Small Groups*, eds. A. Paul Hare, Edgard F. Borgatta, and Robert F. Bales (New York: Alfred A. Knopf, 1955), p. 115.
10. Any organization or group will of course usually be divided into subgroups or factions that are opposed to one another. This fact does not weaken the assumption made here that organizations exist to serve the common interests of members, for the assumption does not imply that intragroup conflict is neglected. The opposing groups within an organization ordinarily have some interest in common (if not, why would they maintain the organization?), and the members of any subgroup or faction also have a separate common interest of their own. They will indeed often have a common purpose in defeating some other subgroup or faction. The approach used here does not neglect the conflict within groups and organizations, then, because it considers each organization as a unit only to the extent that it does in fact attempt to serve a common interest, and considers the various subgroups as the relevant units with common interests to analyze the factional strife.
11. For a fuller discussion of this question see Mancur Olson, Jr., and David McFarland, “The Restoration of Pure Monopoly and the Concept of the Industry,” *Quarterly Journal of Economics*, LXXVI (November 1962), 613–631.
12. Robert Michels contends in his classic study that “democracy is inconceivable without organization,” and that “the principle of organization is an absolutely essential condition for the political struggle of the masses.” See his *Political Parties*, trans. Eden and Cedar Paul (New York: Dover Publications, 1959), pp. 21–22. See also Robert A. Brady, *Business as a System of Power* (New York: Columbia University Press, 1943), p. 193.
13. Alexander Heard, *The Costs of Democracy* (Chapel Hill: University of North Carolina Press, 1960), especially note 1, pp. 95–96. For example, in 1947 the National Association of Manufacturers spent over \$4.6 million, and over a somewhat longer period the American Medical Association spent as much on a campaign against compulsory health insurance.
14. “If the full truth were ever known . . . lobbying, in all its ramifications, would prove to be a billion dollar industry.” U.S. Congress, House, Select Committee on Lobbying Activities, *Report*, 81st Cong., 2nd Sess. (1950), as quoted in the *Congressional Quarterly Almanac*, 81st Cong., 2nd Sess., VI, 764–765.
15. Sociologists as well as economists have observed that ideological motives alone are not sufficient to bring forth the continuing effort of large masses of people. Max Weber provides a notable example:

All economic activity in a market economy is undertaken and carried through by individuals for their own ideal or material interests. This is naturally just as true when economic activity is oriented to the patterns of order of corporate groups. . . .

Even if an economic system were organized on a socialistic basis, there would be no fundamental difference in this respect. . . . The structure of interests and the relevant situation might change; there would be other means of pursuing interests, but this fundamental factor would remain just as relevant as before. It is of course true that economic action which is oriented on purely ideological grounds to the interest of others does exist. But it is even more certain that the mass of men do not act this way, and it is an induction from experience that they cannot do so and never will. . . .

In a market economy the interest in the maximization of income is necessarily the driving force of all economic activity (Weber, pp. 319–320). Talcott Parsons and Neil Smelser go even further in postulating that “performance” throughout society is proportional to the “rewards” and “sanctions” involved. See their *Economy and Society* (Glencoe, Ill.: Free Press, 1954), pp. 50–69.
16. This simple definition focuses upon two points that are important in the present context. The first point is that most collective goods can only be defined with respect to some specific group. One collective good goes to one group of people, another collective good to another group; one may benefit the whole world, another only two specific people. Moreover, some goods are collective goods to those in one group and at the same time private goods to those in another, because some individuals can be kept from

consuming them and others can't. Take for example the parade that is a collective good to all those who live in tall buildings overlooking the parade route, but which appears to be a private good to those who can see it only by buying tickets for a seat in the stands along the way. The second point is that once the relevant group has been defined, the definition used here, like Musgrave's, distinguishes collective good in terms of infeasibility of excluding potential consumers of the good. This approach is used because collective goods produced by organizations of all kinds seem to be such that exclusion is normally not feasible. To be sure, for some collective goods it is physically possible to practice exclusion. But, as Head has shown, it is not necessary that exclusion be technically impossible; it is only necessary that it be infeasible or uneconomic. Head has also shown most clearly that nonexcludability is only one of two basic elements in the traditional understanding of public goods. The other, he points out, is "jointness of supply." A good has "jointness" if making it available to one individual means that it can be easily or freely supplied to others as well. The polar case of jointness would be Samuelson's pure public good, which is a good such that additional consumption of it by one individual does not diminish the amount available to others. By the definition used here, jointness is not a necessary attribute of a public good. As later parts of this chapter will show, at least one type of collective good considered here exhibits no jointness whatever, and few if any would have the degree of jointness needed to qualify as pure public goods. Nonetheless, most of the collective goods to be studied here do display a large measure of jointness. On the definition and importance of public goods, see John G. Head,

"Public Goods and Public Policy," *Public Finance*, vol. XVII, no. 3 (1962), 197–219; Richard Musgrave, *The Theory of Public Finance* (New York: McGraw-Hill, 1959); Paul A. Samuelson, "The Pure Theory of Public Expenditure," "Diagrammatic Exposition of a Theory of Public Expenditure," and "Aspects of Public Expenditure Theories," in *Review of Economics and Statistics*, XXXVI (November 1954), 387–390, XXXVII (November 1955), 350–356, and XL (November 1958), 332–338. For somewhat different opinions about the usefulness of the concept of public goods, see Julius Margolis, "A Comment on the Pure Theory of Public Expenditure," *Review of Economics and Statistics*, XXXVII (November 1955), 347–349, and Gerhard Colm, "Theory of Public Expenditures," *Annals of the American Academy of Political and Social Science*, CLXXXIII (January 1936), 1–11.

17. There is no necessity that a public good to one group in a society is necessarily in the interest of the society as a whole. Just as a tariff could be a public good to the industry that sought it, so the removal of the tariff could be a public good to those who consumed the industry's product. This is equally true when the public-good concept is applied only to governments; for a military expenditure, or a tariff, or an immigration restriction that is a public good to one country could be a "public bad" to another country, and harmful to world society as a whole.
18. R. M. MacIver in *Encyclopaedia of the Social Sciences*, VII (New York: Macmillan, 1932), 147.
19. It does not, however, follow that organized or coordinated group action is *always* necessary to obtain a collective goal.

1-2 The Tragedy of the Commons

Garrett Hardin

In this seminal article, Garrett Hardin identifies another class of collective action problems, the “tragedy of the commons.” The concept—a “tragedy” because of the inevitability with which public goods, or the “commons,” will be exploited—is generally applied to study cases in which natural resources are being misused. Unlike the problems we have already encountered, which concern the production of public goods, the tragedy of the commons affects their conservation. Because public goods are freely available, members of the community will be tempted to overly consume them—to overfish, to overuse national parks, to pollute public water or air—even as they realize their behavior and that of their neighbors is destroying the goods. Hardin discusses social arrangements that can substitute for the commons, or public ownership of scarce resources, and argues that the tragedy of the commons is becoming a more pressing concern as the population increases. As with the problem of free riding described by Mancur Olson Jr., government authority offers one solution extricating participants from their bind.

At the end of a thoughtful article on the future of a nuclear war, Wiesner and York concluded that: “Both sides in the arms race are . . . confronted by the dilemma of steadily increasing military power and steadily decreasing national security. *It is our considered professional judgment that this dilemma has no technical solution.* If the great powers continue to look for solutions in the area of science and technology only, the result will be to worsen the situation.”¹

I would like to focus your attention not on the subject of the article (national security in a nuclear world) but on the kind of conclusion they reached, namely that there is no technical solution to the problem. An implicit and almost universal assumption of discussions published in professional and semipopular scientific journals is that the problem under discussion has a technical solution. A technical solution may be defined as one that requires a change only in the techniques of the natural sciences, demanding little or nothing in the way of change in human values or ideas of morality.

In our day (though not in earlier times) technical solutions are always welcome. . . . [Yet of the] class of human problems which can be called “no

technical solution problems” . . . [i]t is easy to show that [it] is not a null class. Recall the game of tick-tack-toe. Consider the problem, “How can I win the game of tick-tack-toe?” It is well known that I cannot, if I assume (in keeping with the conventions of game theory) that my opponent understands the game perfectly. Put another way, there is no “technical solution” to the problem. I can win only by giving a radical meaning to the word “win.” I can hit my opponent over the head; or I can drug him; or I can falsify the records. Every way in which I “win” involves, in some sense, an abandonment of the game, as we intuitively understand it. (I can also, of course, openly abandon the game—refuse to play it. This is what most adults do.)

The class of “No technical solution problems” has members. My thesis is that the “population problem,” as conventionally conceived, is a member of this class. How it is conventionally conceived needs some comment. It is fair to say that most people who anguish over the population problem are trying to find a way to avoid the evils of overpopulation without relinquishing any of the privileges they now enjoy. They think that farming the seas or

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developing new strains of wheat will solve the problem—technologically. I try to show here that the solution they seek cannot be found. The population problem cannot be solved in a technical way, any more than can the problem of winning the game of tick-tack-toe.

WHAT SHALL WE MAXIMIZE?

Population, as Malthus said, naturally tends to grow “geometrically,” or, as we would now say, exponentially. In a finite world this means that the per capita share of the world’s goods must steadily decrease. Is ours a finite world?

A fair defense can be put forward for the view that the world is infinite; or that we do not know that it is not. But, in terms of the practical problems that we must face in the next few generations with the foreseeable technology, it is clear that we will greatly increase human misery if we do not, during the immediate future, assume that the world available to the terrestrial human population is finite. “Space” is no escape.²

A finite world can support only a finite population; therefore, population growth must eventually equal zero. . . . When this condition is met, what will be the situation of mankind? Specifically, can [Jeremy] Bentham’s goal of “the greatest good for the greatest number” be realized? . . .

The . . . reason [why not] springs directly from biological facts. To live, any organism must have a source of energy (for example, food). This energy is utilized for two purposes: mere maintenance and work. For man, maintenance of life requires about 1600 kilocalories a day (“maintenance calories”). Anything that he does over and above merely staying alive will be defined as work, and is supported by “work calories” which he takes in. Work calories are used not only for what we call work in common speech; they are also required for all forms of enjoyment, from swimming and automobile racing to playing music and writing poetry. If our goal is to maximize population it is obvious what we must do: We must make the work calories per person approach as close to zero as possible. No gourmet meals, no vacations, no sports, no music, no literature, no art. . . . I think that

everyone will grant, without argument or proof, that maximizing population does not maximize goods. Bentham’s goal is impossible. . . .

The optimum population is, then, less than the maximum. The difficulty of defining the optimum is enormous; so far as I know, no one has seriously tackled this problem. Reaching an acceptable and stable solution will surely require more than one generation of hard analytical work—and much persuasion. . . .

We can make little progress in working toward optimum population size until we explicitly exorcize the spirit of Adam Smith in the field of practical demography. In economic affairs, *The Wealth of Nations* (1776) popularized the “invisible hand,” the idea that an individual who “intends only his own gain,” is, as it were, “led by an invisible hand to promote . . . the public interest.”³ Adam Smith did not assert that this was invariably true, and perhaps neither did any of his followers. But he contributed to a dominant tendency of thought that has ever since interfered with positive action based on rational analysis, namely, the tendency to assume that decisions reached individually will, in fact, be the best decisions for an entire society. If this assumption is correct it justifies the continuance of our present policy of laissez-faire in reproduction. If it is correct we can assume that men will control their individual fecundity so as to produce the optimum population. If the assumption is not correct, we need to reexamine our individual freedoms to see which ones are defensible.

TRAGEDY OF FREEDOM IN A COMMONS

The rebuttal to the invisible hand in population control is to be found in a scenario first sketched in a little-known pamphlet in 1833 by a mathematical amateur named William Forster Lloyd (1794–1852).⁴ We may well call it “the tragedy of the commons,” using the word “tragedy” as the philosopher Whitehead used it: “The essence of dramatic tragedy is not unhappiness. It resides in the solemnity of the remorseless working of things.”⁵ He then goes on to say, “This inevitableness of destiny can only be illustrated in terms of human life by

incidents which in fact involve unhappiness. For it is only by them that the futility of escape can be made evident in the drama.”

The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, “What is the utility *to me* of adding one more animal to my herd?” This utility has one negative and one positive component.

1. The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.
2. The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of -1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Some would say that this is a platitude. Would that it were! In a sense, it was learned thousands of years ago, but natural selection favors the forces of psychological denial.⁶ The individual benefits as an individual from his ability to deny the truth even though society as a whole, of which he is a part, suffers. Education can counteract the natural tendency to do the wrong thing, but the inexorable succession of generations requires that the basis for this knowledge be constantly refreshed.

A simple incident that occurred a few years ago in Leominster, Massachusetts, shows how perishable the knowledge is. During the Christmas shopping season the parking meters downtown were covered with plastic bags that bore tags reading: “Do not open until after Christmas. Free parking courtesy of the mayor and city council.” In other words, facing the prospect of an increased demand for already scarce space, the city fathers reinstated the system of the commons. (Cynically, we suspect that they gained more votes than they lost by this retrogressive act.)

In an approximate way, the logic of the commons has been understood for a long time, perhaps since the discovery of agriculture or the invention of private property in real estate. But it is understood mostly only in special cases which are not sufficiently generalized. Even at this late date, cattlemen leasing national land on the western ranges demonstrate no more than an ambivalent understanding, in constantly pressuring federal authorities to increase the head count to the point where overgrazing produces erosion and weed-dominance. Likewise, the oceans of the world continue to suffer from the survival of the philosophy of the commons. Maritime nations still respond automatically to the shibboleth of the “freedom of the seas.” Professing to believe in the “inexhaustible resources of the oceans,” they bring species after species of fish and whales closer to extinction.⁷

The National Parks present another instance of the working out of the tragedy of the commons. At present, they are open to all, without limit. The parks themselves are limited in extent—there is only one Yosemite Valley—whereas population seems to grow without limit. The values that visitors seek in the parks are steadily eroded. Plainly, we must soon

cease to treat the parks as commons or they will be of no value to anyone.

What shall we do? We have several options. We might sell them off as private property. We might keep them as public property, but allocate the right to enter them. The allocation might be on the basis of wealth, by the use of an auction system. It might be on the basis of merit, as defined by some agreed-upon standards. It might be by lottery. Or it might be on a first-come, first-served basis, administered to long queues. These, I think, are all the reasonable possibilities. They are all objectionable. But we must choose—or acquiesce in the destruction of the commons that we call our National Parks.

POLLUTION

In a reverse way, the tragedy of the commons reappears in problems of pollution. Here it is not a question of taking something out of the commons, but of putting something in—sewage, or chemical, radioactive, and heat wastes into water; noxious and dangerous fumes into the air; and distracting and unpleasant advertising signs into the line of sight. The calculations of utility are much the same as before. The rational man finds that his share of the cost of the wastes he discharges into the commons is less than the cost of purifying his wastes before releasing them. Since this is true for everyone, we are locked into a system of “fouling our own nest,” so long as we behave only as independent, rational, free-enterprisers.

The tragedy of the commons as a food basket is averted by private property, or something formally like it. But the air and waters surrounding us cannot readily be fenced, and so the tragedy of the commons as a cesspool must be prevented by different means, by coercive laws or taxing devices that make it cheaper for the polluter to treat his pollutants than to discharge them untreated. We have not progressed as far with the solution of this problem as we have with the first. Indeed, our particular concept of private property, which deters us from exhausting the positive resources of the earth, favors pollution. The owner of a factory on the bank of a stream—whose

property extends to the middle of the stream—often has difficulty seeing why it is not his natural right to muddy the waters flowing past his door. The law, always behind the times, requires elaborate stitching and fitting to adapt it to this newly perceived aspect of the commons.

The pollution problem is a consequence of population. It did not much matter how a lonely American frontiersman disposed of his waste. “Flowing water purifies itself every 10 miles,” my grandfather used to say, and the myth was near enough to the truth when he was a boy, for there were not too many people. But as population became denser, the natural chemical and biological recycling processes became overloaded, calling for a redefinition of property rights.

HOW TO LEGISLATE TEMPERANCE?

Analysis of the pollution problem as a function of population density uncovers a not generally recognized principle of morality, namely: *the morality of an act is a function of the state of the system at the time it is performed*.⁸ Using the commons as a cesspool does not harm the general public under frontier conditions, because there is no public; the same behavior in a metropolis is unbearable. A hundred and fifty years ago a plainsman could kill an American bison, cut out only the tongue for his dinner, and discard the rest of the animal. He was not in any important sense being wasteful. Today, with only a few thousand bison left, we would be appalled at such behavior.

In passing, it is worth noting that the morality of an act cannot be determined from a photograph. One does not know whether a man killing an elephant or setting fire to the grassland is harming others until one knows the total system in which his act appears. “One picture is worth a thousand words,” said an ancient Chinese; but it may take 10,000 words to validate it. It is as tempting to ecologists as it is to reformers in general to try to persuade others by way of the photographic shortcut. But the essence of an argument cannot be photographed: it must be presented rationally—in words.

That morality is system-sensitive escaped the attention of most codifiers of ethics in the past. “Thou shalt not . . .” is the form of traditional ethical directives which make no allowance for particular circumstances. The laws of our society follow the pattern of ancient ethics, and therefore are poorly suited to governing a complex, crowded, changeable world. Our epicyclic solution is to augment statutory law with administrative law. Since it is practically impossible to spell out all the conditions under which it is safe to burn trash in the back yard or to run an automobile without smog-control, by law we delegate the details to bureaus. The result is administrative law, which is rightly feared for an ancient reason—*Quis custodiet ipsos custodes?*—“Who shall watch the watchers themselves?” John Adams said that we must have “a government of laws and not men.” Bureau administrators, trying to evaluate the morality of acts in the total system, are singularly liable to corruption, producing a government by men, not laws.

Prohibition is easy to legislate (though not necessarily to enforce); but how do we legislate temperance? Experience indicates that it can be accomplished best through the mediation of administrative law. We limit possibilities unnecessarily if we suppose that the sentiment of *Quis custodiet* denies us the use of administrative law. We should rather retain the phrase as a perpetual reminder of fearful dangers we cannot avoid. The great challenge facing us now is to invent the corrective feedbacks that are needed to keep custodians honest. We must find ways to legitimate the needed authority of both the custodians and the corrective feedbacks.

FREEDOM TO BREED IS INTOLERABLE

The tragedy of the commons is involved in population problems in another way. In a world governed solely by the principle of “dog eat dog”—if indeed there ever was such a world—how many children a family had would not be a matter of public concern. Parents who bred too exuberantly would leave

fewer descendants, not more, because they would be unable to care adequately for their children. David Lack and others have found that such a negative feedback demonstrably controls the fecundity of birds.⁹ But men are not birds, and have not acted like them for millenniums, at least.

If each human family were dependent only on its own resources; *if* the children of improvident parents starved to death; *if*, thus, overbreeding brought its own “punishment” to the germ line—*then* there would be no public interest in controlling the breeding of families. But our society is deeply committed to the welfare state,¹⁰ and hence is confronted with another aspect of the tragedy of the commons.

In a welfare state, how shall we deal with the family, the religion, the race, or the class (or indeed any distinguishable and cohesive group) that adopts overbreeding as a policy to secure its own aggrandizement?¹¹ To couple the concept of freedom to breed with the belief that everyone born has an equal right to the commons is to lock the world into a tragic course of action.

Unfortunately this is just the course of action that is being pursued by the United Nations. In late 1967, some 30 nations agreed to the following: “The Universal Declaration of Human Rights describes the family as the natural and fundamental unit of society. It follows that any choice and decision with regard to the size of the family must irrevocably rest with the family itself, and cannot be made by anyone else.”¹² It is painful to have to deny categorically the validity of this right; denying it, one feels as uncomfortable as a resident of Salem, Massachusetts, who denied the reality of witches in the 17th century. At the present time, in liberal quarters, something like a taboo acts to inhibit criticism of the United Nations. There is a feeling that the United Nations is “our last and best hope,” that we shouldn’t find fault with it; we shouldn’t play into the hands of the archconservatives. However, let us not forget what Robert Louis Stevenson said: “The truth that is suppressed by friends is the readiest weapon of the enemy.” If we love the truth we must openly deny the validity of the Universal Declaration of Human Rights, even though it is promoted by the United

Nations. We should also join with Kingsley Davis in attempting to get Planned Parenthood–World Population to see the error of its ways in embracing the same tragic ideal.¹³ . . .

The argument has here been stated in the context of the population problem, but it applies equally well to any instance in which society appeals to an individual exploiting a commons to restrain himself for the general good—by means of his conscience. To make such an appeal is to set up a selective system that works toward the elimination of conscience from the race.

PATHOGENIC EFFECTS OF CONSCIENCE

It is a mistake to think that we can control the breeding of mankind in the long run by an appeal to conscience. . . . If we ask a man who is exploiting a commons to desist “in the name of conscience,” what are we saying to him? What does he hear?—not only at the moment but also in the wee small hours of the night when, half asleep, he remembers not merely the words we used but also the nonverbal communication cues we gave him unawares? Sooner or later, consciously or subconsciously, he senses that he has received two communications, and that they are contradictory: (i) (intended communication) “If you don’t do as we ask, we will openly condemn you for not acting like a responsible citizen”; (ii) (the unintended communication) “If you *do* behave as we ask, we will secretly condemn you for a simpleton who can be shamed into standing aside while the rest of us exploit the commons.” . . .

To conjure up a conscience in others is tempting to anyone who wishes to extend his control beyond the legal limits. Leaders at the highest level succumb to this temptation. Has any President during the past generation failed to call on labor unions to moderate voluntarily their demands for higher wages, or to steel companies to honor voluntary guidelines on prices? I can recall none. The rhetoric used on such occasions is designed to produce feelings of guilt in noncooperators.

For centuries it was assumed without proof that guilt was a valuable, perhaps even an indispensable, ingredient of the civilized life. Now, in this post-Freudian world, we doubt it.

Paul Goodman speaks from the modern point of view when he says: “No good has ever come from feeling guilty, neither intelligence, policy, nor compassion. The guilty do not pay attention to the object but only to themselves, and not even to their own interests, which might make sense, but to their anxieties.”¹⁴

One does not have to be a professional psychiatrist to see the consequences of anxiety. We in the Western world are just emerging from a dreadful two-centuries-long Dark Ages of Eros that was sustained partly by prohibition laws, but perhaps more effectively by the anxiety-generating mechanisms of education. Alex Comfort has told the story well in *The Anxiety Makers*; it is not a pretty one.¹⁵

Since proof is difficult, we may even concede that the results of anxiety may sometimes, from certain points of view, be desirable. The larger question we should ask is whether, as a matter of policy, we should ever encourage the use of a technique the tendency (if not the intention) of which is psychologically pathogenic. We hear much talk these days of responsible parenthood; the coupled words are incorporated into the titles of some organizations devoted to birth control. Some people have proposed massive propaganda campaigns to instill responsibility into the nation’s (or the world’s) breeders. But what is the meaning of the word responsibility in this context? Is it not merely a synonym for the word conscience? When we use the word responsibility in the absence of substantial sanctions are we not trying to browbeat a free man in a commons into acting against his own interest? Responsibility is a verbal counterfeit for a substantial *quid pro quo*. It is an attempt to get something for nothing.

If the word responsibility is to be used at all, I suggest that it be in the sense Charles Frankel uses it.¹⁶ “Responsibility,” says this philosopher, “is the product of definite social arrangements.” Notice that Frankel calls for social arrangements—not propaganda.

MUTUAL COERCION, MUTUALLY AGREED UPON

The social arrangements that produce responsibility are arrangements that create coercion, of some sort. Consider bank-robbing. The man who takes money from a bank acts as if the bank were a commons. How do we prevent such action? Certainly not by trying to control his behavior solely by a verbal appeal to his sense of responsibility. Rather than rely on propaganda we follow Frankel's lead and insist that a bank is not a commons; we seek the definite social arrangements that will keep it from becoming a commons. That we thereby infringe on the freedom of would-be robbers we neither deny nor regret.

The morality of bank-robbing is particularly easy to understand because we accept complete prohibition of this activity. We are willing to say "Thou shalt not rob banks," without providing for exceptions. But temperance also can be created by coercion. Taxing is a good coercive device. To keep downtown shoppers temperate in their use of parking space we introduce parking meters for short periods, and traffic fines for longer ones. We need not actually forbid a citizen to park as long as he wants to; we need merely make it increasingly expensive for him to do so. Not prohibition, but carefully biased options are what we offer him. A Madison Avenue man might call this persuasion; I prefer the greater candor of the word coercion.

Coercion is a dirty word to most liberals now, but it need not forever be so. As with the four-letter words, its dirtiness can be cleansed away by exposure to the light, by saying it over and over without apology or embarrassment. To many, the word coercion implies arbitrary decisions of distant and irresponsible bureaucrats; but this is not a necessary part of its meaning. The only kind of coercion I recommend is mutual coercion, mutually agreed upon by the majority of the people affected.

To say that we mutually agree to coercion is not to say that we are required to enjoy it, or even to pretend we enjoy it. Who enjoys taxes? We all grumble about them. But we accept compulsory taxes because we recognize that voluntary taxes would favor the

conscienceless. We institute and (grumblingly) support taxes and other coercive devices to escape the horror of the commons.

An alternative to the commons need not be perfectly just to be preferable. With real estate and other material goods, the alternative we have chosen is the institution of private property coupled with legal inheritance. Is this system perfectly just? As a genetically trained biologist I deny that it is. It seems to me that, if there are to be differences in individual inheritance, legal possession should be perfectly correlated with biological inheritance—that those who are biologically more fit to be the custodians of property and power should legally inherit more. But genetic recombination continually makes a mockery of the doctrine of "like father, like son" implicit in our laws of legal inheritance. An idiot can inherit millions, and a trust fund can keep his estate intact. We must admit that our legal system of private property plus inheritance is unjust—but we put up with it because we are not convinced, at the moment, that anyone has invented a better system. The alternative of the commons is too horrifying to contemplate. Injustice is preferable to total ruin.

It is one of the peculiarities of the warfare between reform and the status quo that it is thoughtlessly governed by a double standard. Whenever a reform measure is proposed it is often defeated when its opponents triumphantly discover a flaw in it. As Kingsley Davis has pointed out,¹⁷ worshippers of the status quo sometimes imply that no reform is possible without unanimous agreement, an implication contrary to historical fact. As nearly as I can make out, automatic rejection of proposed reforms is based on one of two unconscious assumptions: (i) that the status quo is perfect; or (ii) that the choice we face is between reform and no action; if the proposed reform is imperfect, we presumably should take no action at all, while we wait for a perfect proposal.

But we can never do nothing. That which we have done for thousands of years is also action. It also produces evils. Once we are aware that the status quo is action, we can then compare its discoverable advantages and disadvantages with the predicted advantages and disadvantages of the proposed

reform, discounting as best we can for our lack of experience. On the basis of such a comparison, we can make a rational decision which will not involve the unworkable assumption that only perfect systems are tolerable.

RECOGNITION OF NECESSITY

Perhaps the simplest summary of this analysis of man's population problems is this: the commons, if justifiable at all, is justifiable only under conditions of low-population density. As the human population has increased, the commons has had to be abandoned in one aspect after another.

First we abandoned the commons in food gathering, enclosing farm land and restricting pastures and hunting and fishing areas. These restrictions are still not complete throughout the world.

Somewhat later we saw that the commons as a place for waste disposal would also have to be abandoned. Restrictions on the disposal of domestic sewage are widely accepted in the Western world; we are still struggling to close the commons to pollution by automobiles, factories, insecticide sprayers, fertilizing operations, and atomic energy installations.

In a still more embryonic state is our recognition of the evils of the commons in matters of pleasure. There is almost no restriction on the propagation of sound waves in the public medium. The shopping public is assaulted with mindless music, without its consent. Our government is paying out billions of dollars to create supersonic transport which will disturb 50,000 people for every one person who is whisked from coast to coast 3 hours faster. Advertisers muddy the airwaves of radio and television and pollute the view of travelers. We are a long

way from outlawing the commons in matters of pleasure. Is this because our Puritan inheritance makes us view pleasure as something of a sin, and pain (that is, the pollution of advertising) as the sign of virtue?

Every new enclosure of the commons involves the infringement of somebody's personal liberty. Infringements made in the distant past are accepted because no contemporary complains of a loss. It is the newly proposed infringements that we vigorously oppose; cries of "rights" and "freedom" fill the air. But what does "freedom" mean? When men mutually agreed to pass laws against robbing, mankind became more free, not less so. Individuals locked into the logic of the commons are free only to bring on universal ruin; once they see the necessity of mutual coercion, they become free to pursue other goals. I believe it was Hegel who said, "Freedom is the recognition of necessity."

The most important aspect of necessity that we must now recognize, is the necessity of abandoning the commons in breeding. No technical solution can rescue us from the misery of overpopulation. Freedom to breed will bring ruin to all. At the moment, to avoid hard decisions many of us are tempted to propagandize for conscience and responsible parenthood. The temptation must be resisted, because an appeal to independently acting consciences selects for the disappearance of all conscience in the long run, and an increase in anxiety in the short.

The only way we can preserve and nurture other and more precious freedoms is by relinquishing the freedom to breed, and that very soon. "Freedom is the recognition of necessity"—and it is the role of education to reveal to all the necessity of abandoning the freedom to breed. Only so, can we put an end to this aspect of the tragedy of the commons.

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