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"ENGINEERING" SOCIAL CHANGE IN AGRICULTURE*

William H. Friedland

Introduction

1987 was the centenary year of the Hatch Act, a remarkable legislative act establishing the land grant system of agricultural scientific research. As a piece of legislation, the Hatch Act's consequences have been monumental for several reasons. First, it created what was, through the second world war, possibly the largest single scientific apparatus in the world. Second, that apparatus has been remarkably productive and has contributed greatly to making U.S. agriculture one of the most productive in the world. Third, and on the negative side, that apparatus—though certainly not alone—has contributed significantly to the decimation of the agriculturally-based rural population of the United States and a concomitant concentration of agricultural holdings. In 1880, for example, the rural population constituted 71.8 percent of total U.S. population and the farm population was 43.8 percent of the total U.S. population. By 1980, the rural population (many of whom, while living in rural areas, were involved in urban employment) of the U.S. had declined to 26.5 percent of the total and only 3 percent of the civilian labor force was involved with agriculture (United States Bureau of the Census 1975: 12, 139, 457). During the same time that the size of the U.S. rural and agriculturally-based population declined, moreover, a major shift occurred in the degree of economic concentration in U.S. agriculture. While agriculture is clearly different than manufacturing in its tendencies toward monopoly and oligopoly, similar basic trends have been and continue to be manifested. Thus, in 1984, the top 1 percent of all U.S. farms produced 30.2 percent of all agricultural sales; the top 4.5 percent of farms produced 49.3 percent of sales; and the top 12 percent of farms accounted for 68.6 percent of sales (Marion 1986).

While it would be a mistake to attribute the change in the U.S. population and economy solely to land-grant scientific institutions, it would equally be an error to ignore the role which publicly-funded agricultural research has played in these changes. The latter error is particularly egregious since it indicates a failure to address the fact that U.S. policy, since the foundation of the republic, has argued the merits of Jeffersonian, small-scale, family-based agriculture and that these arguments have provided the justification for the Hatch Act and its consequences, intended and unintended. For one hundred years, federal and state governments have provided tax dollars to develop what has been one of the largest government-supported research and development systems in the world. While there have been many arguments (and rationalizations) for publicly supporting that system, the key one has been based on Jeffersonian ideology, i.e., the social value of family-based

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farming. Yet it is obvious to anyone who has studied agriculture that the land-grant system of research and development has contributed significantly to the endemic crisis of overproduction that has characterized U.S. agriculture ever since the 1880s and that this overproduction has contributed significantly to the destruction of family-based agricultural units.

For this reason it is appropriate to herald the prospects of a transition in the way in which the Hatch Act has been interpreted and implemented. This paper discusses an "experiment" in what I will refer to as the "engineering" of social change. The form of the "experiment" is a suit brought against the University of California about the way in which the University conducts agricultural research. Often referred to as the "mechanization suit," the legal action was brought by an activist organization along with a number of individual complainants, all represented by a public service law firm. The suit was intended to have broad public policy implications, arguing that legislation intended to benefit *all* agriculture has served only larger agricultural units. After briefly considering the current organization of U.S. agricultural science and the critique of this form of organization, the paper will describe the principle actors involved in and the reasoning behind the suit, and the remedy proposed to develop new ways of conducting agricultural research and development.

The Critique of U.S. Agricultural Science

In the midst of yet another razzle-dazzle set of promises about the potential transformation of U.S. agriculture through the application of biotechnology, it is useful to pause for a moment to examine the development of the profound critique of the *manner* in which agricultural science is done in the United States. For two sets of critical arguments, developing since the 1960s from "outside" the land-grant system, illuminate the context in which developments in biotech will be taking place. The first was the environmental critique, initially formulated by Rachel Carson (1962) in *Silent Spring*. Somewhat later, a socially-based populist critique developed with the publication of Jim Hightower's (1973) *Hard Tomatoes, Hard Times*. Each publication instigated social movements which have been responsible for successive waves of criticism, and proposals for reform. None of this has been welcome in land-grant circles.

Indeed, critiques internal to the land-grant system have focused on the mediocrity of its scientific development. One of these, the "Pound Report" (National Research Council 1972), resulted from a study of the agricultural sciences conducted in the early 1970s. More recently, the so-called "Winrock Report" (1982) called for a shift to elite-centered, high quality, and basic research in the agricultural sciences. The overarching context within which these critiques have emerged has been one of increased national concern over the ever-increasing federal deficit. Lately these concerns have escalated with the installation of budget-reducing national administrations that have been singularly unable to implement the policies to which they have made major public commitments.

The response of land-grant personnel to this context has been to focus on those agricultural producers who have prospered and grown while the overwhelming bulk of the agriculturally-based population was being decimated. Their explanations for

the success of the few and the decline of the many continues to be centered on the notion that some agriculturalists are better managers and more efficient farmers than others. That other forces might be at work, that the land-grant system itself might have become part of the social infrastructure driving the process of economic concentration in agriculture—and the destruction of the agriculturally-based population—has never been seriously considered. Indeed, land-grant scientists and administrators have been among the most vigorous voices denying such arguments.

Consequently, land-grant institutions continue to uncritically move down the high technology pathway. In modern times this means a movement towards biotechnology. That there should be continual "demands" from private forces in U.S. agriculture for the land-grant system to become involved in biotech development makes considerable sense insofar as it would permit some of the costs of such research and development to be borne by the public. From this standpoint, basic research would be conducted in the public sector whereas it would be utilized by highly capitalized firms with the plant, equipment, and skilled manpower to *apply* basic findings.

Two basic arguments, redolent of the past yet having no congruence with present reality, especially considering the near-disappearance of the agriculturally-based population, sustain this commitment to biotechnology. These arguments focus on the neo-malthusian myth of the hungry world, and the need for reduction in the costs of production so that the U.S. can export to a starving world. The fact that many previous importers of U.S. agricultural commodities have now become exporters is either overlooked or explained as a product of "their" unconscionable government intervention and subsidies by land-grant personnel. In addition, they stubbornly refuse to come to grips with the fact that there is now an overproduction of agricultural commodities in the world market. Given the durable hold of the aforementioned arguments, however, the movement towards biotechnology continues to garner support from within the land-grant institutions. Neglected is the likelihood that the development of biotechnology and its application in agricultural sciences will exacerbate and accelerate those developments within agriculture that continue to be the fundamental concerns of environmental and populist critics.

The Institutional System of Agricultural Research and Development

According to Ruttan (1982: 184), approximately \$1.88 billion dollars were expended for agricultural research and development in 1975. Of this amount, \$0.8 billion was spent in the private sector, \$1.07 billion in the public sector, and an additional \$10 million by foundations. While private sector expenditures have been increasing and have contributed to capital accumulation in agriculture, there has been little research on private spending on agricultural research and, therefore, it will only be dealt with briefly in this paper. Far more agricultural research has been publicly-funded. The cluster of interests that receive public funding will be treated, in this paper, as state elements—in contrast to purely private agricultural research and development which is concerned, almost exclusively, with developing and enhancing narrow accumulation functions within agriculture. The following overview deals with the state apparatus concerned with agricultural research and development, and how it fulfills the functional requirements of agricultural capitalism.

This apparatus consists of public (or governmental), private, and semi-governmental units, the latter constituting an interesting marginal category.

The public sector involves, most directly, the research agencies of the land-grant system. This includes an elaborate network of U.S. Department of Agriculture research facilities spread around the U.S. which conduct research on almost every imaginable topic concerned with the production of agricultural products. It also includes the land-grant institutions, the colleges of agriculture and the state experiment stations which conduct basic and applied research and development, and the extension services. These research agencies fill the accumulation function in that their predominant activities are aimed at increasing the profitability of agriculture.

Private sector agriculture research and development is conducted in private firms oriented toward the resolution of specific problems encountered in production. This sector also includes, however, a network of organizations such as foundations which provide infrastructure aimed at integrating private sector research and development with that being carried on in semigovernmental and governmental units. Exemplary are the Rockefeller Foundation and the Farm Foundation. The former has been of considerable influence historically in constructing and elaborating the public research and development system in agriculture. (In 1982, for example, as technical criticism of the quality of publicly-supported agricultural research increased, the Rockefeller Foundation sponsored, in conjunction with the President's Office of Technology, a high-level conference at Winrock, Arkansas. This conference projected a recasting of the public research and development system after the National Science Foundation, i.e., focusing on competitive grants and national review processes that would concentrate agricultural research and development in a small number of elite institutions, effectively cutting off federal support to most land-grant universities.) In addition, private sector researchers articulate with those in the public sector through a complex of formal and informal networks. Private researchers, for example, are members of professional associations in which papers are read and information is exchanged as in any professional association. Just as important, if not more so, are the informal contacts that are developed and maintained between research and development personnel. Not only do technical problems of production get resolved but such networks provide future employment as promising students coming through the colleges of agriculture are "fed" into personal and private networks.

The third and most complex sector of the research and development network, the semi-governmental segment, consists of the research-centered marketing order organizations, units created under state legislation (although there are some federally-permitted research marketing orders).¹ These are important because they impose discipline upon producers of specific commodities, requiring the payment of taxes (assessments on the value of production) to be used for commodity-oriented research. By law, in most if not all states, research problems generated through marketing order units must be offered initially to land-grant institutions. This requirement enforces the maintenance of close contacts between the commodity-based marketing order organizations and academic departments in agriculture

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colleges. Marketing order organizations specify research projects formally on the basis of problems experienced in commodity production; individual researchers in agriculture colleges, however, stimulate interest in research topics by maintaining close relationships with commodity industry members.

A consequence of this social infrastructure has been that the research and development apparatus is integrally linked to larger-scale units of production. As such, public systems of agricultural research have all but completely forgotten their original mission of sustaining small-scale and family-based agriculture. Rather, these systems have built a powerful agribusiness constituency which has demanded and legitimated continued public funding of agricultural research and development.

At the same time, as noted earlier, agricultural research has generated major critiques of the social and environmental consequences of modern agriculture. With the decline of family-based farming, as a result of successive economic crises and with the inexorable tendencies toward the growth in size of agricultural production units, populist social protest has continued to develop. This protest, however, has been ineffective in producing changes in policy implementation and research directions. (Even when populist politicians "took over" the USDA during the Carter administration, they were unable to produce change either in overall agricultural policy or in the implementation of scientific research and development policies.) Nor have the environmental critics been successful. Despite the enormous popularity of the concept of soil conservation during the Roosevelt administration, the main agency for conservation research and development and administration, the Soil Conservation Service, was effectively brought under the control of the "productionists." And to date more modern environmental critiques centered around issues of human and ecological health have been unsuccessful in transforming the direction of modern agriculture and agricultural research.

An Experiment With State Transformation

The approach to change described below might with some justice be referred to as an "experiment in state transformation"² intended to change the manner in which agricultural research gets done.* In what follows, it should be noted, there was initially no conscious attempt at state transformation. Rather, a series of actions were undertaken by individuals, groups, and organizations that, over a period of approximately five years (1973-1978), took the form of an exploratory legal action. Over the period of the next ten years (1978-1987), the activity took shape as a legal challenge to the existing system of publicly-funded agricultural research. The approach became, in my words, an experiment in social "engineering."

*Strictly speaking this is not an "experiment" in the usual scientific meaning of that term. Rather, it represents one attempt to transform a state institution by working within the legal system and utilizing a knowledge base developed within state institutions.

Shaping the Experiment

Three distinct “forces” were involved in shaping the experiment. First and most important, California Rural Legal Assistance (CRLA), a public service law firm, took the lead in assembling a variety of research critical of the existing system of agricultural research and development to formulate a legal action against the University of California’s Agricultural Division.³ Second, there was a dual set of organizations, California Agrarian Action Project (CAAP, which recently changed its name to the California Action Network) and the California Institute for Rural Studies (CIRS), both composed of students and some of their teachers at the University of California, Davis. CAAP became the organizational plaintiff in the suit. Third, there was the critical academic research on agriculture and the agricultural sciences in a number of universities including my own at the University of California, Santa Cruz. Each of these “forces” developed independently and have continued to function independently, with only minimal coordination and integration. To the extent that coordination has occurred, it has been achieved by CRLA when necessary for purposes of the legal action on an ad hoc basis.

California Rural Legal Assistance.

If researchers and activists provided a base for action, CRLA deserves the credit for (1) developing a legal strategy to challenge the way in which agricultural research is conducted and whom it serves; and (2) being sufficiently persistent, despite cuts in resources under the Reagan administration, to maintain the legal suit and integrate the activities of researchers in a way to provide a data base critical to the suit’s legal arguments.

Developing the legal strategy entailed substantial legal research oriented to finding aspects of the law within which a legal challenge to the mode of implementation of the Hatch Act would be feasible. Beyond such research, however, the suit also represented the first conscious effort to challenge the state on the state’s own grounds, i.e., in the legal system. What should be emphasized here is the development of a new strategy for social change, since previous strategies and tactics had involved only research to “expose” the consequences of agricultural science research, i.e., muckraking, plus public protest activities, primarily organized by CAAP.

The legal strategy required considerable effort by CRLA. The discovery period, for example, involved examining hundreds of research projects conducted in the Experiment Station and taking dozens of depositions (legally conducted interviews under oath with representation by lawyers for plaintiff and defense) over a five year period. It also involved searching for the small number of agricultural scientists with intimate familiarity with the land-grant system who would be willing to provide legal testimony supporting the CRLA action. This activity took place as a major transition occurred in national politics from the Carter to Reagan administrations. While he was Governor of California, Ronald Reagan had engaged in a futile attempt to eliminate CRLA. After becoming president he attempted unsuccessfully to eliminate the Legal Services Corporation (the main funding agency for CRLA) but he succeeded in cutting its budget. Midway through the discovery phase, in consequence, the CRLA budget was cut.

Additional complications extended the already lengthy legal proceedings. Once the original trial was well underway, the trial judge became extremely sick. The

declaration of a mistrial meant starting all over: a new judge, a different interpretation of the trial rules, another (but shorter, this time only two years) discovery period. Ultimately, however, Judge Raymond Marsh ruled:⁴

1. The plaintiffs in the case had standing.
2. "There must be some University-level process designed to insure consideration of each of the legislatively expressed interests, with primary consideration given to the small or family farmer" and "none of the defendants' supporting evidence establishes that the University has a process designed to ensure on a programmatic basis that federal or Hatch funds will be expended in a manner which afford primary consideration for the small or family farmer."
3. The Hatch Act provides that there be other beneficiaries as well as "small or family farmers," i.e., consumers and rural communities.

The judge's ruling established the basis for a trial which became obviated when the University stipulated in September 1986 that it did not, in fact, have a process designed to consider the various constituencies that Judge Marsh saw adumbrated in his reading of the Hatch Act.

CAAP and CIRS

The second major actor in this experiment is the California Agrarian Action Project (CAAP), a membership-based organization begun at Davis by some students and several of their teachers who were dissatisfied with the indifference of the University of California agricultural research organization to labor, environmental, and consumer issues. Developing a critique which saw UC agricultural scientists linked to the agribusiness, CAAP was created to publicize, demonstrate, and carry on public activities to change the way in which agriculture is conducted in California. The founders of CAAP recognized the importance of research and created a second organization, the California Institute for Rural Studies (CIRS), which would conduct research on California agriculture, land ownership patterns, the conduct of the University in agricultural research, etc.

CAAP was involved in the "experiment" in two major ways. First, its research involved the analysis of who benefited economically from the tomato harvest mechanization research and specifically considered the assertion of land-grant agricultural science administrators that consumers were a major beneficiary. CAAP research showed that the mechanization research had cut the cost of tomatoes at the cannery by \$7.25 a ton but that this savings had not been passed on to consumers; indeed, canned tomato prices at the retail level rose much higher than both the price of all foods and the price of all processed fruits and vegetables (California Agrarian Action Project 1978:4). CAAP's research thus raised serious questions about the argument that agricultural research benefits consumers by providing more food at low prices.

The second major way in which CAAP became involved in the "experiment" was to serve as collective plaintiff—in addition to nineteen farmworkers who were the

individual plaintiffs. As a collective plaintiff, CAAP provided organizational stability to the legal action. Where the individual farmworkers traveled and moved because of their work and, as a result, lost contact with CRLA, CAAP maintained a continuous organizational presence. In this regard, it should be said that CAAP also served to continually remind CRLA that it was representing a constituency, a category of people affected by UC agricultural research who needed to find a voice to speak on their behalf.⁵

Agricultural research at UC Santa Cruz

It is important to recognize that, after the mid-1970s, a shift took place in rural sociology in the United States, a shift that contributed significantly to the elaboration of a knowledge base important to CRLA's legal action. Specifically, it was because of the reawakened interest of many rural sociologists in agriculture that a broad-scale knowledge base was developed and became utilizable. The project with which I was involved at the University of California, Santa Cruz, became one center of research that provided appropriate data for the suit.⁶ This involved the development of research projects on the ways in which agricultural scientists conducted their research and on specific technological transitions involving mechanized harvesting of processing tomatoes and iceberg lettuce.⁷

One consequence of the research was to begin to formulate an approach that would increase the probabilities that agricultural scientists would devote time to considering the social outcomes of their research (Friedland and Kappel 1979). This publication set out the notion of social goals which should be legislatively determined and for which the University's Agricultural Division should be held accountable. Among the social goals projected was to hold constant or decrease the total volume of non-renewable energy consumed in agriculture, to arrest the decline in the numbers of farms, encourage self-production of food, produce a more equitable distribution of income within agriculture, reduce the volume of chemical applications in agriculture, etc. Kappel and I argued that the University could and should be held accountable for the attainment of these social goals over a period of time and that, failing to achieve these goals, the Legislature would withdraw research funds proportionate to the failure and allocate them to agencies more willing to conduct research aimed at implementing the goals.

The legislative strategy embodied in this approach found no resonance in California's legislature. But the ideas embodied in the publication identifying this approach provided an entry point for CRLA when it began to struggle with the issue of designing a remedy in the legal action against the University of California.

Planning the Remedy

Planning the remedy became the task for four attorneys (the attorneys) and five academics (the experts) who collectively will be referred to as the design participants.⁸ One overarching constraint and several strategic constraints set limits on the approach these participants took in designing the remedy.

The overarching constraint was both principled and strategic: the attorneys and the experts were reluctant to design a remedy that would constitute a significant intrusion on the University. The principled aspect of this constraint derived from the

design participants' concerns about university autonomy. All of the participants believe that the university as a general institution in society is thoroughly enmeshed in existing social, economic, and political relationships. Indeed, all of the design participants have been critical of the way in which the experiment stations and extension services have been integrated into an agribusiness network, producing knowledge which is captured primarily by large-scale agricultural enterprises rather than other constituencies. Despite our knowledge of this effective lack of autonomy, the design participants collectively sought to protect the autonomy of the university and, just as importantly, protect the autonomy of critical intellectuals within the university. As critics ourselves, we were hesitant to see CRLA formulate a remedy that would constitute a major intrusion on university autonomy by a court.

The strategic aspect of the design participants' reluctance to be overly intrusive derived from our conviction that no court would willingly intrude in any major way on a university and that even if such intrusion were found acceptable by a lower court it would not be sustainable on appeal to a higher court. What we sought, therefore, was minimal intrusion which would be legally and strategically viable but not establish unacceptable intrusion principles.

Despite these considerations, there was a countervailing strategic exigency. Namely, the University of California had already developed an extensive and complex network of relationships with *agribusiness*, as manifested in the formal relationships of some of its officials (who served on the boards of large agribusiness corporations) and the maintenance of many advisory bodies, as well as through many informal relationships. Given our analysis of the University in its relations with existing agribusiness groups, the design participants saw the need to develop new, formally organized constituencies that had not historically found a voice in the delineation of research and development priorities in order to create the structural pressures needed to generate research that would serve these new constituencies. Three such constituencies—small family farmers, consumers, and rural communities—had been delineated by Judge Marsh in his decision as to what could and could not go to trial. The judge had also indicated that priority or emphasis should be given to small family farmers.⁹ In these and other ways, the judge's interpretations set the legal parameters within which a remedy had to be designed.

The first strategic limitation that the design participants had to acknowledge was that any proposed remedy not only would have to be seen as legally feasible by the judge but would also have to be sustainable on appeal in state courts and ultimately in the U.S. Supreme Court.¹⁰

The second strategic limitation derived from our understanding of the history of land-grant research and development: any remedy should adhere, as closely as possible, to historic precedent in land-grant experience, utilizing whatever organizational models already existed, rather than seeking to hew new ground. There was, of course, a contradiction here: we were seeking to develop new ways of conducting agricultural research and making agricultural scientists aware of their responsibilities to constituencies other than large-scale agricultural units and agribusiness. To the extent that we could base a remedy on existing models, however, we believed such a remedy would not only be more acceptable to the judge but sustainable on appeal.

A third strategic limitation derived from our understanding of the way in which the university operates as an institution. Situating itself as an ostensibly neutral institution in society, the university serves critical functions for the state in generating knowledge which is captured for purposes of accumulation, providing legitimacy to the system by the generation of ideology, and reproducing personnel who sustain the sinews of economy and society. In addition, however, the university is also a co-optative institution. Because its "mandate" requires that it be open to change, criticism, and new ideas, universities are institutions that tolerate considerable ambiguity. Specifically, universities can absorb new social trends, e.g. environmental problems, upsurges of ethnic and racial minorities, the relative falling behind in technological development of the U.S. as against other nations, etc. The university as a system thus stands ready to study the problem, create organizational entities to generate knowledge about the problem, or to begin the process of socialization of experts to deal with the problem, especially when funding is made available.

What we had to be concerned with, then, was how to prevent some new organizational format from being "captured" by the existing organizational structure. This would obviously involve keeping the suggested remedy as much as possible out of the organizational structure of the Agriculture Division of the University of California while seeking to maximize a relationship to those elements within the University that would be most likely to accept criticism and welcome organizational innovation. What this meant concretely was that it was essential to develop new constituency groups that would represent the groups which Judge Marsh saw as Hatch Act beneficiaries. Despite their being a variety of organized groups "out there," none were organized like, or as well as, large agricultural producers¹¹ with their complex, "organic" relationship with the University, which permitted continuous and extensive involvement in research and development determination while protecting the University's aura of "autonomy." It would be necessary, therefore, in designing the remedy to develop these constituencies in a direct and new relationship to the University.

Designing the Remedy

The remedy which was developed involved three major elements: (1) the creation of constituency advisory groups, that is, of external constituency bodies that would advise the University formally on research proposals intended to benefit the various Hatch constituencies that had been defined by Judge Marsh; (2) the creation of a University-wide body, the Hatch Committee, which would be designated in part by the Academic Senate's Committee on Committees and in part by the constituency advisory groups, to oversee the implementation of the proposed remedy; and (3) the formation on the three campuses of the University of California with agricultural units of three distinct units dedicated to the development of capacity for prediction of social outcomes of research and for evaluation and assessment of outcomes and predictions that would have to be begun to be made under the proposed remedy. These were the Programs for Agricultural Research Methodology and Assessment (PARMAS).

The Constituency Advisory Groups

Since Judge Marsh had delineated multiple constituencies of Hatch Act, the design participants considered this opening a possibility to adopt already-accepted procedures in the University of California of utilizing advisory groups as a means of keeping track of constituencies and their interests. What was necessary was to construct new formal constituencies for the University's Agriculture Division, place them in a formal advisory role with respect to the allocation of Hatch funds, and provide them with some measure of enforcement.

To accomplish these purposes, the remedy required that the University recognize advisory groups from panels of organizations whose membership or purposes explicitly included the Hatch Act constituent categories—small family farmers, consumers, and rural communities. Finding such organizations did not prove to be onerous but did create some dilemmas in designing the remedy. For example, two existing farm organizations, the California Farm Bureau and the California Grange, claim to represent and include in their membership small and family farmers. At the same time, the Farm Bureau organizationally represents the interests of large-scale producers rather than being concerned with small farmers; and the Grange had associated itself with the University as a "Friend of the Court" in opposing the CRLA suit. Nevertheless, these organizations were included among the organizations in the panel from which representation could be designated for the constituency advisory group representing "small family farmers."

To ensure that each constituency advisory group had adequate resources to perform its advisory activities, provision was made in the proposed remedy for allocating funds for the operation of the constituency advisory groups. Each constituency advisory group would be convened by a University-designated person who would provide staff support; provision was also made in the proposed remedy for allocating funds for the operation of the constituency advisory groups. Each constituency advisory group would be convened by a University-designated person who would provide staff support; provision was also made in the proposed remedy for funding this position. Each constituency advisory group would receive, during the annual funding cycle for Hatch projects, proposals from University researchers. These proposals would be similar to those with which researchers were familiar except for two new additions: a social impact assessment and an explicit designation of the intended beneficiary or beneficiaries, if there were to be multiple beneficiaries. On the basis of the researcher's designation of the beneficiary, research proposals would be routed to the appropriate constituency advisory group.

Review by each constituency advisory group would *not* deal with the scientific merits of proposals. Rather, their review process would take place *after* scientific review at the level of peers, department chairs, and associate directors of the Experiment Station on each of the three agricultural campuses. The review by the constituency advisory group would address the appropriateness of the social impact statement and make an assessment of the likelihood of the research benefiting the constituency named. Each group, in assessing specific proposals with respect to likelihood of benefiting the constituency named, would rank and prioritize the proposals forwarded for review. The advice of the constituency group would be returned to the local

experiment station director for final action. The experiment station director would not be required to accept the advisory group's recommendations but would be required to provide an overall annual report on the actions taken.

Thus the intention of this component of the proposed remedy was to (1) establish new constituency relations between the University and groups with which it has not had relationships, at least with respect to agricultural research; (2) provide adequate funding and staff support for operations; (3) keep the constituency advisory groups in an advisory position, rendering opinions on limited issues, i.e., the likelihood of benefiting a specific constituency, and keeping them out of traditional peer review and University review functions; and (4) provide some clout to the advisory function by requiring reports on outcomes, which would be made public.

The Hatch Committee

To ensure an internal University process that would be faithful to the intent of the proposed remedy, the designers proposed the creation of an internal University committee to be composed exclusively of faculty members of the University of California (i.e., members of the Academic Senate). This "Hatch Committee" would be composed of two kinds of faculty members: three would be designated by each of the constituency advisory groups and the other members would be nominated by the Committees on Committees at each of the three campuses with agricultural units. This procedure was intended to emphasize that internal University regulation remained a key principle while providing some constituency influence on the Hatch Committee.

The Hatch Committee, under the proposed remedy, was given oversight responsibility for establishing criteria, for conducting the studies needed to establish criteria (e.g., what is a "small family farm?"), and provided with funds from Hatch Act sources to conduct its business. To ensure that its members would not consider membership simply another burden of service to the University, Committee members were to be awarded release time for their service.

The Programs for Agricultural Research Methodology and Assessment

One innovation proposed in the remedy was the establishment on each of the three agricultural campuses of a Program for Agricultural Research Methodology and Assessment (PARMAs). Each campus unit was to have three explicit functions: (1) to provide technical advice to agricultural researchers in formulating analyses about the potential constituencies that the research was supposed to benefit and to demonstrate the chain of reasoning linking research and beneficiary; (2) to sample and monitor predictions about the benefits to Hatch constituencies as research proceeded and was completed in order to assess the accuracy of predictions and effects on beneficiaries and on this basis improve the methodology of social impact assessment and evaluation; and (3) to commission longer-range studies to be conducted either by PARMA personnel or "outside" personnel on methodological studies that PARMA personnel deemed to be of importance in improving prediction and evaluation.

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Provision was made in the proposed remedy for funding the activities of each PARMA and providing adequate resources for PARMA members to conduct their research. PARMA personnel would be drawn from regular UC faculty and their appointments to the PARMA would be treated as equivalent to an appointment to a research center or institute. The intention was to draw on regular UC faculty who would see career opportunities in furthering research on social impact assessment and who would win release time from other University responsibilities through appointment to a PARMA.

The work of the PARMAs would be evaluated and monitored by the Hatch Committee and public reports would be issued of these assessments. Public reports themselves constitute an important overall theme in the proposed remedy. By requiring that each unit and all activities be open to public scrutiny, based on reports to the governor, legislature, the court, the plaintiffs, etc., the intention was to ensure that the constituency organizations had the information they needed to act to protect the beneficiary groups they represent.

Conclusion

Confronting the judge's decision in the case, the CRLA attorneys had to grapple with some practical legal and political realities. Among these was the dilemma of how much of the remedy prepared by the design panel to propose to the judge? How much "interference" in the functioning of a University would the judge countenance? And, even if the judge accepted a proposed remedy, would this remedy stand up on appeal?

In assessing the situation, the CRLA attorneys had to recognize that the majority on the California State Supreme Court had by now been appointed by Republican Governor Deukmejian and that the U.S. Supreme Court, to which the case would ultimately be appealed, had a majority appointed by President Ronald Reagan. Given their assessment of such legal and political factors, the CRLA attorneys decided to withdraw the proposed remedy. This left it to Judge Marsh to order the University to propose a remedy of its own. Until the appeal has been processed through the final legal stage (the U.S. Supreme Court), the University will not be required to propose its own remedy. But because CRLA had originally suggested a remedy, even though it has been withdrawn, the previously described remedy remains very much part of the agenda for "engineering" social change.

While this case travels through a lengthy appeals process, it must be stressed, the agricultural sciences stand on the brink of another major transition, the transition to biotechnology. Because it is even more capital-intensive both in its methods and applications than existing agricultural sciences, biotechnology research will have to be transmuted through intermediary organizations such as private corporations into the products that will be used in agriculture. What this means, if we utilize the experience of the past to project the future, is that biotechnological applications will be captured by larger agricultural units. For few family farmers will be able to afford to apply the results of biotechnological research to their own farms. Thus the current dilemma confronting public institutions of agricultural science will only become further amplified as a result of the transition to biotechnology.

None of this seems to phase the future-oriented technocrats within the land-grant system. Recognizing that there are problems in conducting their scientific endeavors, they have proposed a new structure for high-tech science. As embodied in the Winrock (1982) Report, this proposal calls for a concentration of scientific endeavors in top-rank land-grant institutions that can work at the forefront of a new and developing field of knowledge. Accordingly, research will benefit larger, non-agricultural corporate organizations with the scientific capability of applying the results of biotechnological research that have been developed by public sector agricultural scientists. The Winrock model, in other words, will provide even greater publicly-supported benefits to private non-agricultural corporations than the traditional land-grant model and their endeavors can be expected to benefit larger rather than smaller agricultural producers.

Nonetheless, there are indications that publicly-funded agricultural science will undergo some transition in its forms of social organization in the future. As the character and the means of that transition remain very unclear, the attempt at socially "engineering" a solution represents but one effort at developing a new orientation toward agriculture and its scientific apparatus. Yet should Judge Marsh's ruling be sustained through the appeals process, there will be significant consequences for the way in which publicly-funded agricultural research is conducted—and not just in California because the legal ramifications of the suit will affect every land-grant institution in the United States. Sustaining the ruling will mean that agricultural research will have to become responsive to a multiplicity of constituencies including small family farmers, consumers, and rural communities. Being responsible to such constituencies will produce very different outcomes as to the sorts of problems that are defined by agricultural researchers.

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NOTES

- ¹ The numbers of marketing orders and the depth of their coverage is highly variant state by state. For a thorough discussion of these orders and the way they operate see Frank (1980), especially Appendix B which provides details on the coverage in individual states of marketing orders.
- ² This should not be interpreted to mean that any of the actors, groups, or organizations involved in the "experiment" have either been conscious of the theoretical orientation explained here or have been motivated by an approach of such grandiosity. The actions are the result of a set of consistent perspectives, not all of which are in congruence with one another. I would emphasize that the conceptual language of "state" and "state transformation" being used in this paper represents my personal analytic framework. While other individual actors and groups are all seeking change in an institutional system, it is doubtful that more than one or two individuals share my particular viewpoint or would utilize the conceptual language I have employed.
- ³ A second public service law firm, Public Advocates, based in San Francisco, provided support for CRLA during the trial, providing legal advice relating to constitutional issues.
- ⁴ Judge Raymond Marsh, Superior Court of the County of Alameda, Memorandum of Decision and Order, Action No. 516427-5, March 20, 1986.
- ⁵ Theoretically, the United Farm Workers union (UFW) was supposed to provide this organizational "voice" for farmworkers. For a variety of reasons which cannot be explained here, the UFW failed to provide this voice (Friedland and Thomas 1974).
- ⁶ The talented students involved in this project include Amy Barton, Anne Fredericks, Tim Kappel, Suzanne Ludlum, Catherine Sonquist, Ayn Schmit, Bob Thomas, and Vince Valvano. I have described the character of this project in Friedland 1984.
- ⁷ Out of these studies came a number of publications: Friedland 1974; Friedland and Barton 1975, 1976; and Friedland, Barton, and Thomas 1979, 1981.
- ⁸ In addition to the two principal attorneys from CRLA, two attorneys from Public Advocates, a second public service law firm, were involved. The five academics came from four universities spread across the U.S. The academicians were involved in numerous individual telephone consultations with the attorneys, conference calls, and a two day conference which involved four of the five.
- ⁹ CRLA had argued that farmworkers also constituted a constituency that had to be benefited by Hatch-funded research. Judge Marsh, in his reading of the Hatch Act, did not see the farm worker constituency within Congress' meaning.
- ¹⁰ Here, of course, the advice of the attorneys—and their debates—became critical. None of the agricultural experts were aware of the complex legalities involved; while we had a lot of "common sense," the attorneys quickly taught us that there is not necessarily any relationship between common sense and law.
- ¹¹ The classic example of land-grant universities developing a constituency and becoming captured by it can be found in the formation of the state agricultural extension services under the Smith-Lever Act of 1914. Smith-Lever created a "cooperative" relationship between federal, state, and county governments. Local extension agents, recognizing the difficulties in reaching the large population of farmers operating at that time in the U.S., decided to create a new farmer organization which would consist of "progressive" farmers, i.e., those more open to new techniques of production. The organization was called the "Farm Bureau." The "progressive" farmers constituted the capital-accumulators of their time. Having created farm bureaus around the country, within a single year, the newly formed American Farm Bureau Federation and its state and local bureaus became the controlling elements of Agricultural Extension. Located, in most states, directly on the campuses of the land-grant

colleges of agriculture, formal separation of Extension and the Farm Bureaus did not occur until after the second world war. For an historical account of the capture see McConnell (1969). Fiske (1979) describes this capture in California. Block (1960) provides an account of the separation of Farm Bureau from the University of Illinois.

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