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THE CONFLICT OF PUBLIC AND PRIVATE INTEREST IN LAND USE

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THROUGHOUT many of the conference sessions we have been discussing fundamental considerations of land, people, and policy. And now in one of the final papers it seems to me an uncommonly complex job has been assigned—that of treating all three of these fundamentals and of focusing population and policy questions upon land and land use.

Obviously there are no easy and universally applicable answers to the land-use questions faced by various nations with extremely diverse patterns of economic development and equally extreme variations in population—resource ratios. Presumably if the answers were simple the topic would not be on the programme. Let me point out, then, at the beginning, that this will not be an exhaustive treatment of the topic. Its implications are too broad to be fully encompassed in a brief paper. My comments shall be restricted to broad outlines of land-use questions. They shall be directed primarily toward conditions in the United States with only passing reference to other situations.

The very wording of my topic assumes a conflict of public and private interests. Hence it may be more than a little germane to attempt to state each interest so that we may have a focus from which the discussion may proceed.

Agriculturally speaking, the term *land* may be interpreted to include space relations and the prevailing complex of climatic, topographic, and soil conditions. *Space* is a stable factor. But agricultural space may expand or contract in accordance with industrial, residential, recreational, and similar uses, or as the total land area occupied and used by a social group expands or contracts. Historically, space expansion has been a dominant force in shaping the U.S. economy and the prevailing patterns of land use. It is now an essentially static factor. Likewise *topography* is essentially stable. Climate ranges from the highly predictable and stable in some regions to the highly unpredictable in others, and thus in some areas may pose changing problems of land use. But certainly the principal charac-

teristic of agricultural land over which public and private interests may clash is the *soil*.

I shall proceed on the premiss that the soil mantle is the essential foundation of all society, no matter how urbanized and industrialized it may become. The soil is a product of natural processes, which continue to-day as they have through all time. But they are processes which grind slowly indeed. The present soils, upon which every plant and animal are dependent for life and growth, are the product of long ages of development. Yet they may be quickly damaged or even destroyed by abusive use. It is primarily a growing realization of this fact which in recent years has brought public attention in the U.S.A. to focus upon the land problem.

Public interest in land extends across the whole range of land uses. It is home sites, and places of business, and recreation. But it is also, and perhaps basically, in an assured supply of agricultural produce. From this point of view *the public interest is in the maintenance of a productive capacity in the soil base of the nation that will provide an adequate and continuing flow of the desired farm produce at the lowest cost commensurate with a continuing supply.*

I conceive that statement to apply specifically to such a highly self-contained nation as the United States—and also to the world at large. Particularly in the connotation of a fully adequate food supply for local populations it does not apply to all areas and regions. For example it would not apply to New York State, or to Great Britain. But even in these regions the concept of a continuing supply of the economically justified produce is still applicable.

Private interest in land use, or expressed from the viewpoint of the individual commercial farmer, can be summarized as *long-time, continuing, efficient farming*. The United States farmer has operated in an institutional framework of freehold land, of family-size farm units operated as individual businesses and subject to refinancing in each generation, and of essentially free-market prices and costs. It has been a system of as nearly full and atomistic competition as could be readily conceived. The individual farmer in this system sells in a market over which (because of his small volume) he has no control. His relative success among farmers, and his relative standard of living, are tied to the volume of his product and to the relative level of his unit costs. He will strive for his most profitable combination of volume and cost, never knowing precisely what they are. He will know, however, that only through low-unit cost will he compete successfully.

Can it be expected that the farmer operating within this pattern

will maintain the productivity level of his land? A case can be made that, in his own enlightened self-interest, he will. Farming is a conservative, long-time business. A financial killing over a few years' time is seldom possible even by skinning the land. Successful farm operation must be projected over a lifetime. Consequently, it may be argued, the intelligent and forward-looking farmer will balance soil-depleting with soil-building influences in his year-to-year operations—and thus, for his personal interest, follow precisely the pattern of behaviour that meets the public interest. That this is fact and not theory can be illustrated with many individual cases in any commercial farming region.

On the other hand, it may be illustrated also that individual farmers, hard pressed in the competitive struggle, will forgo soil maintenance in the interest of short-run personal gain and without regard to the long-run welfare of either the public or themselves. This cannot be regarded as 'efficient farming' in the long-time, continuing sense. As an operating policy it may arise from ignorance, from ill-advised adherence to custom, from unfortunate location on land of low natural productivity, or from periods of serious and widespread economic distress. Some farmers in these circumstances may realize what is happening but stand powerless to check the trend. By a few it may be done maliciously. In any event this kind of operating policy represents the conversion of essential long-time personal capital into current 'income', while from a public point of view it may result in an ill-afforded diminution of social capital and of future productivity.

Thus we have before us the first of two potential conflicts of public and private interest—the question of maintenance of the soil resource.

In viewing the land-use questions in the United States it must be recognized that we are concerned with a young country. Its physical frontier has only recently closed. Until a generation ago the major concern was to get resources into use, to establish homes and enterprise, to build up communities, to fill up the open spaces. Throughout the past century public lands were sold into fee-simple ownership at a nominal price, or were actually given into fee-simple ownership under limitations easily fulfilled.

It was an expanding pioneer economy. Resources were used lavishly—precisely as sound economic practice under such conditions would dictate. Virgin forests of the finest hardwoods were girdled and burned across the eastern states to open the land for cropping. My own great-grandfather chopped a western New York farm out

of virgin beech, ash, maple, and oak timber and burned the trees for pearl-ash with which he paid for the farm. Such an act would appear to us now as fantastic waste. At that time it not only made economic sense, but was also essential—crops could not be grown in the forests.

Wasteful utilization of all resources—forests, minerals, soils, and others—assuredly went too far. But a pioneer economy and resource conservation are unaccustomed bedfellows. The end of *seemingly* limitless resources dawns only slowly on either the public or private interests. A public unaware of potential future shortage does not object to cheap timber, cheap food, or cheap minerals made available by exploitive private interests. The awakening comes eventually, but not without prolonged yawning and eye-rubbing. In the early years of this century conservation got its start in the U.S. But only the great depression of the 'thirties brought full awakening and public concern over whether there was not in the offing similar resource problems as have plagued older and more crowded countries.

The U.S.A. continues, and will long continue, to use resources (land and other) less sparingly than will European countries. A proper proportioning of production factors in the U.S. economy so dictates. Resource values are showing a tendency to rise. But the relative costs of land and labour have not changed their historic relationship. Labour productivity has continued to rise. Wage rates have risen accordingly. The entrepreneur (farmer or other) remains as much under pressure as ever to maximize the productivity of his labour force. This might be considered as an influence inimical to soil maintenance. But it can hardly be more serious than the heavier pressure of population on the land that prevails in some other countries.

The dominant type of farming in many regions of the United States has gone through repetitive change. Such must obviously have been the case as commercial farming followed the frontier westward. Sheep production was once centred in New England but is now located primarily in the Mountain states of the west. Wheat acreage was once concentrated on the eastern seaboard but now centres in the Great Plains. As new areas have come into commercial production longer-settled communities have been forced into new patterns of farming. Such adjustments, with their concomitant capital losses and requirements for new capital outlay, are not always easily made. When forced by economic circumstances they result frequently in a lag period of unprofitable farming, of which soil deterioration is a

component part. Some farms and some land never do change over, but drop out of the competitive race as an ever-changing technology of production increases the pace of competition. Recent interpretation of the public interest in the United States has supported credit institutions with public backing to facilitate necessary adjustments. Continued productivity of the land has been considered to offset some risk of public loss.

Still another factor that has posed soil-maintenance problems in the U.S.A. has been the steady expansion of farming activities into new and unfamiliar environment. Such a situation is practically unavoidable in the original development of broadly dissimilar areas. Even the early migrants from western Europe into the humid forest country of the eastern U.S. found unfamiliar conditions of climate and soil. Within this area that is in many respects similar to western Europe they still had to adapt new ways of farming, new methods, new crops. Migration continued westward into humid grasslands with strikingly different, but fortunately, very strong and adaptable soils. Still westward was the sub-humid, short-grass country of the Great Plains; and beyond, the semi-arid lands in the rain shadow of the western mountains.

Particularly did the drier grasslands pose new problems. The institutions brought in from the humid east—especially the eastern concepts of water rights and farm size—were entirely unadaptable. The 160-acre homestead, well suited to the mid-west of horse-farming days, was a serious bobble when extended into the dry country. It imposed an ill-adapted institutional factor which further complicated the adjustment to a new environment. It established too-small farms in an area where accumulating experience indicated only larger, extensively operated farms were suited. The 160-acre homestead imposed an undue burden of family support upon the scanty output of each dry acre. Soil-maintenance problems were accordingly increased.

By singling out this particular illustration of a new environmental problem and an unfortunate institutional setting, I do not mean to imply there were not others. In nearly all parts of the country there now has been at least a generation of adjustment from earlier ignorance and errors. But ill effects of such early mistakes on farm-family welfare and on soil-maintenance problems have not been overcome in total. A considerable sum of public funds are being spent on farm-organization studies to promote further adjustment to the dictates of experience. The benefits of such studies go not only to individual farmers who may be thus assisted, but also in equal or greater degree to the general public.

Important as adjustments to new environment and to changing types of farming have been in relation to the maintenance of soil resources, a still greater problem has been posed by the changing technology of agriculture.

Agriculture in the United States is now about 90 per cent. commercial—meaning that 90 per cent. of the total consumable produce is sold off the farms and only 10 per cent. is consumed by the households on the farms where it is raised. This is a marked increase over the degree of commercialization that prevailed only a few decades ago. Not all farmers have met the increasing commercialization with equal success.

In 1946 the top third of all U.S. farms turned out an average of \$10,000 of produce each, and produced in the aggregate well over 80 per cent. of the total farm production. The true food base of the country is this group of top producers, which number about 2 million farms.

At the other extreme in 1946 was a low third, 2 million farms averaging less than 500 dollars worth of produce each, and yielding in the aggregate less than 4 per cent. of the national agricultural output. Among these low producers are many residential 'farms' and retirement homesteads on which there is no intent to operate commercially. But included also are a vast number of unproductive farms and too-small farms which the march of technical agricultural progress has left behind.

Certainly not all U.S. farms were alike one or two or three generations ago. But differences among them in productivity and in commercial success are now greater than ever before. Many farms, once supporting large families and even producing net income to provide excellent buildings and improvements, now stand in disrepair and support smaller families in relative poverty. The abuse of once-fertile soils is no doubt a frequent reason. But more often the real problem is natural soil quality too inferior to be used with profit in a highly technical, highly commercial agriculture.

Any discussion of soil resources must recognize the inherent variability of soils. Even in the virgin state their natural fertility ranges from the exuberance of a compost pile down to the sterility of a pavement. The best are highly fertile and easily maintained. But on down the range of soil quality there are first the fertility limitations which may be easily overcome, and then those of more serious nature. When the public interest in soil resources is being argued, these facts demand recognition. Soil improvement is possible from a mere biological point of view far beyond any point that can

be economically justified. Of course, the actual marginal improvement expenditure will vary with regions and nations, and will depend upon the time and the place, and the abundance or the lack of soil resources in relation to population and to capacity to import.

A further point to be emphasized is that technical advances in production methods contribute most to the land that is already best. They do least for land that is poorest. Chemical fertilizers, for example, have come increasingly into use on U.S. farms. As Dr. Johnson has pointed out, we are now using approximately twice the tonnage that was used a decade ago. The amount used varies from region to region around the country, but within each region the fertilizer is used mainly on the better soils instead of on the poorer ones. It gives its greatest yield response on soils that lack absolutely nothing except the chemicals added. When used on soils with limiting conditions of drainage or texture or other handicaps, the yield increase is less and the income increase is less. In economic terms the problem is merely one of proportioning, within the law of diminishing returns. In biologic terms it goes back to von Liebig's law of the minimum.

Improved crops and animals and machines tend to add constant percentage rather than constant amount to yield when applied across different grades of land. The new hybrid corn seed, with a capacity to add something like 20 per cent. to yield, adds 15 bushels on 75-bushel land and 5 bushels on 25-bushel land. The relative contribution to farming success is obvious.

In a short span of years our commercial farming has gone through a revolutionary change in the direction of improved crops, improved livestock, improved equipment, better soil-maintenance practices, and better disease and pest control. These technical improvements have boosted acre yields. But let me repeat, they have added most to the land that is best. The spread in net income between more productive and less productive soils keeps widening as agricultural science pushes on ahead.

Technical improvements have added much more to production per worker than they have to production per acre. This is in keeping with the growing technology and the rising productivity of labour throughout the whole economy. It is the basis for the rising level of living. But it has enormous impact upon land use. In fact, rising living standards are inevitably throwing some farm lands into misuse and deterioration. Cash operating costs are high in a highly technical, highly commercialized system of farming. Trouble comes at the point where all costs cannot be covered.

Somewhere between the upper and lower extremes in soil quality is a point where either the farm capital or a desired level of family living cannot be maintained. Below that point the soils are most certain to be abused and deteriorate. It is of course a variable point. In times of economic depression it moves upward in the range of soil quality. In boom times it moves downward. At all times it varies from farm family to farm family depending upon their skill in management and upon the degree to which they place expenditures for living above expenditure for maintaining the farm.

But the very fact that the point of marginality tends to move upward as agricultural science progresses indicates there will always be a land-use problem in the sense that adjustment will be recurrent in line with advancing technology levels.

I think the public sees this but dimly, and in consequence tends to misinterpret its interest. For example, we have in the north-eastern United States a large acreage of land once farmed but now reverted to nature. If our farming methods had been static over the past two generations much of it would still be farmed. Likewise it would still be in agricultural use if alternative and more profitable industrial employment opportunities had not become available or if population growth relative to the expansion of the national economy had been more rapid. But the fact now stands that the region has one-quarter less land in farms than it had in 1900.

The cry is recurrent from the public, or parts thereof, to bring the derelict lands back into production and on to the taxrolls. The desirability of so doing obviously must be determined in terms of cost and value, and with an answer individually determined for each parcel. Any land area or parcel that would require more public service and expense than its potential productivity would support would appear as a doubtful asset to the society within which it is included. For example, it was said on our trip on Thursday: 'What we do with Dartmoor will neither feed us nor make us starve.' That statement lacks the Scotch-Devonian brogue, and the emphatic bobbing, with which it was delivered—otherwise it is pure Currie. In the United States the vast publicity which soil conservation and land use has received since the recent 'awakening' has emphasized primarily the *quantity* aspect of land. It seems more than a little pertinent to recommend *quality* considerations.

The public interest in farm land bears *not so much with each acre* as with an adequate, continuing supply of the desired produce from *the total land base*. It is essential to the public interest that marginal points of quality be determined (both present and prospective

margins), and that public concern, public assistance, and expenditures, if any, to maintain *farm lands* be concentrated on the supramarginal acres.

The comment is considered to apply peculiarly to the United States. But I believe there is now evidence of this same problem in Great Britain, and probably likewise over a large part of the world. With currently prevailing conditions of food shortage and high food-prices there is both public pressure and private activity towards bringing long-idle acres into arable use. Within whatever country, the long-time economic considerations peculiar to its economy—as well as short-time need and opportunity—must be focused sharply upon the true economic productivity of land so reclaimed.

Let me go on from there to note another soil-maintenance problem—that of the too-small farm. Even when located on productive land, the too-small farm may skid off into the same problems of maintenance as plague submarginal acres. Too heavy demands for family living piled upon too few acres lead inevitably to depletion. The little farm, unless operated with offsetting intensity, may not keep even a minimum labour force productively employed. Enterprise efficiency tends to be low, particularly if mechanized production is attempted. All these factors argue for adequate size of farm units as well as adequate quality of production factors, if private interest in level of living and public interest in maintenance of the land are to be achieved.

And it is important to note also that 'adequate size' is not a constant while technology, and particularly machine technology, continues to push ahead. On a given space resource it means a trend towards fewer and larger commercial farm units. In the United States it may not mean fewer farms as counted by the Census Bureau because suburbanization is creating increasing numbers of residential farms. I do not mean to imply either that U.S. farming should or will tend towards a pattern of great corporate units. It is simply that the family-commercial farm requires more acres than formerly if it is to make adequate use of mechanized equipment, if it is to continue to provide productive employment for the same labour force, and if it is to provide both for good living and good maintenance.

Thus if one farm family is to maintain adequate employment that cannot be provided by increasing intensity of land use, it means that some other family is deprived of acres. Such a trend creates another social-economic problem—that of displaced farmers. But to the degree that the too-small farm (as the sole source of a family's

support) is absorbed, it promises well for the public interest in the maintenance of soil resources.

A large farm population certainly offers advantages to an industrial society in the direction of stability and continued growth of the total population. But too many people on the land creates underemployment and diverts net output which should be used for farm maintenance into the immediate consumption needs of surplus farm population.

Consequently in an economy like that of the United States, both public and private interests in the land require a net flow of population from farm to non-farm activities in such volume as will offset both the displacement of farm workers by technology and the natural increase in farm population.

And let me add that I still question whether long-time considerations within the economy of Great Britain, for example, demand the reverse of that policy, a widespread building of new, permanent farmhouses, and the settlement of more families on the land.

A further point in land maintenance may be considerations involved in land-tenure institutions. In the States we have long cherished the institution of owner-operation, and yet it has been greatly modified by the institution of tenancy. Tenancy will continue with us, and should continue, as an important form of land holding and operation. Though it is often criticized as contributing to soil wastage, it need not do so under a properly developed form of lease and with adequate size of farm units.

As most of you know, we have two major types of tenancy in the United States. One is dominant in the tobacco regions and in the Old Cotton south; the other in the corn and wheat regions and in general farming sections. Tobacco and cotton have been little mechanized as yet. The cropper-system which has predominated in the production of these crops is less accurately described as tenancy than as a system of hiring field hands, and assuring their interest in the work by paying them a share of production. To the degree that this system has contributed to soil deterioration it should be charged to the landowner, to the practice of long-continued row cropping and inadequate soil management. It should not be charged to tenancy.

The cropper-system is now on the wane, particularly in cotton farming. And no doubt it will continue to decrease as cotton regions shift to more diversified farming, and as mechanization increasingly takes over.

Tenancy as practised in general livestock and crop farming is a

more permanent institution. In our system, much as is done here in Great Britain, the tenant rents land and improvements and contributes labour, equipment, livestock, and management to the business. This type of tenancy may be expected to increase as the amount of capital needed for an adequate farm unit continues to rise. It is a means by which a young farmer gets the use of land more in keeping with the vigour of his farming activities, and by which the older farmer may turn over to the capital-short young man land in excess of the amount which the older farmer wishes to continue to operate. In the United States, so long as farming continues to be an individual business with the need for refinancing each farm unit each generation, tenancy is a means by which the public interest can be served by keeping land in the hands of the most vigorous operators.

Here in Britain this form of tenancy is not only considered to serve the public interest, but the discussion has progressed beyond that point to the question of whether there should be a single landlord (the State) or a diversity of individual landlords. With respect to land maintenance, and in whatever country, I think the number of landlords and their legalistic character are quite secondary to the lease provisions under which the land is operated.

Leasing terms which discourage either or both tenant and landlord from maintaining and improving the farm are a contributing factor to land deterioration. Such considerations may include length of lease and security of tenure, equity in the division of costs and returns, compensation for unexpired improvements, and liability for damage or for disturbance. But lease terms which discourage proper farming or which are inequitable are adverse not only to the public interest, but equally so in the long run to the private interests of both tenant and landlord.

In United States agriculture trends are definitely evident to improve leasing terms over those which have prevailed in the past. And with more intensive educational effort what we may call *enlightened leasing* will shortly predominate, if it does not now. Public and private interests in this matter are so similar that marked differences are not to be expected as we move progressively beyond the frontier philosophy.

Agriculture as practised in frontier regions is unavoidably extractive. Both public and private psychology on the frontier are geared to exploitive operation. But self interest as well as public interest dictates a change as the frontier recedes farther into history. On a static space resource as contrasted to the expanding space relations of the frontier, private interest in land turns toward the *sustained-*

yield type of farming activity. The *time preference* in resource utilization is shifted from the present only towards a balance between the present and the future. And public and private interests tend to become so much alike as to be far more similar than in conflict.

No doubt the public thinking in the United States and similar new countries has changed more rapidly and has exceeded full private realization of similar interests. But I believe that in our circumstances, the closing of any final gap which remains is essentially a matter of education and of increased stability of farm income rather than of any abrupt change in the institutional framework of land tenure.

Given a national setting of reasonable prosperity, the future of our commercial farming soils in the United States need not be painted as a picture of dark lines. The federal Soil Conservation Service has increased immensely both public and farmer consciousness of proper long-time soil management and proper year-to-year soil usage. And that our soils have not been deteriorating at a wholesale rate is evidenced by a total of farm production in recent years at the highest levels in our history.

Certain special interests within the United States are now promoting the idea that our soils have been heavily depleted during the recent war. Such a concept has gained considerable public support, but is nevertheless erroneous. Increased use of chemical fertilizers and increased livestock numbers with corresponding increased use of farm manures have put a great deal more plant nutrients back into our soils than the increased cropping of the war years and increased yields have removed. Such a fact is worthy of emphasis, even in a paper at this International Conference, as an illustration of an attempt by special interests to corrupt public thinking with an appealing idea. If proper land management, in the full long-term meaning of the concept, is to be achieved through education, then public as well as private interests must be truly educated and not misguided.

Very probably some may feel at this point that I have dealt inexcusably long with conditions which apply only to the newer countries, and wish for greater treatment of problems more typical of other societies. My excuse is obviously that I have discussed the conditions I know best.

It seems to me other situations fall into two types. First, the land-use problems in older nations and regions where the impact of new areas has had a depressing influence on traditional farming activities—however robust they may once have been. Parts of Europe perhaps may be thought of in this connexion. And within the United States we have this sort of condition at least in parts of the north-eastern

states to which I previously referred. Such conditions are expressed in lands reverting to nature, in fences and buildings falling into disrepair, and in gradual depopulation as young folks move out and old folks die off.

Some such land becomes first marginal then progressively sub-marginal for any kind of commercial farming on the basis of its comparative fertility. Other parcels may be returned to production by shifting the type of farming, by the outlay of new and wisely invested capital, by new knowledge and new experience. Such shifts are commonly a costly and trying chore. They are a vast challenge. And both public and private interest demand that they be undertaken only with thorough-going analysis of potential opportunities.

A second type of situation is found where population is overburdensome on the land and is there immobilized by lack of alternative employment. Parts of both the Near and Far East are certainly in this situation, but they are only type examples and by no means exclusive. In the United States we have the same direction, if not the same degree of problem in parts of the Old Cotton south. The situation is characterized by hand-labour farming, by tenancy which commonly channels into the less-desirable forms, by land rents disproportionately high relative to production, by low levels of diet even on the best land, by high birth-rates, high death-rates, low educational levels, and by failure to maintain the land in an optimum state of productivity. Some such populations are concentrated on extremely strong alluvial soils where operations can continue for an exceedingly long time. Other aggregations have been less fortunate in their location and have run into soil-maintenance problems much sooner.

If I had any quick solution for these problems my services would be too valuable to permit me to attend this conference. Permanent corrections can be only in the direction of fewer people engaged directly in farming, a greater use of production capital and science per farmer left on the land, and a decrease in reproduction rates. Others have already presented to the conference much more pertinent material on these matters than I am capable of contributing.

Entirely aside from any question of proper land management, there may be a second area in which public and private interests may conflict. Whether it is less important or more important than land-management problems I shall not attempt to answer. I wish only to point it out but not to discuss it in any considerable detail.

What I have in mind is the potential, if not actual, conflicts of

interest which arise from pressure-group political action on the one hand, and from a centrally administered, instead of a market directed economy, on the other.

Pressure-group actions may push out into all sorts of directions without regard to economic dictates if only the pressure groups are strong enough or clever enough to foist off their desires upon a beguiled public. A four-star example of such pressure action is found in the irresponsible use of the protective tariff. It is, however, only a type example.

We need not look very far down the list of world powers to find one which I think has made irresponsible use of tariffs. It is a country which recently considered a Wool Bill. Certainly it has a few sheep farmers, and considerable acreage suited only to grazing sheep. But the Wool Bill, while extremely important to the private interests of a small minority, would have been, if passed, equally adverse to the general public. The whole question is whether it is more important to the public interest to keep a certain area of desert and mountain grazing land in use by assuring high wool prices to a few thousand producers, or to permit 140 million people to buy wool (and consequently woollen clothing) more cheaply from other producers who are willing to sell more cheaply. I see here the private interest and the public interest as being directly opposed. Private interests have often prevailed (as, for another example, the sugar interests in this same country) through the economic ignorance of the general public and a political system peculiarly adapted to the well-worn institution known as log-rolling.

The application of tariffs may enormously influence land use through interference with a free play of the principle of comparative advantage and the breakdown of inter-regional specialization. To the great unwashed public of most nations, the across-the-border exchange of goods is only an obscure principle couched in unintelligible terms in the text-books of a befogged social science. It is much less understandable than Buy British, Buy American, or Buy Ithaca.

As economists we have a vast educational job on our hands. The education cannot be accomplished overnight any more than the tariffs (and other forms of similar restrictions) can be eliminated overnight. I look no farther than right at home, right in my own classroom, for beginning the job.

The United States has the horns, tail, and red suit of a prime offender. I believe our tariff acts of 1922 and 1930 were important factors in the inter-war growth of economic nationalism, in the

depths to which the Great Depression descended, and a contributing factor underlying the Second World War. The battlefields of that war were a form of land use adverse to both private and public interest.

Letting that example do for pressure groups, may I turn quickly and probably equally unsatisfactorily to conflicts in an administered economy. These problems grow out of what I believe to be misinterpretations of the real public interest. We have previously referred to misinterpretations of private interest—situations in which an individual misdirects his efforts either through ignorance or through deliberate short-run grabbing. There can be similar mistakes and misinterpretations of public interest—and an administered economy is most susceptible to them.

Private interests can be expected to follow in production the dictates of price and cost relationships. In an essentially free economy this means that individual farmers will use their land in accordance with its adaptation under the principle of comparative advantage. In a centrally planned economy where it is decided that produce should be raised in a balance between products different from that dictated by free price-cost relationships, the farmer lacks other production guidance than that indicated by the goals and plans of administrative agencies.

All administrators who have the wisdom and uncompromising justice of the Almighty can do a good job. Others make mistakes.

My information relative to certain parts of continental Europe indicates that military governments and other administered governments have fixed prices and pegged currencies at levels which misdirect food production and distribution. In essence black markets are fostered. Livestock are produced where more potatoes and other types of primary foods would more nearly meet the prevailing public interest.

We were told on the first day of the Conference that Britain is going to aim at 400,000 acres of seed flax. This marine-west-coast climate has long been the climatic home of fibre flax, but has not been considered the ideal for seed flax. Is this a programme to spite Argentina? Has it considered the possibilities of seed-flax climatic areas in Australia and South Africa if Empire sources are desired? And has it fully considered that within Britain, potential flax-seed land is wheat land? And what is the public interest, flax or wheat? I do not know. I am merely asking a question that will be answered only by experience. Four hundred thousand acres will be a lot of experience.

In private conversations (and I sincerely hope that this is no breach of confidence) Sir Manilal has indicated that certain Indian farmers are concentrating on tobacco production instead of food because food prices have been fixed at a level less profitable than tobacco. Again, has the public interest been properly interpreted, and does smoking compensate for empty bellies?

I believe that the areas in which public and private interests conflict are small indeed relative to the areas of agreement when the facts are known by all parties. Not all the facts are known—not by the public, nor by individuals, nor by that select group classed as administrators. The challenge to agricultural scientists and educators is of vast proportions. But I submit that research and education are the only solutions.

DISCUSSION

SHERMAN E. JOHNSON.

What I have to say will be more in the nature of supplementation than a question. Perhaps Dr. DeGraff will want to react to it after I get through. It was a stimulating paper, but I do want to supplement it on two or three points. On the question of war-time depletion and damage to soil resources in the United States, I would go along on the statement that we had more restoration of plant nutrients relative to the output of farm products than we had before the war. Therefore, if it were just a question of depletion of soil fertility that could be restored by the application of more fertilizers, and by other practices, the question would not be serious. But we have ploughed up about 8 million acres of land, going largely into wheat, some of it in the dry, high hazard areas that are going to give us trouble again when the dry years return. From a long-time standpoint that land ought to be in grass. I think that is a serious problem. I must confess that I do not have any measure that I can suggest as to the seriousness of the damage, but I am convinced that it exists. I think this also is true in the hilly areas where we planted intertilled crops too frequently on land that was not suited for continuous planting of intertilled crops. And there we did have erosion damage that to some extent is irreparable. This land cannot be restored with commercial fertilizers.

On another point I thought Dr. DeGraff gave the impression that in an efficient agriculture soil maintenance was always or nearly always immediately profitable. I doubt that from the experience in the United States at least. I have had some discussions with the folks

in our Pacific north-west regarding the situation in their wheat areas. They do not find that there are sufficient near-term returns from conservation farming, so that farmers would find it profitable to farm in a way that would maintain soil resources. And of course the outstanding area in our country where that is true is our Great Plains wheat region. We have not devised any system of farming that will maintain soil resources in that part of the United States, consequently we are mining that area. Now, if you regard the use of this land in the same way as you think of a coal-mine, that is one thing, but we are not maintaining soil resources in that part of the country, and we might as well recognize it. I suspect that there are other areas in the world that are similarly situated.

I think we need to remember that there are two necessary prerequisites for soil resources to be maintained in efficient farming. First, it must be technically possible, and second, it must be profitable to farmers. In our Great Plains region it is not technically possible yet, unless we shift entirely to grazing, which when land is once ploughed up is a very much lower value use under ordinary circumstances. In other words, the scientists have not discovered the technical possibility of maintaining that soil with arable farming. In other areas it is technically possible to maintain soil resources but farmers do not find it profitable. How can we maintain soil resources to the extent that maintenance is in the public interest in such areas? I am not saying that we should maintain them intact, but I think we need to give considerable attention as to how much conservation we need in the public interest, and to how much investment is necessary to achieve it. Public investments should be made to the extent that they are necessary to maintain the public interest. And in that regard I make very little distinction between the different kinds of investment. I think we might use all types of investments that are needed to do the job. And by all kinds I include education and research, which are public investments. Most of us are employed by the public, and we regard our work as public investment in the public interest. That is one type of investment. The Soil Conservation Service in our country is furnishing technical service in the way of laying contour lines for terracing and for contour farming and so on. That is another type of public investment in the public interest. We have had a third type in recent years. We have furnished lime and fertilizer, and in fact other materials to promote conservation. To the extent that those materials promote conservation in the public interest, I think they are in the same category as education and research. You can raise questions of course about the difficulties of

administration, but I think the lime programme especially has been very effective in promoting the uses of lime, because the uses of lime have about quadrupled since 1935.

Because of a discussion I had after yesterday morning's programme, I am going to ask you to bear with me for just a moment on another point. I was asked what we were doing in the southern states, and whether there were any suggestions from that work which might be helpful to the people from other areas who were faced with similar problems, similar in form if not in intensity. Dr. DeGraff also referred to that this morning. I am not a southerner, and I do not want to pose as an expert on the south. Mr. Sayre could say this much better than I can. Perhaps he would not agree with what I say. But we have had a committee of southerners working for about a year and a half, and working very hard on southern problems, and just in very brief, one-two-three fashion, I want to mention some of their conclusions.

First of all they suggested full steam ahead on industrialization. That area has not been industrialized to the extent that other areas have. They do have resources of water-power, coal, iron, gas, oil, timber, and others. They have the only sulphur mines, by the way, that we have in our country. So that there are resources within the region. And the population is heavily concentrated. How can industrialization be accelerated? I do not know. One of the suggestions that has been made is to ensure venture capital in that area. Some of the states are tackling it in other ways. But we do know that we do need to go full steam ahead on industrialization.

As number two they suggested greater emphasis on education, starting with the young people, but also working with older people as well. Training for non-farm work is more important than for farming because so many of them are going to have to shift to non-farm work. But in farming I believe we need to think of some new methods of education and training. One of them might be apprenticeship farming. I think also there are some real possibilities in the way of farm management assistance. Some of you are acquainted with what was our Farm Security programme. It was an attempt at rehabilitation of poorer farmers, and the idea of rehabilitation with some supervision and aid on both farm and home aspects may have in it some suggestions for other areas. To be sure, credit and other types of assistance should also be in the picture.

Although material assistance is necessary for improvement of farm resources it seems to me that we need to think of starting where we are with the present generation of farmers and then working towards

improvement and development of skills for other employment for the younger people who will not be needed in farming in an efficient agriculture.

That kind of a programme will require a great deal of public investment in agriculture as well as in other lines—in the public interest. And I think we ought not to be afraid of that. Of course, the more serious the crisis or the more serious the conditions, the more public investment and the more public attention will be required. I do not believe in any more public investment or public programmes than are necessary to do the job that has to be done in the public interest. Sometimes we do those jobs very poorly from an administrative point of view. But I think we need to recognize that some public activity is necessary in the public interest—not as a substitute for individual effort, but to complement it.

EDGAR THOMAS.

Before putting my point I would like to give my personal thanks to Professor DeGraff for his very able and, if I may so describe it, scholarly paper this morning. It was probably accidental that this paper should come at the end of the conference. But, even if the persons who were responsible for the programme had seen all the papers beforehand, we could not have had a more fitting final paper to our conference. That at least is my feeling.

The point I want to make is this. This morning we are not discussing farm management at all. We are discussing land management. Professor DeGraff touched on the importance of the systems of holding land in this connexion. In considering the relative merits of tenancy systems and occupying ownership there are certain well-recognized advantages in being a tenant from the farm-management angle, i.e. from the point of view of the operating farmer. But in considering land use we are more concerned with the advantages from the point of view of land management, or from the point of view of the ownership of land. In this country we use the term 'estate management' in this connexion. The term 'estate', in turn, conveys the conception of the large landed property, something which is larger than the farm and which permits whoever is responsible for the management of the estate to practise certain principles of estate management which I suggest are not possible under a system of occupying ownership. If we are to practise land management we must have control of large tracts of land before what we mean by estate management is practicable. Whether the ownership of these estates is in individual hands or in corporate hands or in

public hands is a secondary consideration. The point is that in considering land use we have to think in terms of much larger areas of land than even the largest-sized farms.

I do wish that Professor DeGraff had not restrained himself when he came to touch on the present position in this country. I suspect that if he had let himself go he would probably have expressed concern about the trend towards the state ownership of land and all it means by loss of freedom and so forth. I want to suggest, without developing the point at all, that it is just possible that the rules and regulations and restrictions which have to be imposed in order to get the optimum land use under private ownership may be a much greater menace to the freedom of the individual operator than anything which would be necessary if the land itself were in public ownership.

A. W. ASHBY.

I would like to put one or two points relative to this discussion. Theoretically if we conceive at least of the Western world as moving very rapidly towards a stationary population, and if we remember the recent progress in agricultural science and its application, I think we have, in the course of time (and but for the intervention of this war in a relatively short course of time), to consider the necessity of retirement of land and also to consider the *processes* of land retirement. 'Land retirement', I believe, is a term which we need to get into these general concepts of conservation, reclamation, and use. Retirement in some cases is just as important as any of these other processes. I agree with Dr. DeGraff that, up to the present moment, the contribution of science and engineering to production in agriculture have been greater in the case of the output per man than in the case of the output per acre. I agree particularly if you are looking at crop production for direct human consumption. But I believe that, if you are taking crop production including pasture production and the processes of livestock production together, the increase in output per acre there has been far more than in the case of the crops grown for direct human consumption. There are these factors in that particular case. First, there is the increase in the production of crops including pasturage per acre. There has been an absolute revolution in pasture production in New Zealand, and there is perhaps beginning to be a similar revolution in this country. Considerable improvements in pastures have been somewhat general. Second, there is the increase in the converting capacity of the livestock themselves. Third, we have had in the last twenty years a factor almost as important as

the other two, namely, the increasing knowledge and the increasing application of knowledge in the combination of pasturage and other crops, and converting capacities, for livestock production. If we look at certain parts of the world, and particularly at New Zealand, the increase in output per acre has been extremely rapid.

To the general proposition which I put at the beginning there are of course one or two slight qualifications, one that when opportunity occurs in the Western world the people may eat more food, another that they may eat a higher quality of food, i.e. more livestock products in the totals, thus requiring more land. And still a third, taking the world as a whole, there may be more agricultural production of industrial raw materials. Those are qualifications of the original theorem. But at the same time one must remember that with the types of agricultural policies being pursued, and with the ideas that are in the minds of some of the nutritionists, we could give the world, even the Western world, better food, purely from the point of view of nutrition alone, with less land than we have in occupation and use at the present time, if we turn the population back on to a lower cost and more vegetarian dietary.

Beyond this, I think that in any case if we look not at the theoretical position, but at the practical position as it has developed in this century, land retirement is often necessary. If you want to go farther back you will find any number of cases in the previous centuries. Cases of the need of land retirement are always occurring. The general process has been just to let it go out of use—to 'tumble down'. But where there is no necessity of land retirement as such, there is the necessity of transfer of land from higher agricultural to lower agricultural uses, such as Mr. Johnson was mentioning about the wheat plains a few minutes ago. We in this country are beginning to feel more confident in dealing with a situation of that kind, very largely because of the very rapid and very effective increase in the knowledge and practices of making and managing pastures. Indeed, if we were concerned with the production of livestock products in some parts of our country, the probability is that we get as much carbohydrate, as much starch equivalent, from some of our pastures as we should from treating the same land under arable crops. On the balance at any rate there is very little difference. But there is in all these cases of transfer from higher to lower agricultural uses the necessity, as Dr. DeGraff said, for the institutional adjustments or the adjustment of the size of farm to the new use. In this country I would say that we have very little land which is absolutely marginal if it is used in farms of the appropriate size for appropriate purposes.

Our marginality is very largely determined by the historical type of settlement; that is, by the size and the type of existing holdings and their equipment. And the provision and arrangement of the new institutional settings for change of use is an enormous problem, especially in this country with the very solid buildings that you have seen, and the generally heavy capital investment.

At this point I would just like to comment on an early part of Dr. DeGraff's paper and say that if you are looking at the surface soils of large parts of a long-settled country, their characteristics are man-made. The effective surface soil consists largely of labour and materials. That is true of some of the most productive parts of this country. If you are looking at hilly parts, you will find fields that lie close to the farm buildings, extremely productive fields, and if you move a quarter of a mile away you will find fields that look and act entirely differently. Set the chemist and the physicist on the job and they would tell you that there is little or no difference between the nearer and the more distant soils. All that has happened is that for a thousand years we have been putting livestock on the nearby lots. And that is what Sir Manilal said about India the other day—more productive land near the villages, less productive in the margins between villages. That condition occurs in the Midlands of England. But one of the fundamental problems in attitudes to land, and in public and private actions in relation to land, is the condition in all the older countries, and I believe practically the world over, of the emotional set of the general population, very often on the lines that the land is sacred, and that all lands should be used for food production. That is our fundamental problem, getting rid of sentimental attitudes, setting out to establish rational general conceptions of the relations between land, supplies of materials, and all types of labour force for production; supply of food-stuffs and industrial raw materials required; and also, of course, between these and the living conditions of the cultivator. In this country during the war reclamation and renovation of land have been extremely popular. The publicity value has been extremely high. But I can tell you that if we had used on the better land the main part of the labour, the main parts of the lime and superphosphate, that we used on reclamation and renovation, we would have got a greater contribution to national food supplies. But that would not have given such spectacular results, and it would not have been so popular. However, even in this country we do have to consider this problem of land retirement and the appropriate form of retirement in certain circumstances, and the appropriate processes of retirement.