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AGRICULTURAL PRODUCTIVITY, ECONOMIC GROWTH, AND THE FARM POLICY MOTIVATION OF URBAN ELECTORATES

Whatever the stage of their economic development, all nations continue to have, as always, a vital concern in agriculture and food. In the last few decades farmers in some of the highly industrialized countries have succeeded in utilizing the results of scientific research, innovation, and mechanical engineering on such scale that productivity has increased more than in the nonagricultural parts of the economy. The problem in leading agricultural exporting countries, including the United States, Canada, Argentina, Australia, New Zealand, Burma, and Thailand, is a continual aggregate excess capacity of food and fiber production, while in enormous areas of the world with an overwhelming majority of the world's population, agriculture is struggling hard to produce at least a minimum supply, for the direst needs, of food, feed, and fibers.

It may seem paradoxical that in the industrially advanced countries with excess agricultural capacity, either in the aggregate or for certain major commodities, the farm policy typically involves heavy subsidization of farm income and farm exports, while in the forcefully and coercively industrializing countries with their notorious shortage of farm products the opposite is true; namely, the state subsidizes industries at the expense of the farmers by a variety of measures which squeeze capital out of agriculture. However, in reality, state intervention in the form of income support as well as the "squeeze" is to a considerable degree responsible for excessive or insufficient output by overaccelerating or by retarding growth of capacity.

In the United States as well as many Western European countries there has evolved through many years a political and legislative deadlock in the treatment of their peculiar type of "farm problem." It seems essential for all countries with representative government that their electorate, legislators, and administrators understand fully the nature of the impact of technological change and the powerful dynamic shifts and changes in the structure and performance of agriculture within a private enterprise and market economy. This is particularly necessary because in all these countries the farmers, like industrial groups and a part of labor, for at least two generations have been politically well organized and very

effectively represented, something that does not hold for the consumers. Moreover, the actual situation in agriculture in industrially advanced countries is substantially different from what the public thinks it is and what certain farm pressure groups claim it to be. Only when it is clearly seen what specifically has caused the continual rise in productivity of agriculture will it be possible to break the deadlock of farm policy without impeding the forces that give agriculture in the noncoercive society its momentum in the creation of wealth while protecting an abundant, reasonably priced supply of what remains every industrial nation's foremost raw material—food.

In all countries, the hard core of the over-all farm problem is not cyclical or temporary, but almost eternal in nature and therefore not amenable to a real remedy or cure. It is part of the epic of man's struggle for survival in, and gradual conquest and partial control of, a hostile, reluctantly and scantily yielding nature. The core of the farm problem is an integral element in the eternal process of economic development and growth. What has happened in agriculture's history and what continues to go on differs considerably from what is popularly assumed in many countries, including the United States, to be a temporary disturbance in a more or less static situation in man's adaptation to geography and nature.

CONTINUAL SHIFT IN ALLOCATION OF HUMAN RESOURCES

In Thomas Jefferson's time nine-tenths of the American people earned their living by farming. Around 1900, only 50 per cent of the labor force worked on the farm; today it is less than 10 per cent. This evidence of profound social and economic change is most significant and illuminating.

What was the state of the American economy 185 years ago? This can be shown by the economy of many pre-industrial countries which today are still where our economy was then. In the underdeveloped economy nearly all economic activities are carried on at the farm except for work done by government personnel, armed forces, teachers, and some general storekeepers and other merchants. Food, clothing, shelter, farm and other tools, transportation, education, entertainment, and medication are all produced on the farm. Farmers build houses, barns, and bins out of brick, wood, and other materials; they lay pavements, dig ditches and canals, build bridges and dams; they raise draft animals, tan hides, and card, spin, and weave; they process and cure any sort of food, and bake bread; they slaughter, preserve, smoke, salt, and pickle; they produce wheels and wagons and sleds, and with animal draft power provide transportation for people or cargoes. Farmers provide entertainment at all festivals, baptisms, nuptials, and after funerals; they educate and train the young people, treat the sick and the aging, and bury the dead. So farmers are jacks-of-all-trades, producing plants and animals, lumber and firewood, and peat and gravel and sand. Naturally, what goes to market for cash is little. Hence, it is sheer nonsense to measure their real income by the cash returns in dollars, as is done today by international agencies in their statistics for underdeveloped countries, and to use such meaningless and utterly misleading figures for comparisons with countries that have a highly developed exchange economy. This distorts the true income out of all proportion, exaggerates almost to futility the task of develop-

ment, and serves only to stir resentment against the industrially more advanced nations. Since the criterion for an underdeveloped economy is the predominance of what the Greeks called the "oikos," i.e., the self-supporting household, and the absence of a high volume and velocity of exchange of goods and services, the degree of abject poverty of entire nations is statistically created by definition.

In that underdeveloped stage the economy functions within a structure of total decentralization and with vast numbers of small, vertically integrated units. As development begins, one activity after another is segregated from many farms at a time. Hence, not only do new occupations arise, but the skilled workers begin to operate on a much larger scale than before, at much lower costs and prices, and with much higher profits. Since they no longer produce for themselves but for customers, the market begins to become more active. Many specialized crafts appear: wheelwrights, carriage and harness makers, blacksmiths, and more and more of all the others. Their lower prices expand the market, and their income increases the demand for farm products. If originally farmers were jacks-of-all-trades, they gradually became jacks-of-fewer-and-fewer-trades and thereby became more skilled and more productive. Thus, by the division of labor, farm operations become more and more specialized and refined—until ultimately only crops and animals are produced. This process lowers costs per unit of product and leads to lower prices of farm products or higher farm profits or both, a shift that generates more development. Gone from the farms are the building trades, the processing of textiles and clothes, the slaughter and curing of meat; finally even bread, butter, and most other foods are bought because the time of the farm people is so precious.

This process of economic development is little understood. It amounts to a piecemeal disassembling and reassembling of the economy with growth of cities and the rise of industries, commerce, transportation, education, research, and a multitude of more and more refined services.

As more people become urban consumers with a rising purchasing power, they are bidding not for more calories but for a diet with more calories from products with a high "value added," such as sugar, milk, meat, bacon, butter, eggs, fruits, and vegetables, and less from starchy staples like corn, wheat, and potatoes. With a rising demand for their products in the markets the people remaining on the farm increase their output, and with it their income. In order to do this, they have to equip themselves with better tools, more mechanical power, better plants and animals. In other words, they must increase the capital at their command, and must perform with ever increasing efficiency as self-employed farm manager-workers. In doing this they continue to lower the unit costs and the prices of their products while increasing their income.

VOLUNTARY MOBILITY OF LABOR

All of this is proceeding every day in our completely decentralized, essentially free-enterprise economy where people are not pushed from one job to another by the Government or anybody else, but where under the lure of differential inducements by employers they make their own choice and choose their occupation, their place of work and living, according to their own preference and the available opportunities. In doing this the families evaluate the whole package of working

and living conditions, the opportunity of improving their composite income in cash, kind, and amenities, the security of their job and livelihood. Even in the backwoods they usually know very well what other jobs pay, and they decide to take or leave the often better pay.

He who claims that in recent years several million farm people "have been driven off the farm" should first explain who was responsible for the shift from 90 per cent to 10 per cent in farm work in 185 years. Who drove them off? The answer is: Nobody, except perhaps occasionally a nagging partner in marriage. Those who left did the sensible thing, contributing their service where it was needed most as the country developed and the economy started and continued to grow. In a politico-economic system of free people nobody has a right to determine where the individuals and families live and where they choose to work, or on what, except they themselves. In fact, so long as they ask for no support from the public, pay their taxes, and are not delinquent as parents of minor children, nobody has a right to force them to be efficient or to increase their income, even if they prefer to live like hermits or to sleep like Rip van Winkle. In reality, since all normal people have a great variety of needs and a far greater variety of wants, it is safe to count on their desire to satisfy these needs and wants and to respond to the incentives for doing so which the market economy with flexible wages offers.

It is axiomatic that without the movement of people from farm to town and cities, all industrial and urban development—the entire construction of a civilization on a continent that 100 years ago was still mostly wilderness—would have been impossible.

THE PARADISE-LOST COMPLEX OF URBAN ELECTORATES

Moreover, in this long historical shift from farms to urban life and work lies the key to a secret in all modern democracies which puzzles even political scientists and which few people understand: namely, the fact that the smaller the proportion of farm people in the electorate, the more they are assured of the good will of urban voters, legislators, and administrators, and their readiness to grant farm aid. It is not the rising political power of rapidly shrinking "farm blocs" that guarantees this, but the subconscious memory of all people in Western industrial society that all of them originally came from the farm, which solidly anchors their fondness and affection for the farm people. I call this the urban dweller's image of Paradise Lost: the farm as the forebears' origin and the happy valley where life is imagined as having been simple, safe, harmonious, and peaceful. Indeed, it is an incontestable historical fact that, outside of the Garden of Eden, the cradle of all civilizations was the farm. Mixed with such nostalgia is a feeling of guilt toward those who were left behind in the heroic march of urban progress and who are supposed to be condemned to live in social isolation, deprived of the comforts of modern city residences, forced to do hard physical work for long hours, being tied to tend cows and other animals 365 days a year, exposed to the vicissitudes and hazards of weather and unstable international markets. All such secular assumptions have a strong foundation in the high social value that most religious bodies assign to the farm as a favorable setting for family life. Hence, with this reverence for their idealized common origin, the

urban voters have nothing against subsidies for the "poor fellows on the farm," even if it means many billions of dollars of taxpayers' money. All they care about is that the money not be wasted by bureaucrats and shall really help the farmer, which is after all reasonable enough. What really motivates the free society and its noncoercive economy is the social conscience and a striving for justice and equality.

Irrespective of how far these thoughts stray from reality, they are anchored deep in the modern industrial nation's soul and backed by the determination of the electorate in a democracy to come to the assistance of the underdog. Such thoughts are as solid and real a stock of good will for the farmer as is the stock of gold bullion in Kentucky for the United States Treasury. Indeed, they should be nursed by the farmers, their organizations, and their political leaders as tenderly as the gold reserve is by the Secretary of the Treasury, the disproportionately large representation of farm interests in the United States Senate notwithstanding.

What has actually happened on the farms is far more complex than the average citizen can realize, and the present farm situation is quite different from what such nostalgic sentiments imply. Needless to say, the dim past was also quite different from what its idealization makes of it.

Our economy has grown in the long run at a very steady rate and this growth has at all times been hinged to the rise in agricultural productivity, meaning the rate of output per man-hour. In recent years the rate of productivity on farms has not only left the rates of growth of population and per capita income far behind, but also the rate of productivity of the rest of the economy. This gain has historically been the effect of increased productivity elsewhere, and in a shuttlecock reaction has become the cause of more productivity in agriculture, which again caused productivity gains elsewhere. How this has technically come about may be sketched in a few rough strokes as follows.

MECHANIZATION OF A GREAT TRANSPORT INDUSTRY: AGRICULTURE

Agriculture is in fact the world's oldest and, until recently, its greatest industry of year-round cross-country transportation. In the United States nowadays our 3.7 million farms use and operate 470 million acres of cropland, 900 million acres of grazing land, and over 160 million acres of commercial forest land, or a total of more than 1.5 billion acres, from below sea level to high mountain plateaus. Every square foot of cropland must be worked with implements and tools, or passed over with loads of materials many times every year—indeed, for some crops up to 35 times—and, where double or triple cropping takes place, even more often. And people and bulky commodities have to be transported from the fields to the farmstead and back again, and from town to farm and from farm to town.

Therefore, to a large extent the saga of progress on the farm is the saga of the fabulous evolution in the technology and reduction of costs of transportation which began with better ocean-going vessels to and from the New World. The American Indians had no ox, no donkey, no horse, and not even a cart with wheels. The Spaniards and other colonial powers to whom we owe our origin brought cattle, donkeys, mules, horses, and wagons. This increase in transport

power and rolling stock was the most decisive capital import that gave the spur to development. From their beginning up to the turn of this century, American farmers, with the employment ultimately of over 30 million draft animals, converted some 450 million acres of cropland and some 700 million acres of grassland to agricultural use, and cleared in the process some 400 million acres of forest land in humid climates. This basic operation of pushing the forests back to the "absolute" forest land cost three generations of toil; it was a piece of home work Western Europe had already done during the Middle Ages, and something Soviet Russia must do in the future. Contrary to the ignorant indictment by politicians in the early thirties, this clearing of the woodland was one of the great achievements on which, here as in Europe, the civilization was built. Clearing the wood not only freed moist acreage for crops such as cotton, tobacco, wheat, oats, corn, and root crops, and opened land for pasture and hay; it supplied the entire economy with fuel for homes, industries, steamships, and railroad engines, and also the chief raw material for housing and most other construction, including railroad ties and mine timbers. As Schurr and Netschert have shown, in 1850 fuel wood supplied over 90 per cent of all heat and mechanical energy consumed in the United States, while by 1900 the fuel wood share had declined to 21 per cent and by 1955 to less than 3 per cent.

The first impetus to growth was passed to American farming by water transportation, which is still today far less costly than any form of land transport. Yet draft animals powered all land transport on which agriculture and industries relied. Around the middle of the last century steamships and railroads began to supplement and gradually to replace draft animal transportation between farms and markets. This reduced costs enough to move tallow and hides and grain over longer and longer land distances, and set free more and more draft animals for work on the farms.

As the economy developed, draft animals became clearly too inefficient in terms of both manpower and cropland. Labor, especially, was too scarce and expensive to be wasted. Toward the eighties of the last century the steam engine brought the huge steam plows such as those built by Fowler in Leeds. I still operated these on German estates in 1919, and there are still some standing around on western ranches in the United States. But these twin monsters with their steel cable with which they shuttled the 12-share tilting gangplow back and forth across the field, made no real inroads on animal draft power. They were too clumsy, too costly, and could be used only for plowing. Neither did the electric plow bring any change despite Lenin's prediction in 1902 while in exile in Switzerland. (A German corporation and a Soviet Russian Institute experimented with the electric cable plows until the mid-thirties.)

But in this century the internal combustion engine became, during and after World War I, the effective replacement to animal power—though first, and still predominantly, in this country. It provided individual motive power for the totally decentralized transportation industry that is identical with agriculture. Progress was slow and halting. But the potential market of 100 million farms in the world attracted and concentrated the work of the engineers of many countries on the task. However, the horse could be profitably replaced only with the combination of three motor vehicles—the tractor, the truck, and the car—because the horse, with the equivalent of four or more gears giving it different speeds

and gaits, was effective locomotive power for wagons, carts, and buggies as well as for farm machines. But with the introduction of power take-off, self-propelled machines like combines, and the all-purpose tractor with adjustable axle width, attachable tools, and powerlift, all formerly horse-drawn equipment was gradually replaced. However, this scrapping of all the obsolete inventory and the replacement of all "rolling stock" of wagons and implements involved a vast amount of new capital, and tied agriculture more and more to the commercial operations of the exchange economy and its cycles.

The revolution in transportation on and off the farm which the internal combustion engine has brought about since 1914 has continually lowered one of agriculture's greatest operational cost items per unit of product and thereby contributed remarkably to economic growth.

Today we have a fleet of 15 million tractors, trucks, cars, and combines, plus many million electric motors, on less than 4 million farms. At the peak of animal draft power use in the late 1920's about 15 million horsepower were available. A recent estimate listed the mechanical power equipment of our farms at 115.6 million horsepower, all railroads at 88.7, and all factories at 28.2 million. The result is a gigantic increase in all transportation *on the farm* while transportation *off the farm* has mostly been taken over by others: barges, railroads, trucks, and air cargo carriers. The increase in available means of transportation on the farm has been further improved by the shift in the entire economy from the farm-produced and transported cordwood as fuel to minerals like coal, oil, and gas, or to hydroelectric power.

Furthermore, agriculture ceased to transport the small grains—with about twice as much weight of straw—from field to bins for threshing during the winter, and to transport the vast amount of straw back to the fields once it had been used as litter in barns. The combine harvester-thresher eliminated movement of all the straw. The disappearance of this huge transportation job on the farms promptly set free a vast amount of draft power and labor for more effective cultural practices.

With oxen, horses, and mules practically gone, and with vastly more mechanical draft power at hand, there is more speed, more power-propelled equipment, and such a gain in productivity of manpower on farms, that despite increasing purchasing power of a rapidly growing population there is a surplus of manpower on the farms. It seems likely that for the next decade this surplus will continue, while better equipping of manpower with mechanical draft power will remain profitable. Thus, agriculture is still a growing market for the farm machinery and vehicle industries, and the petrochemical industries. Our farms are consuming half as much steel as the entire automotive industry. Secretary of Agriculture Ezra Benson, in a speech on November 21, 1958, at Beltsville, estimated that by 1975 United States agriculture would purchase chemicals at an annual rate of \$3¼ billion—namely \$1 billion worth of pesticides and \$2¼ billion worth of fertilizers.

FAVORABLE PRICE-COST RATIOS

The value of the equipment of our farms, including machinery and motor vehicles, has increased in the last 20 years from \$3 billion to over \$18 billion current dollars, or, valued in constant dollars at 1940 prices, from \$3 billion to

over \$7 billion, i.e., by 138 per cent. But in terms of work capacity and actual performance, the gain represented by this increase per volume and quality of physical productive assets is immeasurably greater. Of course, farmers buy more new machinery, not because they love new gadgets that do more fancy stunts, but only if and when all costs per unit of work leave a clear net gain over the costs replaced, and in the course of several years the costs per unit leave a net gain under the prevailing sales price per unit on the farm. Since for many years farm wages have been rising much faster than prices of labor-saving machinery, and the costs per unit of machine work have been rising much less than prices of farm products, farmers have invested in more machinery. And since the growth of the general economy has absorbed the labor set free, the number of farms has shrunk from a peak of 6.8 million units in the thirties to 4.5 million by 1960,¹ and the acreage per farm increased from roughly 155 to roughly 275 acres with a continual improvement of the farmer's financial position compared with prewar years. The enlargement of acreage per farm has improved the mix of cost items, cutting down the proportion of overhead costs and increasing the proportion of variable costs.

As it became more and more profitable to replace the horses and mules, the acreage for producing their feed shrank from 92 million in 1914 to 7 million in 1960, setting free for crops and, even more, for cattle, 85 million productive acres of land.

Simultaneously with the vigorous mechanization, the production per plant and per acre of crops and per animal has been increased. Crop yields were boosted by better cultural practices, improved seed, and more efficient protection of plants against weeds, rodents, insects, worms, bacteria, and fungi. But first and last was the better feeding of the plants with more nutrients. Among the nutrients the key factor turned out to be nitrogen. This vital element in the life-bearing proteins is mined in this country and many other industrial countries with the use of heat energy from the air. It serves as fertilizer, rocket propellant, and base for chemicals. And since plants fed with more nitrogen have rapidly increasing moisture requirements (300,000 to 400,000 gallons of water per ton of grain or cotton produced, i.e., 1,200 to 1,600 units of weight of water per unit of weight of grain or cotton produced) and "burn up" if they run short of it, farmers applied more supplementary irrigation to break this bottleneck. According to European experience, one ton of nitrogen produces 15 to 20 tons of grain equivalent, provided there is no critical shortage of water or other major growth factors. Farm application of nitrogen in the continental United States has increased from next to zero in prewar years to over 2 million tons, while simultaneously sprinkler irrigation has spread into all States of the Union. This was chiefly owing to the decline in the cost of applying the unit of water to the crops, which resulted partly from the decline in the price of aluminum pipe and motor pump units, and partly from the avoidance of costly earth movement involved in leveling the land, or of setting furrows or check dams for irrigation and dragging these down afterwards. The economic force that pushed this acceptance of better tech-

¹ This preliminary figure ignores a change in the definition of a "farm" between the 1954 and 1959 censuses of agriculture and is based on estimates of the United States Department of Agriculture. The 1959 Census of Agriculture with the new definition reported a total of only 3.7 million farms.

nology was again the increasing spread between the costs per unit of nutrient or water applied to the crop and the resulting price per unit of product. In other words, the marginal value productivity of the input has increased. This means in plain language that on most American farms fertilizer and water yield at present an increasing income as greater use is made of them, although at a future point marginal costs may approach or equal marginal revenues.

For animal husbandry the same has happened. Animals are only converters of feed. If a farmer could produce cheaper feed by putting nitrogen on irrigated pasture, he could produce milk or beef at lower cost and with more profit, if the price of these products did not drop too much. But in addition, hybridization, antibiotics, better feed mixtures, and other methods have helped to improve the input-output ratio. Owing to a reduction of the life of broiler chickens to 65 days before slaughter, and various other factors, feed requirements have been reduced to a commercially attainable ratio of 2.3:1 from formerly 4 or 4.5:1.

CAPITAL INTENSITY THE KEY TO PRODUCTIVITY

The aggregate impact on American agriculture of all this increased productivity is enormous, and has become the envy of the world. Not only have we long since prevented any contingency of food shortage, but with their unique managerial talents, their up-to-date equipment, and the unequalled services provided by such enterprises and institutions as the land grant colleges, research stations, and extension service, the American farmers have developed their giant business into the greatest chemical industry in the world, that of converting crude feed materials to animal products of much higher value. This mobile chemical industry converts roughly 355 million tons of grain equivalents—namely, 160 million tons of grain and high-protein concentrates, 125 million tons of grain equivalent in the form of forage on pastures and ranges, and 70 million tons of grain equivalent in the form of all other roughage, such as hay, silage, and other succulent feed. This is capitalism at its best, with the able capitalists in overalls on the tractors, trucks, or haybalers, or in the mechanical milking parlor. Many people do not know it, but if government payments and surplus purchases are excluded, United States farms earn \$19 billion, or well over 60 per cent of their cash receipts, from sales of livestock products. Over 17 million grain-consuming and close to 100 million roughage-consuming animal units, each equivalent to one dairy cow or head of adult cattle, represent as much "capital on the hoof" in live inventories as there is in machinery inventory, namely, \$18 billion in each.

The rich capital assets of American agriculture are one of the secrets of its success in raising productivity: it has the capital, which it can depreciate, maintain, or expand. In the Soviet orbit and many other countries of the world, the rulers squeeze capital out of agriculture in order to invest it in publicly owned industries, with the consequence of low productivity and waste of natural resources. A great farm income support in this country is the generous depreciation allowance for farm machinery and breeding stock under the revenue code.

For the farm equipment and machinery industry and the endless variety of their auxiliary industries it is vital to realize that in the future agriculture in the United States is bound to go even farther in the direction of more livestock

business. Hence, concentration on labor saving devices and automation for every part of livestock operation seems an inevitable orientation of business.

A few basic data may be helpful to sum up what this huge business of agriculture amounts to in terms of output and of transportation of goods. With no more than 8.5 per cent of the nation's continental labor force, or 7.4 million workers, it produces in a single year—in very rough and rounded terms—*175 million metric tons of grain, 20 million tons of oil-bearing crops, 2 million tons of sugar, 20 million tons of meat and eggs, 60 million tons of milk, and 40 million tons of fruits and vegetables (including potatoes)—a total of 317 million tons of edible products. To this would be added 3 million tons of cotton, 1 million tons of tobacco, 110 million tons of hay, and 70 million tons of fuel wood and timber, or a grand total of 500 million metric tons of major products.*

An appropriate measure for the magnitude of these figures is best provided by a comparison with the productivity of Soviet Russia's agriculture. After 40 years of a brutally enforced experiment of collectivization, it produces with $4\frac{1}{2}$ times the number of farm workers (33 million) one third as much meat (7 million tons) as do the farmers of the United States; and even of grain, most of which Soviet Russia's farmers eat rather than feeding it to livestock, they produce only 60 per cent of the American output. This in spite of an abundance of natural resources in Europe and Asia. One American farmer produces food for himself and 24 others. One Soviet farmer produces enough for himself and four others.

The essence of the dynamic change in American agriculture with reference to the concept of the farm problem is not only the segregation of all separate crafts, the change from a "do-it-yourself economy" to more and more division of labor and the rise of the urban economy, but the utter dispersion of the business of producing food, feed, and fibers throughout the entire modern economy. It is absurd to believe that in 185 years the technological revolution has shrunk the proportion of the national input of labor to the production of food, feed, and fibers, measured in comparable terms, from 90 to 10 per cent. This share never was 90 per cent to begin with, as was demonstrated, and it has not shrunk to 10 per cent by a long shot. If one defines the farmers as members of the active labor force who produce food, feed, and fibers, then the modern economy has farmers in nearly all commercial, industrial, and service enterprises. In the Middle Ages the allocation of manpower in the economy was divided into the Food Estate, the Defense Estate, and the Educational Estate. It is beyond question that in the highly developed economy less manpower is allocated to the Food Estate and more to the Educational Estate (health, education, welfare, arts, and religion), but the extent of the change in allocation is indefinite. If one takes the rather defective estimate of the Gross National Product (GNP), which substantially underrates the real output of goods and services, one finds that in a GNP of roughly \$500 billion with \$331 billion total consumer expenditures, food, beverages, and tobacco absorbed roughly \$94 billion of the latter, or over 28 per cent.

However, the dynamic structural and operational change within the agricultural economy both on and off farms during the last 50 years has been so enormous that it does not make sense to apply any formula for comparisons of per

capita income or share of national income over time between different "sectors" of the economy. The economy is not organized in sectors, but in widely dispersed and interlocked functions. Hence the parity formula with its historical base is, on the ground of profound structural changes alone and aside from many others, a totally discredited and impermissible statistical tool, irrespective of revisions in the definition. In a society that stands on the principle of social mobility and economic progress with freedom, attempts at measuring social justice and equality by a sort of comptometer expose the inadequacy of our advanced statistical tools in national economic accountancy whenever such lofty values and intangibles are involved.

The real cause of the dramatic structural change and advancement in productivity in American agriculture during the last two decades was not an explosive forward jump of technology as such, but the successive application of a multitude of new means and methods, all leading to a reduction in costs per unit. This was achieved by investing more and more capital per man on the farm. As a result of all this, agriculture today is just as commercial as, and even more capital-intensive than, industry and commerce. Of course, this enviable record of agriculture is merely one important facet of the highly integrated performance of the entire economy of a very resourceful nation which is guided by an alert social conscience and accepts economic progress and constant adjustment as a challenge and duty. It cannot be entirely explained by the affairs on the farm nor can it—even for purposes of economic analysis—be emancipated from any part of the functions of the high velocity of exchange of goods and services throughout the economy.

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