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Conservation and Engineering

II. Utilization of Land

The continental United States has about two and a quarter billion acres of land, which is utilized approximately as follows: 47 per cent cropland and pasture for food production (vastly more pasture); 6 per cent cropland and pasture for fiber production and other industrial products (also vastly more pasture); 30 per cent forest; 5 per cent cities, towns, roads, national parks, etc.; and 12 per cent unused and presumably unusable desert and mountains. This is the land we have. It isn't going to grow, and it isn't going to improve through use. Indeed, in many cases the land is deteriorating through use. It may seem utterly foreign to us with our history of abundance, but this land is going to be subjected to enormous stresses if we are to feed the population which is predicted. That the food we must grow may be a principal limiting factor in the days to come seems almost impossible to those of us who fret about the present farm programs, based as they are on too much food, but nonetheless our capacity to grow food will be a very serious matter.

Cropland for food production must be effectively increased, and there are essentially only two ways to do it: we must divert to this purpose some land otherwise used, and we must increase our production of food per acre.

The diversion to food production of land now otherwise used is not going to be easy, but there is one category of land use which is capable of such diversion. That is the land now used for growth of fibers and other materials for industrial use. The principal items here are cotton and the pasturing of sheep for wool. The former is moderately destructive to the soil; the latter extremely so. The present governmental practice of subsidizing the wool grower for the difference between the market price and an artificial price of 62 cents a pound has been called by William Vogt simply a subsidy of soil erosion. In any case the land now used for cotton and wool production is wastefully used, badly used, and unnecessarily used. The average production of cotton is about 470 pounds per acre per year, that of wool is about 2 pounds per acre per year. But, through research and invention, wholly synthetic fibers may be made in factories at a current rate of about 300,000 pounds per acre per year. The area on which these figures were based includes everything connected with the factories—intermediates manufacture, storage tanks, offices, even parking lots. It should be noted that these fibers are the wholly synthetic ones, such as nylon, which do not require any raw materials grown on land.

Thus by turning to the manufacture of fibers instead of the growth of them we shall be able to produce the required amount of fibers in about 1/1,000 of the area now used for fiber production. For all practical purposes this will permit us to have for food production essentially all of the 6 per cent of our land now used for fibers. However this is only a 28 per cent increase in our land for food production, which is a step in the right direction, but only a step.

Two facts about this conversion should be noted moreover. (1) Cotton and sheep-grazing land is not usually very good land. Its productivity for food will have to be carefully studied and improved through research. (2) This enormous development of synthetic fibers was not begun as a conservation measure. These fibers were discovered and developed as a natural part of orderly research programs, which are devoted to a constant search for better and cheaper materials—and for new profits. The aid to conservation here is a kind of by-product of this research—free enterprise at its best.

Returning to the tabulation of main land uses, can any other diversions be expected? The only other big item is the forests, and one might think that we could get land for food production by cutting them down. One would be thinking in historical perspective because this is exactly what man has done for thousands of years.

Further cutting of our forests, however, must not be done. We simply cannot count at all on possible diversion of woodlands for food production. Our woodlands are enormously important to us for several reasons. First, the wood products such as lumber and pulpwood are essential to our lives. We are only now approaching the successful application of the sustained-yield concept, which ensures that these wood products are taken out only as fast as they are grown. Second, forests play a great part in the hydrologic cycle, and any further destruction of them may yield grievous deterioration in our climate. Third, forests represent the only remaining places for recreation in natural surroundings. This use of woodlands will become more and more important as our cities and suburban areas continue to grow. Furthermore, forests are constantly threatened with destruction through fire, insects, disease, and depredators of all types. Incidentally, we must credit technology with the very existence of our forests; they would have been gone long since had it not been for the discovery and perfection of the use of coke in steel manufacture, which made obsolete the use of charcoal.

There are two prospects through which science and engineering may help us to protect our forests. The first is that the greatest loss of our forests is due to insects and disease. It is certainly to be expected that through research progress will be made in reducing these losses. The second is that we may change the uses to which our wood cut is put. The distribution is approximately as follows: 52 per cent lumber; 22 per cent pulpwood; 16 per cent fuel; 10 per cent veneers, plywood, and others. Since a growing population will require more of these items (particularly lumber), how can we accommodate such need without a serious drain on the forests? One thing to do is to try to reduce and ultimately to eliminate the 22 per cent used as pulpwood. Such pulpwood is grown primarily for the manufacture of paper, paperboard, and rayon. Rayon is gradually being replaced by the wholly synthetic fibers, and this will be more and more the case. Paper and paperboard are next on the list; there is no scientific reason why these products cannot be made wholly synthetically from other raw materials, thus relieving this great drain on our forests.

It thus appears that diversion of certain land now used for the growth of fibers to the growth of food will be helpful but only to a moderate degree. Forestland offers no promise for the supply of food.

Increased productivity of the land will be considered in a later issue.

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