

The Mississippi River Bottomlands

By B. Shimek, Ph.D.

A bill is now before Congress calling for an appropriation of \$3,000,000 for the purpose of securing a wild-life reservation in the Upper Mississippi Valley. The contemplated reservation is to extend about 300 miles along the river from Rock Island, Illinois, to Wabasha, Minnesota. It would therefore include bottomland areas in four states, Iowa, Illinois, Wisconsin, and Minnesota.

This reservation should be made now, before further attempts are made to drain these lowlands. The draining of Muscatine Slough within late years, and the recent attempt to drain the Winneshiek bottoms clearly show what will happen if these areas are not preserved. The forests will be cleared and an attempt will be made to cultivate the soil. Both will result in the destruction of the natural plant anchorage which holds these soils in place in times of floods. All government works along the Mississippi, as well as the navigability of the great stream, are constantly jeopardized by the quantities of silt which are carried by the river and its tributaries. If the bottomlands are cleared, and the soils loosened by cultivation, the amount of this silt will be enormously increased, as it is also by the clearing and attempted cultivation of the slopes of the bluffs along both the Mississippi and its tributaries. As a matter of fact the future of the Mississippi river demands that not only its bottomlands and bluffs, but those of its tributaries as well, should remain covered with an anchorage of permanent vegetation. We are putting millions of dollars into Mississippi river improvements, yet in time these will be made useless if we do not reduce the load of silt carried by the stream. The problem is one of nationwide importance.

The claim that is usually made by promoters of these drainage schemes is that valuable agricultural land will be secured, that riches will be added to the state, that homes will be built, etc., etc. The results seldom equal the expectations, and in altogether too many cases utter failure has resulted. In this connection we need but recall the attempted drainage of portions of Cairo lake, Rice lake, many of the kettle-holes in the Lake Okoboji region, Muscatine Slough, and the straightening of some of our streams, to find confirmation of the foregoing statement. The writer had charge of a drainage project south of Iowa City forty years ago, and to this day the drained land has little value.

We have been draining promiscuously; it is high time

that we adopt a selective policy. The whole drainage problem presents many sides, but we usually refer it to the engineer, who is competent to determine if an area can be drained, but who is not qualified, by training or experience, to decide whether it should be drained. It is especially notable that the all-important and really obvious relation of plants to this problem is usually overlooked or disregarded.

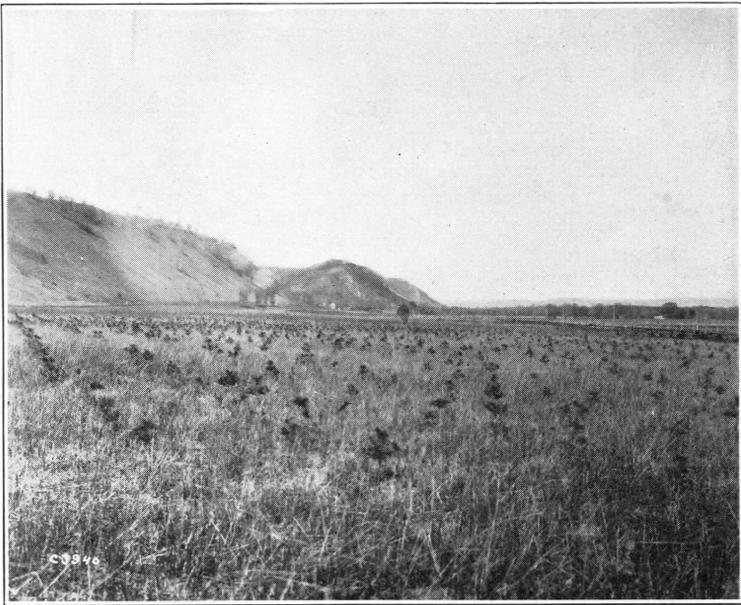
Nothing is more important to plants, cultivated or native, than the maintenance of a constant supply of moisture. This is necessary not only in the soil, but in the air as well. Plants cannot be grown successfully in the dry, super-heated atmosphere of the ordinary living-room, no matter how much they may be watered, for the plant must be protected by moisture in the air from excessive loss of water by transpiration. This supply in the air must be continuous, or the plants suffer. The removal of natural water-surfaces from which vapors rise continuously, inevitably results in diminishing at times the possible amount of invisible water in the air, and when we so reduce the water-surfaces of the state by drainage we kill the goose that lays the golden eggs!

Recent efforts to show that drainage does not affect rainfall are wholly misleading. No one who is familiar with the subject will assert that rainfall has been affected by drainage, for we have no exact information on the subject; but neither can any one deny it, for the same reason! To point to the record of rainfall for a few years in any Iowa locality for the confirmation of the statement that drainage does not affect rainfall is folly. For example, the rainfall at Logan, Iowa, has varied in nearly sixty years from 16 to 56 inches per year. During this period dry and wet years came irregularly, sometimes alternating, as in the year 1874 (28.4 in.), 1875 (42.0 in.), 1876 (28.2 in.), and 1877 (46.1 in.); or they came in irregular groups, as in the wet years 1882 (40.2 in.), 1883 (39.9 in.), 1884 (36.6 in.), and 1885 (40.2 in.); or the dry years 1893 (22.4 in.), 1894 (16.63 in.), and 1895 (26.12 in.).

No one has yet definitely ascertained the exact part which the various factors concerned in these variations play, and it is absurd to select any short period for the purpose of drawing conclusions concerning the influences which affect rainfall.

The fact is, however, that plant-welfare is determined not so much by the **amount** of the water which falls as by the **conservation** of that water for plant use through a longer period of time. The precipitation during a heavy rainstorm adds materially to the total for the year, yet it is likely to do vastly more harm than good, washing the slopes, flooding the bottoms, and otherwise injuring plants. The rain-gauge will not do for measuring plant possibilities!

Just what will result from the extension of drainage projects along the Mississippi is well illustrated by the outcome of the drainage of the "slough" which cut off Muscatine Island. Muscatine Slough, as it was called, in its original state was typical of the low bottomlands along the Mississippi, and the result of its drainage is just what may be expected from other similar attempts. The lands are of two types: the low portions, formerly covered much or all of the year with water, and having a black soil,—being direct "beneficiaries" of the drainage; and the adjacent sandy areas of slightly



WHITE PINE PLANTATION IN WINNESHIEK BOTTOM LAND

greater elevation, chiefly truck gardens, large portions of which are included in the drainage district, with secondary "benefits." None of these areas will sell for as much as the original cost of the land plus the cost of drainage, maintenance, etc., and the sandy areas have actually diminished in value because of over-drainage and the dropping of the ground-water level. Yet the owners of the latter were forced to pay for the "improvement"! A prominent farm-loan man of Muscatine recently declared that he would not loan a dollar on any of the land in the drainage district, and none of it finds buyers. The State does not seem to be able to dispose

of its lands in this area even for the amount of the delinquent taxes! And all this has resulted from the destruction of the original Muscatine Slough, once a beauty spot crowned with beds of lotus, its waters teeming with water-fowl above and game fish beneath,—the latter spawning here in great numbers! In addition to all this the Government is called upon to assist in maintaining expensive levees to protect this “reclaimed” land!

The careful investigation of the soil-problem in connection with the drainage projects on the lower bottomlands of our streams would lead to the condemnation of most of them. These bottomlands present three principal types of surface features:

1.—Frequent and irregular areas are treeless, and are (or were) covered with a flora largely that of the prairies, with blue-stem and other grasses predominating. Such areas may be seen below Ft. Madison, Iowa, above Savanna, Illinois, near Bellevue, Iowa, at Prairie du Chien, Wisconsin, below New Albin, Iowa, and at other points along the Mississippi.

These areas are mostly very sandy, and if the deep-rooted prairie plants are destroyed by attempts at cultivation, they are subject to erosion and shifting by water during floods, and by winds during dry seasons. They should be left wholly undisturbed. They are usually not very fertile, and hence do not offer as much temptation as some of the other areas, but they are numerous, and must be taken into account. If disturbed they furnish much of the sand and gravel which overwhelms more fertile areas during floods.

2.—The second type is the richer low alluvial land, which is usually covered with timber. This is more tempting because the soil seems to be richer, and, besides, the old-time assumption that forests grow on the richest soils is still prevalent. The fact is that as a rule our forests start on poor soils and gradually build up a veneer of good soil either by arresting fine silt during floods, or by gradually developing a leaf-mould.

On the bottomlands under discussion the trees start almost invariably upon gravel- and sand-bars, and the finer alluvium is deposited only after the forest vegetation has gained its foothold. The upper Mississippi and its tributaries furnish innumerable illustrations of this building up of soil in the forest covering. Up and down along the river between Burlington and McGregor, and beyond, you may now see these thickets of tree-seedling starting out on almost every sand-bar, and if you follow them, as I have done in some cases for forty years, you will find that gradually, as the forest de-

velops, the floods deposit more and more fine silt and build up a soil, which is also reinforced by the decay of fallen leaves, etc.

I have personal knowledge of cases in which more than three feet of such soil have been deposited over sand-bars on which I saw such forest-beginnings. Remove the forest covering, and the floods will either sweep the fine soil away, especially if loosened by cultivation, or bury it under masses of sand and gravel. I have repeatedly observed both effects. Any effort to clear and till these areas simply invites disaster in the great majority of cases.

3.—The third type is that which is so low or flat that it is under water during much or all of the year. This includes the ponds and oxbow lakes, and the bottomland swamps covered with cat-tails, rushes, and sedges. These catch-basins, which are usually surrounded by trees, also contain fine alluvium, which makes them more tempting than the sandy areas.

If these areas **can** be drained they are in the same danger during floods as the cleared forest areas. In many cases, however, they are so low that they are almost or quite on a level with the water in the river, and complete drainage is impossible. Klum Lake in northern Louisa county, Iowa, furnishes an example of the mess created in such cases by an attempt at drainage.

There are those, of course, who argue that protective works can be built and the flooding of these areas prevented. This argument is all too often advanced by those who want the job of erecting such works! Experience has shown that no such artificial checks are effective in times of greater floods. Our own experience shows it, and that along the Danube and other European streams is still more conclusive because it reaches over a longer period of time.

There are several objections to this scheme of checking floods:

First, it could be done only at enormous public expense, and even if successful, the result would be the "reclaiming" of land for which there is no pressing need, and which could at best only help a few speculators,—whether private owners or not,—to say nothing of the losses in other directions.

Secondly, as already noted, no such works furnish reliable protection against greater floods, and therefore those who would take the risk of settling upon these low lands would periodically be endangered. That there is little, if any, hope of permanency in the location of homes in such places is shown by the condition of the buildings where settlement has been attempted. I do not recall a single place where these

buildings indicate anything of great prosperity, or of permanence in home-building. More than once I have seen people taken from the roofs of their houses in boats during high water, and where there is such a menace permanent improvements are not encouraged.

Third, the construction of great levees would inevitably result in a narrowing of the channel, and the greater piling up of waters during floods. The present broad bottomlands spread the floods and thus diminish their heads. Along the streams at Dayton, Ohio, great reservoirs have been built to spread the overflow, and here in the Mississippi valley men are deliberately planning to destroy the natural overflow-reservoirs furnished by these lowlands!

Fourth. In some cases the underlying sands permit the seepage of water upon the drained lands during floods, even when the levees hold.

At best the land secured by the drainage of low bottomlands is inferior. Too often it is damaged by floods, as noted, but even where this is not the case the producing value is inferior, for in wet years it remains wet too long, and its crops are always in greater danger from early frosts.

Since this is the case, there seems to be no warrant for the great expenditures for drainage and the necessary protecting works, especially since we do not really need the land. Everywhere farmers are seriously considering the reduction rather than the increase in acreage under cultivation. We need better cultivation of our available farm-lands rather than an increase in superficially cultivated areas.

In conjunction with the evils wrought by the attempts to disturb these lowlands, it is worth while to set out the advantages which such areas present when left in their natural condition, as is contemplated under the pending bill. These advantages may be enumerated under the following heads:

1.—Prevention of the silting up of the Mississippi River.
—I have already called attention to this important question. This will be a constantly increasing danger unless steps are taken to prevent the further destruction of the natural plant-anchorage of the areas involved.

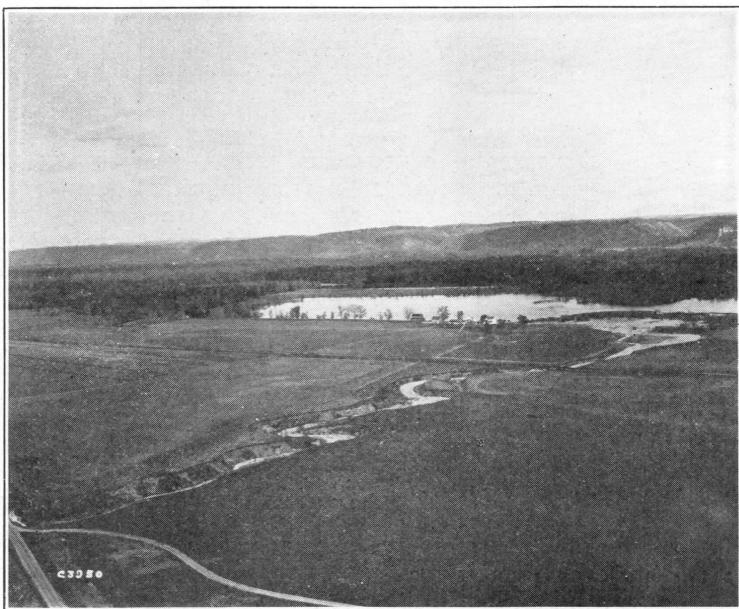
2.—Recreation grounds.—Under natural conditions this area will become an accessible recreation ground for millions of people in the Mississippi Valley, and will be available for twelve months of the year.

3.—Fish-breeding grounds.—The water of these lowlands are the great fish-breeding grounds of the Mississippi Valley. What will happen to them if natural conditions are not pre-

served was well illustrated in the Muscatine area. I have personal knowledge of the fact that previous to the attempted drainage of that area, game fish, such as black bass, crappies, pickerel, etc., were very abundant in all the cut-off ponds or "sloughs" which then abounded, and it was common to see the "nests" of the black bass around which the parent fishes hovered for the protection of their spawn. All this has disappeared in that area, and this will be repeated in all similar areas if disturbed.

4. **Fish-feeding grounds.**—The lowland ponds contain great numbers of mollusks, crustaceans, frogs, aquatic plants, etc., which serve as fish-food, and all these can be protected only by preserving the natural conditions.

5.—**Pearl-button industry.**—The river mussels, or clams, the shells of which are used in this great industry, are di-



VIEW FROM BLUFF JUST ABOVE HARPERS FERRY, IOWA

rectly dependent upon migrating fish for their propagation and distribution, and this industry will be crippled or destroyed if places suitable for the fish are not preserved.

6.—**Water-fowl breeding-grounds.**—Valuable game birds use these areas for breeding-grounds. They will increase under proper protection.

7.—**Bird sanctuaries.**—Our insect-eating birds are mostly timber species which will find food and nesting-places in the protected lowland forests. To these birds fleshy fruits and juicy caterpillars are equally necessary. Fruit-growers complain that their ravages upon cultivated fruits are increasing. This is because we have everywhere destroyed the berry-bearing woody plants, and the birds are driven to our orchards by hunger. Restore and preserve their natural food in the forests, and there will be much less cause for complaint.

8.—**Fur-bearing animals.**—Valuable fur-bearing animals, especially the muskrat and the mink, will be perpetuated if these, their natural habitats, are preserved. Under these conditions they will increase, just as the bison, once considered near extinction, have increased under proper protection until now it is reported that it will be necessary to dispose of the excess in the Yellowstone region to other reservations, or to hunters.

9.—**Native food-plants.**—These wet bottomlands naturally produce wild rice and the lotus, both valuable food-plants. Both could be greatly increased under proper protection of their natural habitats.

10.—**Preservation of evaporation areas.**—This important point has also been discussed. We often claim that our wealth is in the soil, but it is more nearly correct to say that it is in the water of the soil and the air. Some of the most fertile soils (when water is brought upon them) in the world are found in the desert regions of New Mexico. They lack water.

11.—**Forest experimental work.**—A large part of the bottomland area would serve admirably for forest culture, and if properly handled the forest could yield much valuable hardwood without losing its value as an anchorage crop. Black walnut, sycamore, swamp white oak, and other valuable lumber-trees could be grown successfully.

12.—**Scientific research.**—The area is admirably adapted to scientific investigations along several lines. It is especially conveniently located for this purpose with reference to the educational institutions of the four states which include the area, and could, of course, be used by others. The following fields promise especially valuable results:

a.—**Plant succession.**—Important studies on plant succession are possible, particularly in relation to forest development and the dispersal of weeds along our streams.

b.—**Soil building.**—No better area could be found for the study of the development of our soils.

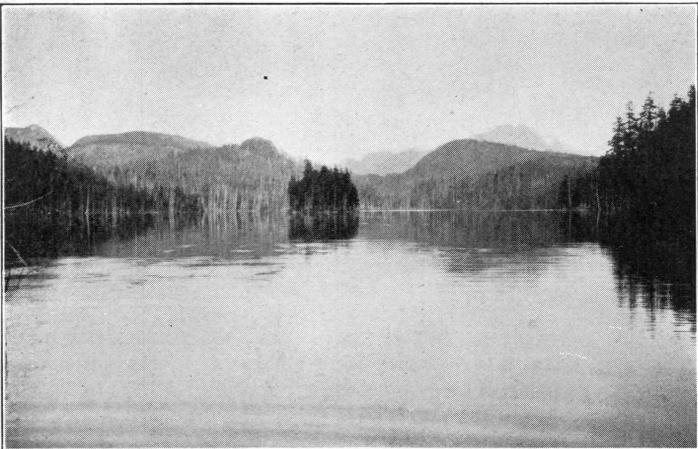
c.—**Bird migrations.**—If preserved, the area will continue

to be a great highway for bird-migrations, and will thus remain a great out-of-doors laboratory for studies in this field.

d.—**Fish-foods.**— Needed observations on the food of fishes, both plant and animal, could be made to great advantage, under the preserved natural conditions.

e.—**Problems of scientific interest.**—The area would offer splendid opportunities for the investigation of many purely scientific problems in botany, zoology, geology, meteorology, etc., etc.

All the advantages and opportunities are enumerated will be lost if the area is not preserved in its natural condition. The problem is of great direct concern to a large and populous section of our country, and in its economic aspects it affects the entire country. The valuable resources of the region should not be sacrificed for the questionable personal benefit of a few individuals!



“BESIDE THE STILL WATERS”