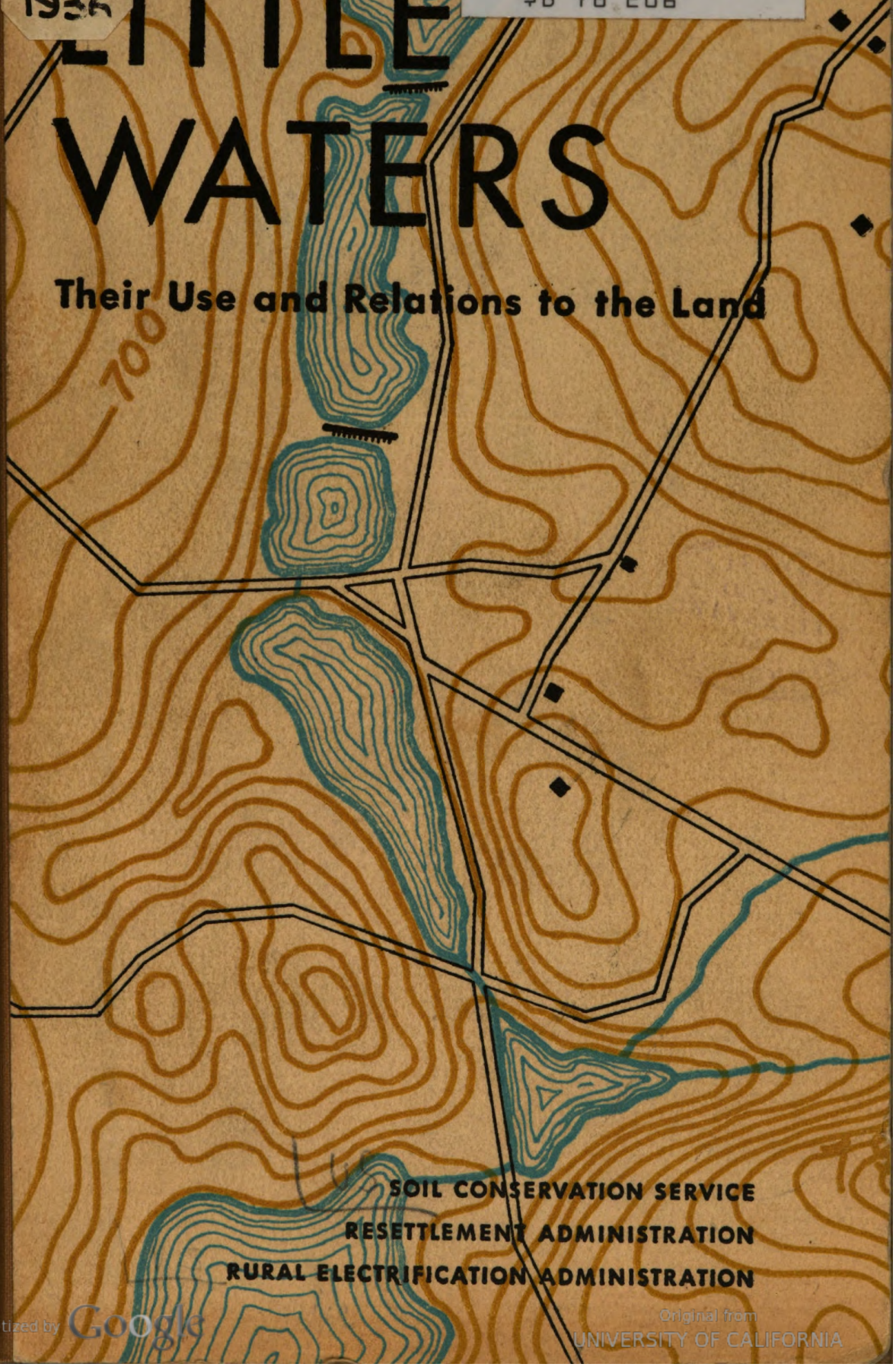
TC
976
A4
1936

UC-NRLF
$B 78 206

LITTLE WATERS

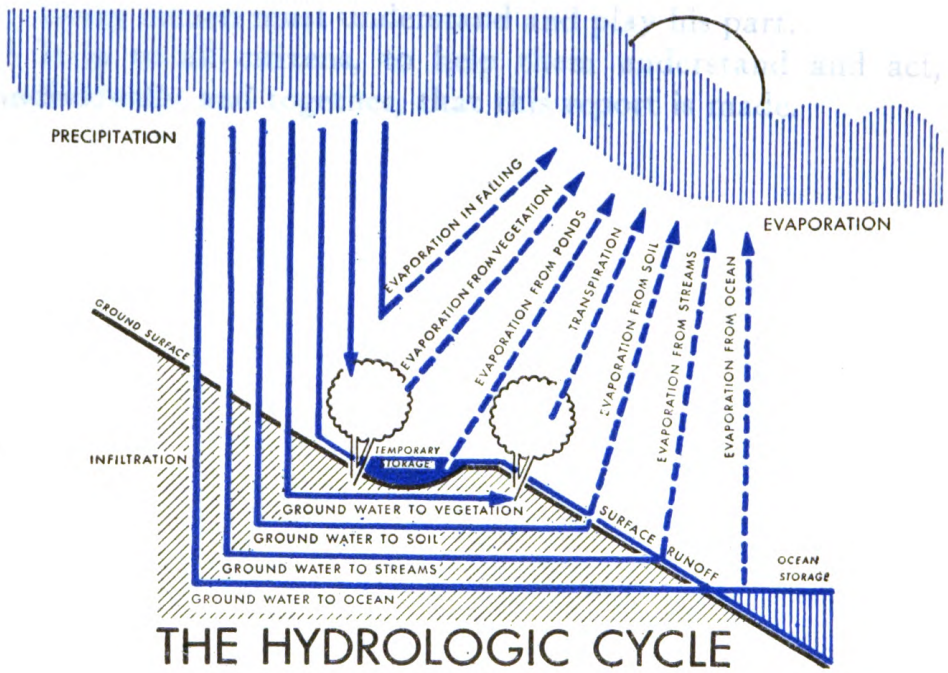
Their Use and Relations to the Land



SOIL CONSERVATION SERVICE
RESETTLEMENT ADMINISTRATION
RURAL ELECTRIFICATION ADMINISTRATION

Digitized by Google
Original from UNIVERSITY OF CALIFORNIA

Generated on 2020-05-06 02:16 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



THE HYDROLOGIC CYCLE

Generated on 2020-05-06 02:20 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF CALIFORNIA

most areas before Man developed the art of producing more subsistence from a given area by tilling the soil. When the drops of rain reach the earth they first strike the trees and bushes, or the herb and grass cover of the soil. The water

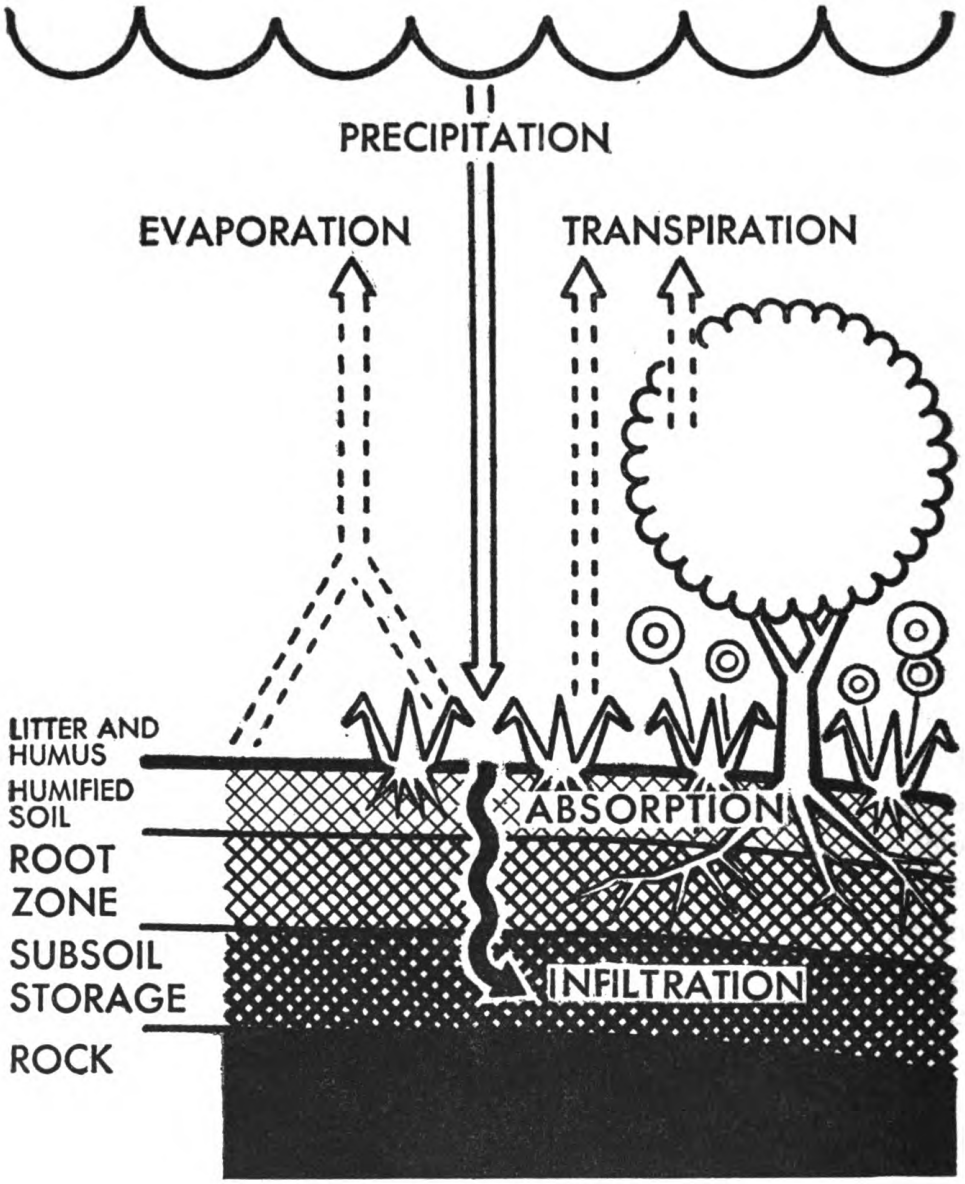
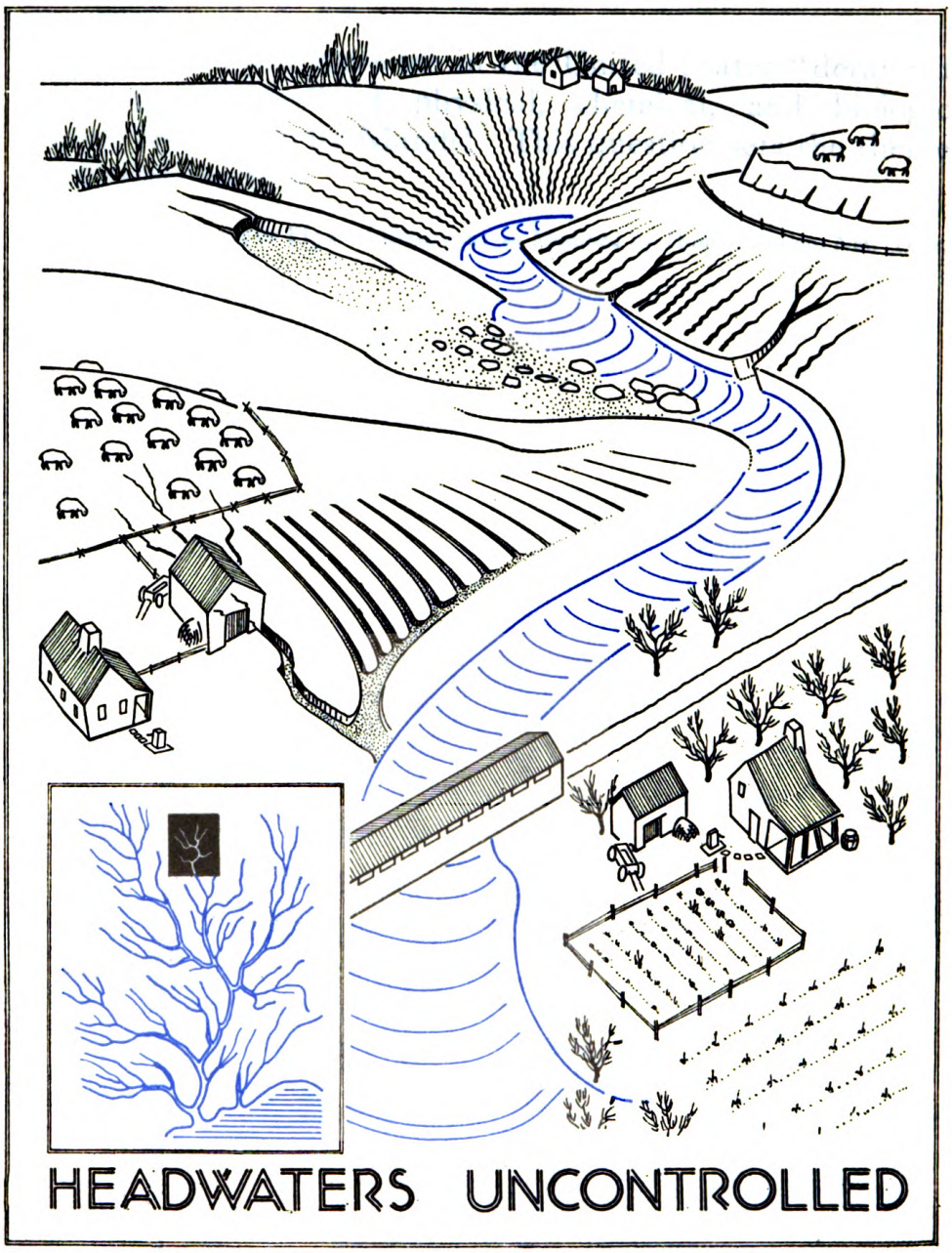


Figure 9.

then trickles through the grass and is absorbed by the loose soil about the grass roots; or, after dropping from the trees and bushes, filters through any forest litter and is absorbed by the loose soil underneath the trees and bushes. When this

Digitized by Google
Original from UNIVERSITY OF CALIFORNIA
Generated on 2020-05-06 02:20 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



Generated on 2020-05-06 02:20 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF CALIFORNIA



oceans. It would require centuries for replacement of the fertile top soils that are being washed or blown away in a single generation.

The question whether the United States is a permanent country, first raised some 70 years ago, has been considered fantastic. Recent measurements indicate that it is far from fantastic—is very real and practical—and that one can rationally assert that in another century this great American granary may have become inadequate to support our population if erosion is permitted to continue at the present rate of

EXTENT OF EROSION IN THE UNITED STATES

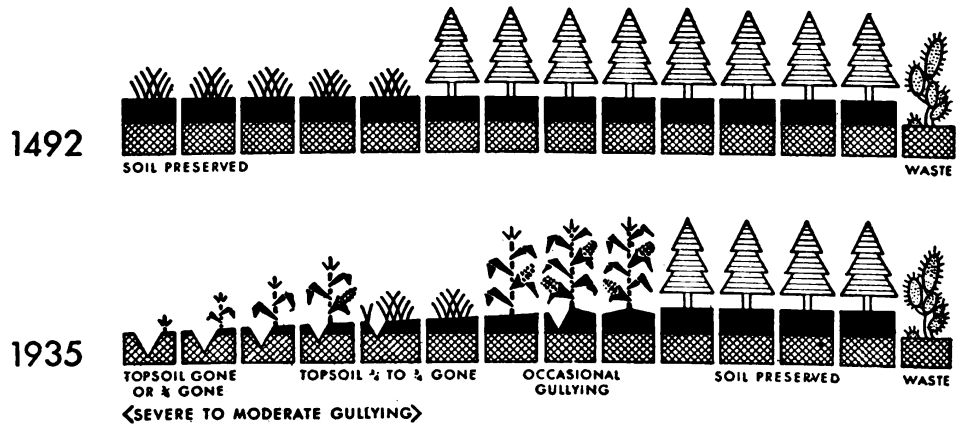


Figure 29.

increase. Already in some sections of the country once cultivated lands have been reduced to sterility.

A deep-rooted but utterly falacious American tradition is that agriculture is inherently a permanent industry. As waters are lost, the soil may be lost. "When the soil is gone, men must go; and the process does not take long," said Theodore Roosevelt.[8] Recent studies indicate that the Sahara and Gobi Deserts were once occupied by prosperous peoples.

[8] Eighth Annual Message, Dec. 8, 1908.

Generated on 2020-05-06 02:21 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF CALIFORNIA

In 1864 this question of permanency of a country was brought to our attention as follows:

If the precipitation, whether great or small in amount, be equally distributed through the seasons, so that there are neither torrential rains nor parching droughts, and if, further, the general inclination of ground be moderate, so that the superficial waters are carried off without destructive rapidity of flow, and without sudden accumulation in the channels of natural drainage, there is little danger of the degradation of the soil in consequence of the removal of forest or other vegetable covering, and the natural face of the earth may be considered as substantially permanent. These conditions are well exemplified in Ireland, in a great part

Soil and water losses

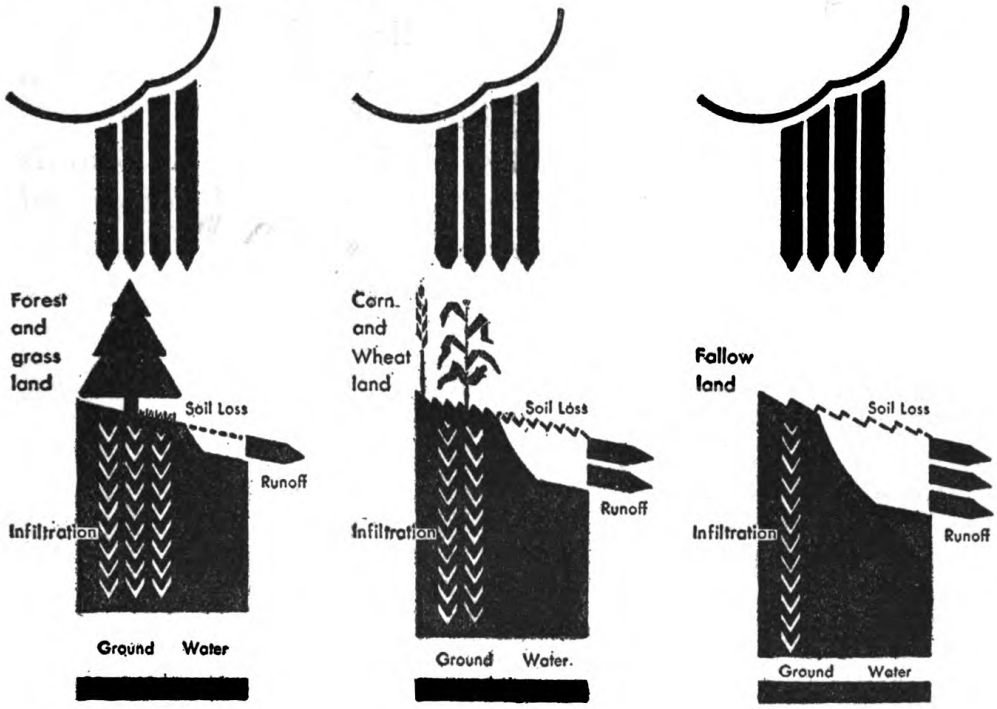


Figure 30.

of England, in extensive districts in Germany and France, and, fortunately, in an immense proportion of the valley of the Mississippi and the basin of the great American lakes * * *.

Destructive changes are most frequent in countries of irregular and mountainous surface, and in climates where the precipitation is confined chiefly to a single season, and where the year is divided into a wet and dry period, as is the case throughout a great part of the Ottoman Empire, and, more or less strictly, the whole Mediterranean Basin. It is partly, though by no means entirely, owing to topographical and climatic causes

Digitized by Google
Original from UNIVERSITY OF CALIFORNIA
Generated on 2020-05-06 02:21 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

predominantly poor agricultural land" we must understand the nature and causes of erosion. The beginning of such understanding is to recall the nature of the hydrologic cycle—precipitation, evaporation, absorption, infiltration, run-off, transpiration, and seepage—the relations to these of vegetative cover, and the parts played by humus, humified soil, and the root system.[13]

The most immediate and direct cause of destructive erosion is soil disturbance, that is, a disturbance, of any kind, of the natural balance between gravitation and the binding power of roots, tending to hold the soil in place, and on the other hand the force of running water tending to move it.[14]

SOIL LOSSES THROUGH CULTIVATION

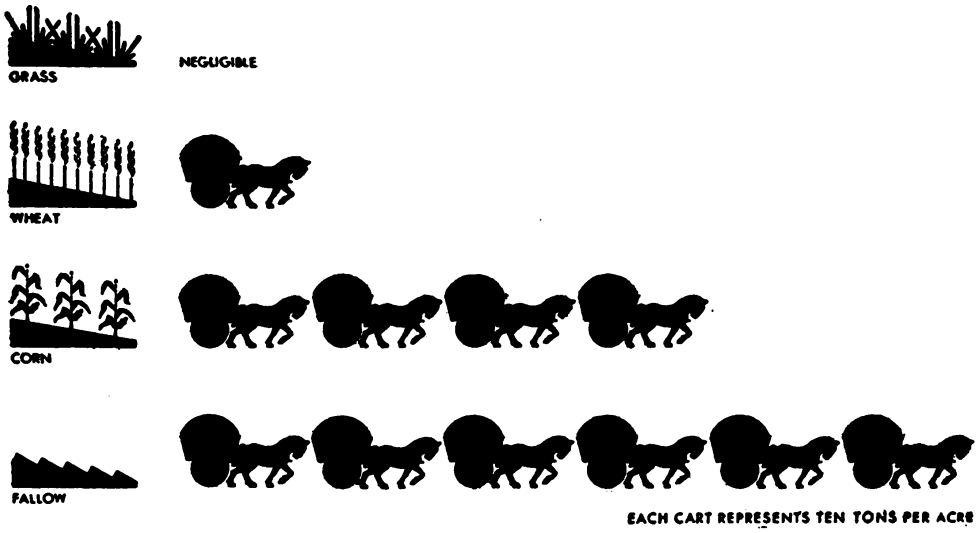


Figure 31.

When forest areas have been cut for their timber and have been left to the almost inevitable following fires, then the litter, humus, and sprouting seedlings are destroyed, accelerated run-off begins to carry away the fertile topsoil, and soon the areas are stripped to the clay, gravel, sand, or rock beneath, and productive lands become waste.

When an excessive number of cattle and sheep are permitted to graze on pasture land, or on native grassland, or in

[13] See p. 6.

[14] C. G. Bates and O. R. Zeasman, Soil Erosion—A Local and National Problem, *Research Bulletin 99*, August 1930, University of Wisconsin Agricultural Experiment Station, p. 94.

Generated on 2020-05-06 02:22 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF CALIFORNIA

other hand, although the owner seeks income, he has the equity and his dominant interest should be to preserve his equity unimpaired. It is his responsibility, therefore, to select tenants who will operate in such a manner as conserves the soil. The owner must bring every influence to bear to secure such management; wise selection of tenants, inducements in the terms of the contract—short-term and share leases should be avoided—information, friendly guidance. It is obvious that also creditors holding long-term mortgages have a similar responsibility.

Tenancy, and all that makes for tenancy, is at the root not only of the agricultural but of the conservation problem.

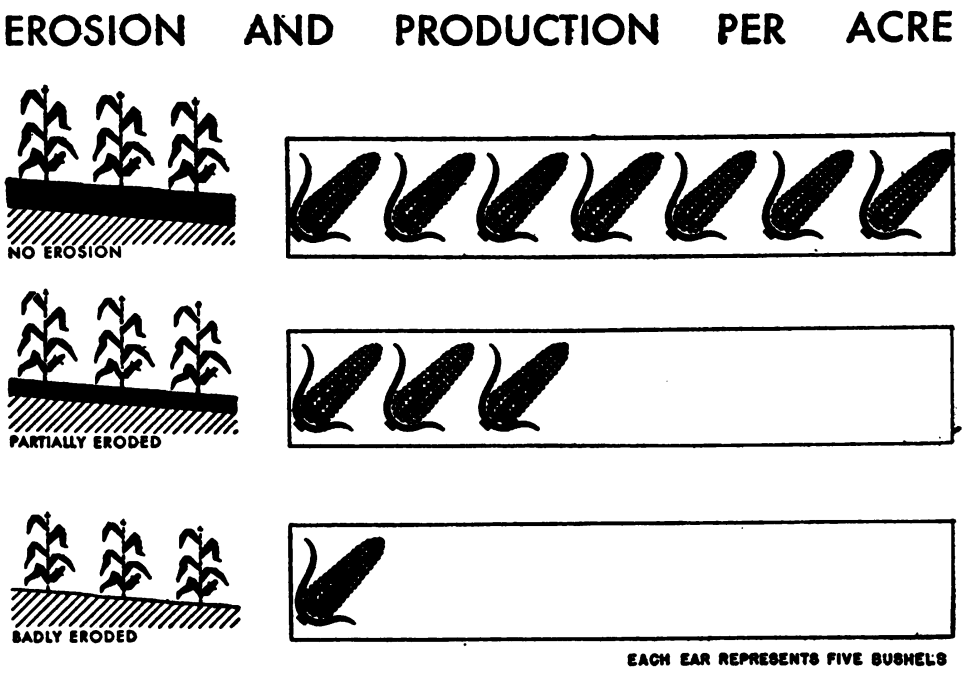


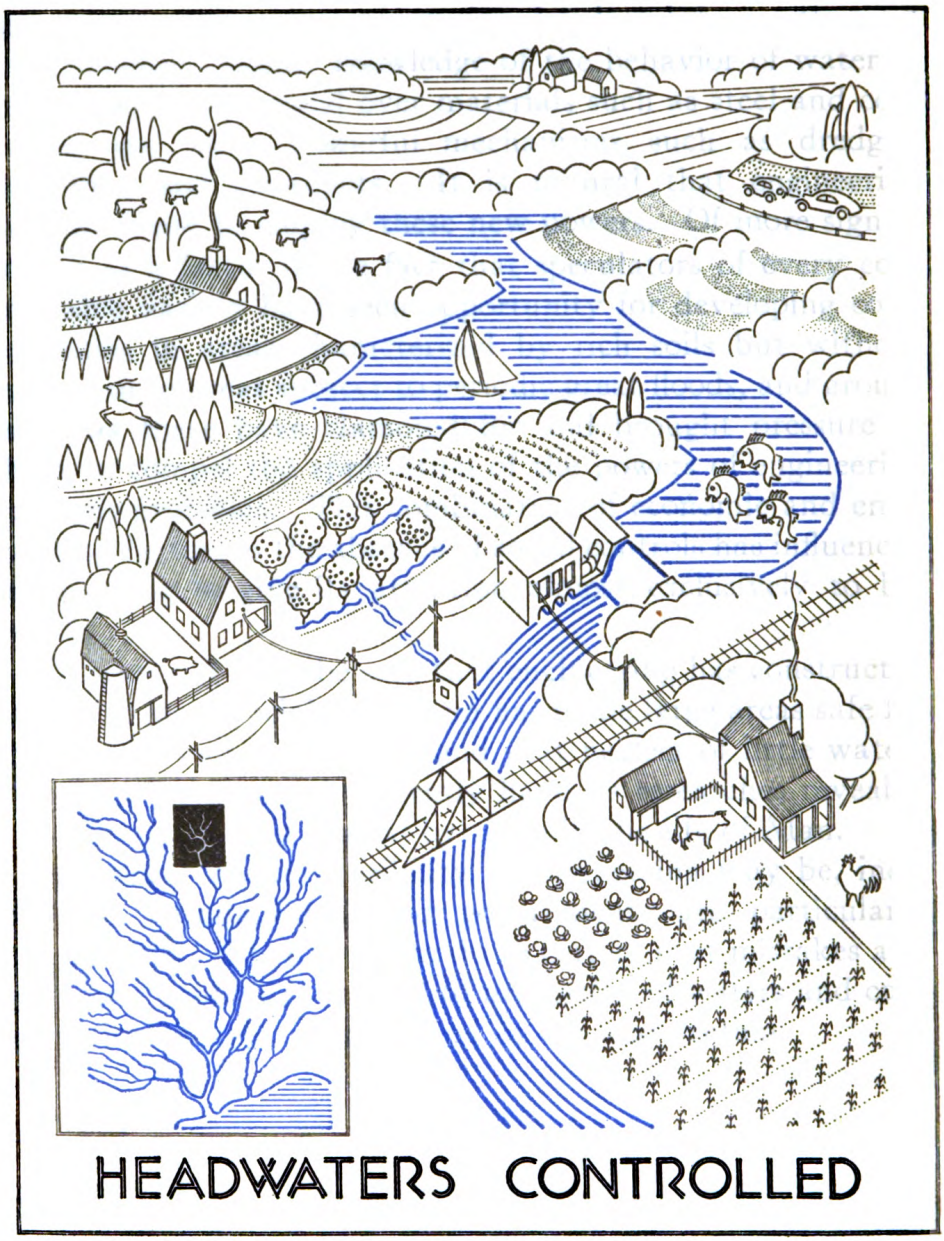
Figure 32.

3. CREEKS, PONDS, RIVERS, AND LAKES

An aspect of drainage policy and practice to which only passing attention has been given is their influence on ponds and lakes, and on creeks and other small headwater streams.[15] Drainage practices have led in places to the disappearance of many ponds and lakes and to the lowering of others; and the desire to reduce the overflow of streams in rainy seasons

[15] See pp. 21 and 27.

Generated on 2020-05-06 02:22 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF CALIFORNIA



Generated on 2020-05-06 02:23 GMT / https://hdl.handle.net/2027/uc1.$b78206
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF CALIFORNIA