

# Human Health *closely related to* Soil Fertility



**M**AN, in the beginning, was created from a handful of dust. Darwin stated the carefully observed natural phenomenon of physical existence as the Law of the Survival of the Fittest. Too many of our modern technologies have kept our thoughts and study away from soil fertility, that handful of dust, as the basis for our being fit. Should we not, then, consider the soil and its fertility from this point of view?

The development of any soil from the natural minerals and the resulting fertility are consequences of the climatic forces, water and heat, working on the particular parent rocks. Missouri is geographically located so that the differing climatic effects may be readily observed. Northwest Missouri receives 30 inches of precipitation annually, whereas the Southeast Lowlands receive 50. This increasing amount of water is made more efficient in its chemical reactions for rock decay into soil, but also more damaging through leaching and fertility destruction when the increasing temperatures follow the same pattern to magnify those effects. This is shown by the evaporation-transpiration curves in figure 1. Rainfall less than evaporation (less than 100) prevails in Northwest Missouri, but rainfall in excess of evaporation (more than 100) is characteristic in the Lowlands of Southeast Missouri.

Other factors are also responsible for the differing fertility areas of Missouri. Unweathered material

from the arid west, washed in by the Missouri River and left in its flood plains, is annually blown over and deposited as fertilizer on the Northwestern section of the state. This material then breaks down to replenish the supplies of plant food elements which produce protein- and mineral-rich crops for good nutrition.

The Ozarks, without such wind-borne additions, are the oldest and most weathered soils in the state with little to offer as plant nutrition. The Southeast Lowlands were formed mainly of materials already highly weathered before they were brought in from the East Central States. Their low fertility is evidenced by their production of cotton, vegetable oil, and watermelons, mainly combinations of air, water and sunshine (carbon, hydrogen and oxygen) with little protein and minerals to offer for nutrition.

Man can be healthy only as the food he consumes supplies him with protein and minerals which are made available to the plants growing on the soil. Soil fertility suggests itself as the determiner of man's

physical health by the correlation between the rejectees (per 1,000 registrants) and the major soil regions (Compare figure 3 with figure 2).

Mental ability and better mental health, dependent as they are on good physical health, are therefore, also related to the soil fertility. This relation is shown by the distribution of honor students in the College of Agriculture, as tabulated for a period of eight academic years, 1949-50 through 1956-57.

The mental quality, as a product of the soil, was measured in terms of square miles required to produce one honor student per year. General soil areas, urban counties excluded, produced one honor student for the number of square miles indicated for each soil area shown in figure 4, namely, Northwest 307, Ozark Borders 376, Northeast 431, and the Ozarks and Lowlands 617.

In terms of population, 7,455 were required to produce one honor student in Northwest Missouri, whereas 15,740 were required in the Ozarks and Lowlands. The percentage of enrollees who had a 3.50 (B+) or higher grade average varied from 5.1% in the Northwest to 3.26% in the Ozarks and Lowlands, with no students of this quality from the bootheel, another indication of student quality according to the soil fertility pattern.

Do these measurements, square miles and population per honor student and percentage of enrollees with high grades, not suggest fertility of

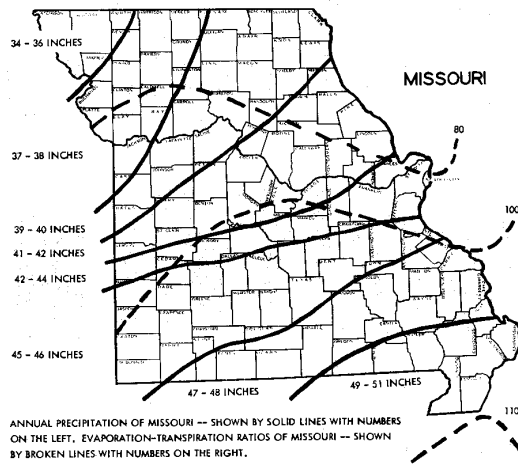
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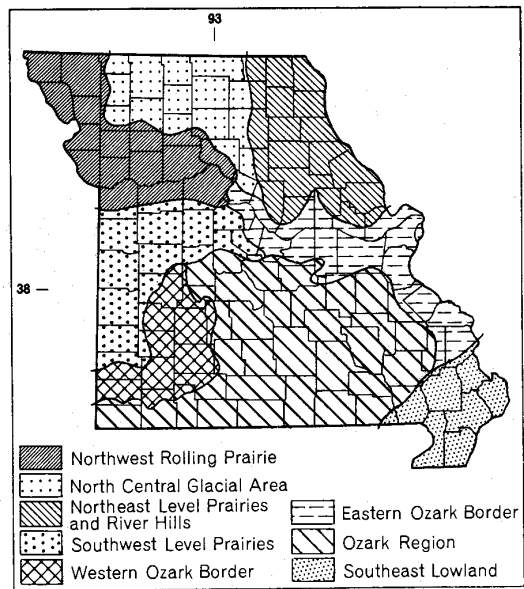
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**Figure 1**



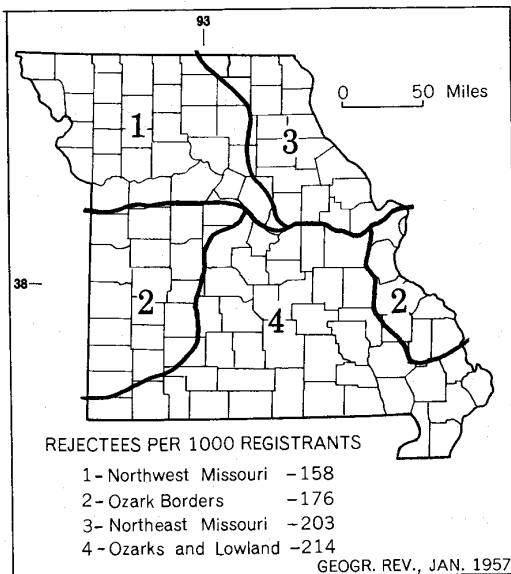
the soil as the basis of mental as well as physical health? Should we not remove the haze of Sputnik from before our eyes so that we might study the soil and work with it to nourish ourselves for health and education rather than exploit the soil? Let us therefore consider the fact that man's mobility has not removed his "roots" from the soil as his best nutrition, and teach physiology and nutrition of and for healthy plants and animals, bodies and minds.

**Figure 2**



The increasing rainfall and temperature in going from Northwest Missouri to Southeast Missouri (figure 1) give higher degrees of soil development, or declining fertility, and different soils (figure 2).

**Figure 3**



**Figure 4**

