contains a higher percentage of sand and a lower percentage of clay than the Shelbyville till.

A red-brown to rusty-brown leached zone is commonly developed on both ice-laid and water-laid deposits. Texturally, this material is clay-bound pebbly sand or clay-bound sand. Red-brown to rusty-brown staining in sand may be up to 11 ft thick (the deepest seen) but the clay-bound upper portion seldom exceeds 2 or 3 ft. Calcareous till or calcareous sand and gravel is frequently found within 4½ ft of the top of the leached till. Coarse-grained granite pebbles and cobbles are common, and an occasional basic pebble or cobble is present. The pebbles, cobbles, and boulders in the clay-bound zone are usually fresh or but slightly altered.

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Streamflow and Flood-Frequency Studies

The U.S. Geological Survey, in addition to its work of routine stream gaging, is at present conducting special investigations of streamflow under two major classifications. The first is a group of projects that may be classed together as low-flow investigations. The second is a nation-wide flood-frequency study.

About 10 yr ago, Federal agencies engaged in the collection or use of hydrologic data organized the Federal Inter-Agency River Basin Committee. The committee recognized that the most pressing need in hydrologic data was for information on small drainage areas. Since that time, a greatly intensified program of small-stream gaging has been carried on by the Survey. Drainage areas ranging in size down to less than 1 mi^2 are being measured. Small streams are so numerous that procedures are being developed for sampling and for selective measuring of important parts of the range in flow.

Knowledge of the low-flow portion of the streamflow record is highly important for many purposes, including farming, water supply, sewage disposal, and control of industrial waste. During periods of drouth and of the usually recurring low-flow periods, many discharge measurements are made within the affected areas. These measurements are being correlated with the records of long-term index stations where continuous records are obtained, in order to establish relationships allowing the prediction of low-water flow in general.

Knowledge of the high-flow portion of the flow regimen of small streams is needed for design of highway culverts, storm sewers, upstream flood-control works, and other purposes. In many places, peak flood measurements on small streams are being made whenever an outstanding flood occurs. One economical means of obtaining peak-stage records is by means of crest-stage gages, which automatically record the highest stage reached at some particular point on a stream and can be converted to peak-discharge records by means of discharge measurements. Records obtained by these means will supplement data already available on larger streams and will allow the development of flood-frequency curves through a wide range in drainage area.

The rational economic design of many structures such as bridges, levees, dams, or other structures on a floodplain requires a knowledge of the size of floods that may be expected and how often, on an average, floods of some particular magnitude will occur over a long period of time.

Engineers and hydrologists have been working for a long time on the problem of defining flood magnitude and frequency relationships. Peak-flood discharges are influenced by rainfall and by many complex and interrelated physical characteristics of the drainage basins involved. It is obvious that actual records of peak discharge represent an integration of all the factors, so that direct use of discharge records should give by far the best answer to magnitude-frequency relationships.

Techniques have recently been developed by the Survey for determining generalized flood-frequency relationships over wide regions. The method consists of two major parts: (i) the determination of the averages of the highest peaks that may be expected to occur each year at any point (known as the *mean annual flood*); (ii) the determination of dimensionless frequency curves that show the relationship in magnitude of a flood of any recurrence interval to the mean annual flood.

Some flood-frequency studies have been made on a state-wide basis. Reports for some states have already been published; others are being worked on. The ultimate objective is a nation-wide coverage, so that the magnitude of a flood of any frequency may be predicted with reasonable accuracy on any stream in the United States.

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Lysenkoism in Athens

Lysenko and his doctrines of genetics need neither introduction nor explanation. The Western World's geneticists have attacked and almost completely discredited all of his claims. Now we must take from him his last withering laurel sprigs, Original Hypotheses and Bold Guessing.

Already, when the Scythians and other barbarian tribes of proto-Russia were still slumped in savagery, Aristotle, Hippocrates, and Theophrastus to the south were proffering and testing the very ideas now called Lysenko's. The time, 350 B.C.; the place, Athens. We might compare some of those ancient Greek hypotheses with the modern Russian's claims.

Lysenko insists that he can "shatter" the heredity of an organism by placing it in a radically changed environment; thus, he says, he changes wheat from

one variety to another. Theophrastus, in his *Enquiry into Plants* (II, ii) stated that ". . . soil [at Philippi] seems to produce plants which resemble their parent . . . [but] a few kinds in some few places seem to undergo a change. . . ." And again, "If anyone were to plant our palm at Babylon it is reasonable to expect that it would become fruitful and like the palms of that country . . . for *the locality is more important* than cultivation and tendance." And a little further on (II, iv), he said, "[in growing plants] when a change of the required character occurs in the climatic conditions a *spontaneous change in the way of growth* ensues." And Aristotle seemed to say about the same, in essence, in his *Generation of Animals* (II, 4): ". . . foreign seeds produce plants varying in accordance with the country in which they are sown."

Recently Kihara and Sax [*J. Heredity* **44**, 132 (1953)] alluded to a new hope or dream uttered by Lysenko in a Chinese document. Lysenko and his followers hope to apply his "methods" to animal breeding and produce rapid and radical modifications there. In the absence of formal genetics, the Greeks thought of that too. Theophrastus had a 2300-yr jump on the Russian. With a straight face, the Greek philosopher wrote, " . . . so also changes in the nature of the ground produce changes in animals; for instance, the water snake changes into a viper, if the marshes are dried up." Considerable "shattering" of heredity was necessary in all of these cases, if true.

Lysenko claims that he can and did change one genus of cereal grain into another. Mendelian geneticists find no such possibility. The Greeks also thought of such changes, perhaps born of hope and desire. Theophrastus notes that "some say that *wheat has been known to be produced from barley,* and barley from wheat, or again both growing on the same stool." Then he hastens to protect himself with: "These accounts should be taken as fabulous." But on another occasion (II, iv) he wrote, without qualification, that "Wheat turns to darnel, one-seeded wheat and rice-wheat change into wheat," and then he adds the proviso, "*if bruised before they are sown* . . . in the third year." Lysenko apes this when he pretreats seeds to "shock" them into change.

The theory that acquired characteristics are transmitted to offspring, usually identified with Lamarck of the 18th century, has recently been "invented" by Lysenko. The gentlemen of the Lyceum were no strangers to that either. Listen to Aristotle (*History of Animals,* III, 12): "Some animals change the color of their hair with a change in their drinking water, for in some countries the same species of animal is found white in one district and black in another . . . and in Antandria there are two rivers of which one makes the lambs white and the other black." Hippocrates, in his *Airs, Waters, Places,* even constructs a theory to explain and support the idea. It was much like Darwin's Pangenesis and just as lacking in validity.

Those of Lysenko's "new" claims that are 23 centuries old can be enumerated as follows: (i) the "shattering" of heredity by sudden environmental change; (ii) the effective *pretreatment* of seeds of cereal grains to precipitate changes; (iii) the man-regulated *transmutation* of one genus of cereal grain into another; (iv) the quick *change of one genus of animal into another* by environmental control; and (v) the *transmission of acquired characteristics.* The Greeks asserted all of them provisionally.

The great thinkers at Athens may be excused, and even admired, for probing and postulating among the riddles of genetics; their reference libraries had not one datum to enlighten or guide them in that area. Lysenko has mountains of valid data, which he ignores. His claims are really all Greek to us.

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Bedrock Geology of the Montpelier Quadrangle, Vermont

The Montpelier quadrangle covers an area of about 213 mi^2 in the mountainous region of central Vermont east of the summit of the Green Mountains. The Worcester Mountains trend northeastward through the central part of this area. The Winooski River flows west-northwestward across the southern part of the quadrangle, between the city of Montpelier and the village of Waterbury.

The rocks of the quadrangle are in the east limb of the Green Mountain anticlinorium, whose axis nearly coincides with the north-northeast-trending summit ridge of the Green Mountains 3 to 6 mi west of the western border of the quadrangle. Bedded metamorphic rocks, originally sedimentary and volcanic, predominate. They include numerous intergradational rocks—chiefly quartz-sericite-chlorite schist, graphitic schist, and phyllite—and quartzite, greenstone, and interbedded quartzite and quartz-albite-sericite-chlorite granulite. These rocks, of Cambrian and Ordovician age, are overlain by interbedded slate, phyllite, and crystalline limestone probably of Silurian age.

Intrusive igneous rocks, which underlie less than 1 percent of the area, range in age from Ordovician probably to Mississippian. In the western part of the quadrangle serpentinite, possibly the oldest of these igneous rocks, is intruded chiefly into quartz-sericite-chlorite schist interbedded with greenstone. The serpentinite and its metamorphic alteration products—talc-carbonate rock and steatite—form tabular, lenticular, and pod-shaped masses that strike north-northeast and dip steeply in approximate parallelism with the schistosity and, commonly also, with the bedding of the enclosing rocks. Numerous sills and dikes of greenstone and chlorite schist, which are probably metamorphosed diabase, intrude interbedded quartzite and quartz-albite-sericite-chlorite granulite well east of the bodies of sepentinite. Sills of granite intrude