Mottled enamel, a defect of human teeth, has been recognized by the dental profession since 1916. It was not however until 1931 that the agricultural science became interested in the problem and discovered its cause (1). “Mottled enamel is chiefly characterized by the presence of dull chalky white or paper white patches distributed irregularly over the surface of the tooth. In many cases the whole tooth presents this dead white, unglazed appearance. The teeth glare unnaturally when the mouth is open because of the loss of their normal translucency. Frequently the enamel is badly pitted and corroded, and the teeth are structurally weak, the enamel tending to chip off. Filling these teeth when decayed is unsuccessful for they do not hold fillings well. Mottled teeth may or may not become stained later. The stain is frequently confused with the enamel defect itself, but it is a secondary phenomenon. It shows considerable variation in coloration from dark brown, almost black to yellow.”

In Arizona the condition was first reported from Mesa and several years later from St. David, a small agricultural community in the eastern part of the state on the San Pedro River. Shortly thereafter it was also reported from many other places in the Gila Valley.

A survey showed some environmental factor in the community which was producing mottled enamel, for if a child with part of his permanent teeth already erupted on which the enamel was perfect should move into the community, all teeth cut later would be mottled.

In looking for the environmental factor diets were studied and the usual analyses made of the drinking water. These showed nothing unusual. However when water residue or water concentrated to one-tenth of its original volume was fed to rats, a tooth defect similar in appearance to mottled enamel resulted. This defect was the same as that produced when fluorides were incorporated in the diet of the animals. Subsequent analyses of the waters from endemic regions showed abnormal concentrations of fluorides, while waters from non-endemic regions had little or none. Thus it was established that fluorides in the drinking water was the cause of mottled enamel.

There is no satisfactory chemical method for determining the fluoride content of foods and agricultural products, so there is little reliable information in the literature on the amounts of fluorides plants are able to remove from the soil.

Knowing that an excess of fluorides either in water or foods taken into the body would cause defective enamel it seemed that the occurrence of mottled enamel might be correlated with certain soil series, the crops grown on them and the groundwater associated with them. To view the soil series in the endemic and non-endemic regions.

At St. David (3) the Anthony and OIlado series predominate, while the McClellan, Imperial, Riggs and Gila series occur to a lesser extent. Mottled enamel might therefore be associated with a particular soil series in this area.

Outside of this area mottled enamel was particularly prevalent along the Gila River, the Gila, a recent alluvial soil is more common. However in other parts of the state were found to occur on the more weathered series McClellan (3) (5) (6) (9) Laveen (5) (8) and Anthony (5) (8). All of these series have found to occur in areas in which mottled enamel occur.

In the San Simon (4) area the Karro series is derived from old valley filling material. It is only of local importance however an area of its occurrence there is associated with mottled enamel. As a rule the Mohave, an old alluvial soil which occurs in the San Simon (4), Buckeye-Beardsley (5), Middle Gila (6), Paradise-Verde (8) (9), and Gila Bend (10), areas is not associated with mottled enamel but occasionally, as near Laveen definitely associated.

The Cajon (8) (9), a recent alluvium found in the Paradise-Verde and Salt River Valley, has not been shown to exist where mottled enamel occurs. Unestansive local series on which the malady do occur are the Cochise (4), Winslow (7), and Glorieta (7).

From these observations one must conclude that there is no relation in Arizona between soil series and mottled enamel, except that it occurs on these series more often than any others. Again any correlation between soil series and mottled enamel is imperfect. It becomes known that mottled enamel has to occur in each of the six soil regions as Glacial and Loessial province, the Piedmont, the Atlantic and Gulf Coastal Plains Province, and reported from seventeen states, most of which of the Mississippi River. The states west of Missis- sippi from which it has not yet been reported are Missouri, Louisiana, Nebraska, Montana, Wyoming, and Nevada. East of the Mississippi it occurs in Virginia and South Carolina. Soil surveys have been made in all endemic regions in many states, available surveys again show soils of widely varying sources and formation. In the vicinity of Cincinnati the Rowan and Rome series predominate.