an increased interest in the analysis of other varieties of maize for their content of lysine and other amino acids. As it is frequently not possible to have access to an amino acid analyzer, other methods, such as microbiological ones, can be used for this purpose. We have developed a simple microbiological method for the assay of methionine, lysine and phenylalanine which can be used for maize. The three amino acids were assayed through nutritional deficient mutant strains of the fungus Aspergillus nidulans by a technique first developed by Princivale and Caradona (Rend. Inst. Sup. Sanitá, 26, 75) for the microbiological assay of vitamins. In our case, the diameters of the growth zones for the amino acids were linear functions of the logarithms of the doses for solutions of 15.625 ug/ml to 500 ug/ml for methionine and 156.25 ug/ml to 5000 ug/ml for lysine and phenylalanine. Using an acid hydrolysate of endosperm of opaque-2 maize, the results obtained were comparable with those found through the use of amino acid analyzers. In conclusion, the method presents several advantages: the media used are simple inexpensive preparations; the strains can be maintained for years without changing properties; the standard deviation obtained was never more than 9%; the fungus is resistant to penicillin so that this antibiotic can be added to the medium reducing the danger of contamination during the assay; responses are highly specific and are not influenced by other substances. The method can be useful for those people who have no facilities for analyzing their local varieties of maize for amino acid content through an amino acid analyzer.

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2. A preliminary report on the literature related to the history of the races of maize in Brazil.

Although in certain areas of Latin America the variation among the races of maize is very great, the races of maize from the lowland regions of southeastern South America encompassed by eastern and southern Brazil, Uruguay, Paraguay, eastern Argentina and certain parts of Bolivia have relatively little variability. The region was occupied by several different Indian groups which are known to have cultivated maize and from which Brieger et al (1958) managed to obtain collections. The descriptions of maize encountered in the literature are remarkably consistent with those of ethnologists who have observed the remnant Indian populations in recent years. Although there appears to have been some transposition of names, the collections of maize described by Brieger et al seem to correspond quite well to the early descriptions also.

The earliest descriptions[1] (Thevet, 1556; Lery, 1578; Souza, 1587) indicate that the maize commonly encountered in the coastal regions of Brazil was a

[1]The non-twentieth century dates cited are those of the earliest known editions except in case of extreme delay in publication for which the actual year that the article was written is cited.

white flint, and that there were cream, black (or purple), and/or red (or purple) variants in lesser proportions. In addition, a floury maize was cultivated (which was probably also predominately white).

The white flint corn was generally called either "Avati tupi" or "Avati ata" or variants thereof (Montoya, 1639, Azara, 1809; Dobrizhoffer, 1784; Graty, 1865), although these may be generalized names for flint corn rather than specific names for the white flint under discussion. The white flour corn was generally called either "Avati ti" or "Avati moroti" (Montoya Azara, Dobrizhoffer, Graty). Yellow corn was generally called "avati yu" (Graty, Montoya), while the first description of what appears to be the pointed popcorn of the region was presented by Dobrizhoffer, who called it "bisingallo."

Most of coastal Brazil was inhabited at the time of its discovery by various groups of Tupi (the Portuguese name) or Guarani (the Spanish name) Indians to whom the maize types described above belonged. Much less is known about the other groups of Indians of Brazil. The group called the Ge Indians is particularly important, but reports about their agriculture are quite conflicting. They have been reported to have been non-agricultural until being pacified during the present century (Silva, 1930 referring specifically to the Caingang tribe); as having been agricultural at the time of the discovery, but as having quit the pursuit of agriculture soon thereafter, readopting it recently (Henry, 1941, also referring to the Caingang); and as having been agricultural continuously since well before the discovery (Nimuendaju, 1946). The maize of the Caingang tribe described by Brieger et al. and Barboza (1913) appears to differ from the maize of the Timbira tribes of central Brazil described by Nimuendaju only in having larger kernel size. The Suya Indians, another Ge tribe from central Brazil, are reported to have had a small-eared maize with golden colored kernels at the time of their discovery (Steinen, 1894).

In general the long-eared, late-maturing floury corn of the deep interior was called "pururuca" or "saboro" (Hunnicutt, 1933; Roquette-Pinto, 1935). It has been called "interlocked" by Brieger et al. and is closely related, if not identical to the race Corioco described by Cutler (1946) and Ramirez et al (1961). Unfortunately very little is known about the distribution of (or about the variation present within) this race.

There seems to be little indication in the early literature that the race "cateto" (or "catete") could have been indigenous to southeastern South America. No mention of an orange-colored flint corn has been encountered, although Souza and Azara mention light yellow-colored flints and Souza also mentions a red-colored flint corn. Although cateto is sometimes said to be "red" ("vermelho"), Lery left no doubt when he said "rouge, . . . bled farrazin". Even the early descriptions of cateto emphasize that it was limited to the coastal regions (Velloso, about 1800), and whereas good descriptions are available for atati ti, avati ata, avati moroti, avati tupi, and "bisingallo" at very early dates, nothing is available for cateto until after 1800.

The word "tupi", as used in the name "avati tupi", has been accepted by Serrano (1936), Schaden (1954), and Brieger et al. (1958) to signify "enemy"

or "something strange or foreign", and Schaden reported that "avati tupi" is said to be a type of maize obtained by the Guarani from their neighbors, the Caingangs, whom they call "tupis". However, at least two other hypotheses exist. Luccock (1820) translates "tupi" as "the excellent people" while Bertoni (1914) says that "tupi" signifies everything that is not civilized, everything that has not evolved from its inferior state; when applied to objects, plants, or animals, he says it always means the most rustic and primitive. Obviously the correct interpretation is important in the case at hand.

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1. Methylation of DNA as the molecular basis for paramutation in maize.

Several parallels can be drawn between the phenomenon of host-controlled modification of phage, and that of paramutation in maize. Recent evidence has established that the basis of the host-controlled modification process, at least in some instances, is a specific enzymatic alteration of DNA. This realization that alteration of DNA, by either glucosylation or methylation, has a specific biological effect prompts consideration of these processes as the possible molecular basis for paramutation in maize.

It is clear from recent reviews /Srinivasan and Borek, Prog. in Nucleic Acid Res. and Mol. Biol. 5: 157 (1966); Borek and Srinivasan, Ann. Rev. Biochem. 35: 275 (1966)/ that the enzymatic alteration of nucleic acids is a highly specific process. In particular, the process of methylation of DNA is apparently of universal biological distribution and has the specificity to reasonably accommodate the specific allelic interactions which occur in some paramutation systems. Moreover, the biological effects of methylation of DNA, as exemplified by host-controlled modification, suggest that certain of the properties distinguishing paramutation systems (invariability of occurrence, occurrence in somatic cells, reversibility of paramutant, and metastabilized states) could be expected as consequences of the process of specific methylation of DNA.

Although an hypothesis of paramutation based on specific methylation of preformed DNA is completely speculative, it may nevertheless be of interest to examine the principal postulates of such a hypothesis applied to the case of paramutation at the R locus:

1. Paramutation results from the effects of substitution of methyl groups on the DNA of a specific segment at or near the R gene. Paramutagenic alleles carry this DNA segment receptive to methyl groups, whereas non-paramutagenic alleles do not.

2. Methylation of the DNA segment is mediated by specific methylases, whose synthesis is controlled by a genetic region at or near the R gene