of nutrients. Apparently stocks of a single variety of barley can differ in their content of diastase according to certain environmental conditions. For example, the content of the enzyme seems to be positively correlated with nitrogen content.

Another interesting development has been the matromorph. This is a plant which results from attempts to cross different species or genera, but it shows no influence of the male parent. Matromorphs are completely homozygous, and are assumed to develop from unfertilized egg cells which have been stimulated into development and chromosome doubling. Interest in matromorphs centres on swedes (*Brassica napus*), kales and other forms of *Brassica oleracea*. The chances are that if the phenomena could be brought under control it would greatly facilitate the production of pure lines. Matromorphs could also be very important in exploiting the heterosis—hybrid vigour—that has recently been found in swedes at Pentlandfield.

PUBLIC HEALTH

Tampering with Water Supplies

from our Social Medicine Correspondent

OPPONENTS of fluoridation would do well to turn to the latest issue of the *British Dental Journal* (127, 128; 1969) in which even more support for the cause is provided (see *Nature*, 223, 228; 1969)—this time by J. Murray of the Dental School and Hospital, University of Leeds. Murray reports that incidence of caries in 368 fifteen year old children from the fluoride community of West Hartlepool (1.5–2.0 p.p.m. of fluoride) was 45 per cent lower than that observed in 381 children of the same age from the low fluoride area of York (0.2 p.p.m. of fluoride). These findings, he says, support studies from other fluoride and non-fluoride areas.

In West Hartlepool, 6.2 per cent of children were free of caries compared with 0.8 per cent of children in York. The difference in the occurrence of caries was greatest in the upper central incisors, the proportion of caries in these teeth being twelve times higher in York than West Hartlepool. It is interesting that the benefits of fluoride were not equally distributed among teeth, nor indeed from one site to another on the same tooth. Inhibition was greatest on the approximal surfaces of upper incisors (approximately 90 per cent); on the smooth surfaces of first permanent molars caries inhibition was 66 per cent. Again, in the anatomical lingual pits of upper incisors inhibition was 62 per cent, compared with only 38.5 per cent in pits and fissures of first permanent molars.

Murray says it is not possible to assess how preventive fillings have masked the true picture. But further epidemiological studies are being carried out in adults in the two communities to determine whether the marked caries-inhibitory effect of fluoride on upper incisors is maintained with increasing age.

An article in the current issue of *Archives of Environmental Health* (19, 124; 1969) deals with the possible effects on humans of the use of iodine to disinfect water. This method of disinfection, which until recently was limited largely to emergency situations, is now being used with increasing frequency for both swimming pools and public water supplies. The advantages of iodine are its effective bactericidal and viricidal

action, economy (disinfection of an Olympic-size swimming pool can be accomplished with iodine at half the cost of chlorination), and freedom from eye-burn for bathers. Iodine reacts slowly with organic matter—hence the small iodine demand of various waters—and the iodide can readily be reoxidized back to iodine. Thus iodine added to a pool can be used between ten and thirteen times.

W. C. Thomas and G. Freund of the department of medicine, University of Florida, Gainesville, and A. P. Black and R. N. Kinman of the department of chemistry have measured the serum concentration of protein-bound iodine and the uptake of radioactive iodine in twenty-two adults before and after swimming in an iodinated pool three hours weekly for one month. Results indicated that the subjects did not absorb sufficient iodine to modify either of these parameters.

They undertook a five year feasibility study of the use of iodine for public water supplies. Beginning in 1963, the study involved seven hundred inmates (men, women and thirteen to sixteen year old girls) of three prisons in Florida. Of these, 133 were selected for evaluation before and during iodination of the water (1 p.p.m. of iodine). No cases of urticaria (rash) or iodism were observed during the five year period, thyroxidine iodide concentrations in the sera of subjects were unchanged during the first thirty-seven months of the study, and none developed clinical evidence of hyper or hypothyroidism. Effective bacteriological control was obtained and the concentration of iodine used imparted little or no taste to the water. Thomas *et al.* conclude that iodination of a public water supply is therefore technically as well as commercially feasible.

COSMIC RAYS

Heavy Elements Detected

A NEW type of cosmic ray detector consisting of layers of photographic emulsion and plastic sheets has proved to be a powerful tool for detecting the existence of transiron nuclei in primary cosmic radiation. The presence of heavy particles of atomic number greater than 30 was first recorded by P. H. Fowler *et al.* in 1967, and now with this new technique G. E. Blandford *et al.* (*Phys. Rev. Lett.*, 23, 338; 1969) have determined the lower limits of the flux values for particles in the three ranges with lower bounds of atomic numbers of 33, 40 and 70.

The analysing power of the new “sandwich” detectors seems to be quite revolutionary. They work on the principle that if nuclear emulsions and plastic sheets are held rigidly together, the path of a charged particle can be followed by scanning each layer of the sandwich. Because different plastics have different charge thresholds for relativistic particles, a judicious ordering of plastics and emulsions in a “multi-decker sandwich” can give quite detailed information on the charge distribution in a stream of particles. The rate of ionization in any layer also depends on velocity, however, and so the particle must be known to be relativistic for this method to be valid.

Two separate balloon experiments are reported by Blandford *et al.* Three sandwiches of emulsion and plastics were used, and their separations were varied to indicate whether the recorded tracks were taken