scrubs. It now seems, however, as if hexachlorophane does not give adequate protection against Gram-negative organisms, and thus it can be classified with other cleansers which have been giving hospital workers a false sense of security. For example, Gram-negative organisms have been shown on occasions to be spread in hospitals by cloths and mops—the cleansing solutions being relied on to clean them are inactive against these organisms.

Gram-negative organisms are increasingly becoming a problem in hospital-acquired infections. In the past the most feared organisms were the Gram-positive staphylococci and streptococci which became resistant to the antibiotics in common use. Hexachlorophane has undoubtedly diminished this worry, but is contributing little to the Gram-negative problem.

Two workers at the University of Bergen School of Medicine (Bruun and Solberg, *Br. med. J.*, **2**, 580; 1973) have studied the effect of hexachlorophane and of ordinary bar soaps on the colonization of the hands by Gram-negative organisms. The bacterial hand flora of nursing staff in one medical and two surgical departments were examined for *Staphylococcus aureus* and the Gram-negative organisms *Pseudomonas aeruginosa, Proteus* and lactose-fermenting coliforms. Two sets of samples were obtained, with a period of 6 months between them during which one group washed their hands with bar soap only, one with bar soap for 3 months and 3% hexachlorophane for 3 months, and the third with hexachlorophane only. Carriers of Gram-negative organisms were followed with regular sampling.

The results confirm again that hexachlorophane reduces the carriage of *Staph. aureus*. But when all the counts obtained during the hexachlorophane period were compared with counts during the period of using soap only, there was a significantly higher isolation rate for Gram-negative bacilli in the hexachlorophane group. At the start 18.8% of the staff in the survey carried Gram-negative organisms, and it seems that 13% of these continued to carry these organisms for periods of 6 to 20 months. All these persistent carriers were in groups using hexachlorophane.

Unfortunately Bruun and Solberg say nothing about how thoroughly the hands were dried after washing, which is important because Gram-negative organisms flourish best in moist conditions. All the same, the results indicate that hexachlorophane cannot always be relied on. The authors point out that most of the persistent carriers had signs of low-grade infections of the skin of the hands for most of the investigation period, and most of the Gram-negative organisms were isolated from these infected areas.

PLANT GEOGRAPHY

Origin of Cockleburs

from our Plant Ecology Correspondent

THE variation of photoperiodic response found in related plant species from different latitudes is now well documented. One of the most informative genera is *Xanthium* (cocklebur) which has a widespread distribution, but which has an extremely complex taxonomy, chiefly as a result of its morphological plasticity. Ray and Alexander (*Am. J. Bot.*, **53**, 806; 1966) found that *Xanthium strumarium* varied in its photoperiodic response according to the latitude of its origin in North America. Plants of northern origin, for example, Montreal, Quebec, required a critical dark period of only 7.5 h to initiate flowering, whereas plants from the south, for example, Texas, required more than a 10-h dark period. This response is genetically controlled and can be regarded as an adaptation to differing climatic regimes in the North American continent.

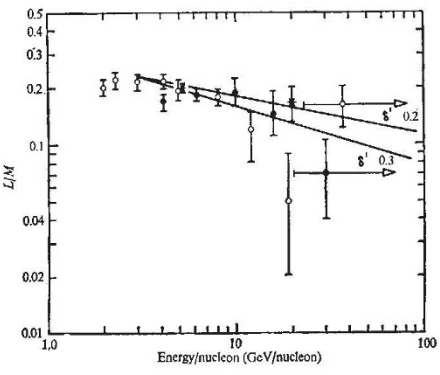
McMillan (*ibid.*, **57**, 881; 1970) has since shown variation in photoperiodic response with latitude in Texas, though in Mexico this was not found to be the case. There, considerable variation occurred within a given latitude, which McMillan explains by reference to climatic variability resulting from irregular topography.

Xanthium is a genus of annual plants characteristic of open habitats. It has invaded several areas of the world such as India and Australia as an aggressive weed. Recently McMillan (*Nature*, **240**, 485; 1972) attempted to trace the geographical origins of the aggressive Indian populations by examining their photoperiodic responses as well as some chemical characteristics. He concluded that the aggressive form was the product of hybridization between indigenous genotypes and a Caribbean taxon, the fruits of which could have been imported in American cotton seed.

McMillan has now turned his attention to the *Xanthium* populations of the Pacific Islands (*Am. J. Bot.*, **60**, 277; 1973), which are regarded as adventives, probably of American origin. He collected seed from plants in Tahiti and Oahu and also from several areas of Mexico at similar latitudes for comparison. Plants grown from the island seeds had a critical dark period requirement of between 10.75 and 11 h. Mexican material showing greatest similarity in response came from the north-western coastal plain in Tamaulipas. Most other Mexican plants had shorter dark period requirements. When grown together at Austin, Texas, in experimental conditions, the populations were shown to differ in a variety of other physiological and morphological characteristics, but the similarity of their photoperiodic requirements gives strong support to the contention that the *Xanthium* populations of the Pacific Islands originated in coastal Mexico. Degener's theory that Hawaiian *Xanthium* was introduced from California now seems most unlikely, because Californian plants have critical dark period requirements varying from 8 h in the north to 9.5 h in the south. The island populations evidently originated in more southerly latitudes.

Galactic Escape and Cosmic Electrons

THE implications for cosmic electrons of the discovery that the escape of cosmic rays from the Galaxy is apparently dependent on energy are examined in next Monday's *Nature Physical Science* (June 25) by Silverberg and Ramaty. They come to the conclusion that the effects of the loss of electron energy by the Compton and synchrotron processes on the electron energy spectrum will be much less than if the "lifetime" in the Galaxy of the electrons is constant at all energies.



The known variation of the ratio of light nuclei ($3 \leqslant Z \leqslant 5$) to medium nuclei ($6 \leqslant Z \leqslant 8$) with energy is shown in the diagram. The lighter nuclei which are produced by fragmentation of the heavier nuclei during their passage through the Galaxy are less in evidence at higher energies, suggesting that an energy-dependent loss process is at work (or, alternatively, that considerable fragmentation takes place in the sources of cosmic rays).

Assuming that the energy dependence of the loss of electrons from the Galaxy is described by similar parameters to those which describe the effect for nuclei, Silverberg and Ramaty show that the change in electron spectral index resulting from the electron energy loss processes is unlikely to be large at electron energies below several hundred GeV.