bers of leucocytes accumulate in the lung during acute bacterial pneumonia, it is concluded that intercellular surface phagocytosis causes the destruction of many of the invading organisms, particularly during chemotherapy in the early stages of the disease when specific antibodies are not present to opsonize the bacteria.

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Use of 2,4-D Weed Killers on Woody Weeds in Cuba

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The problem of eradication of woody perennial weeds is much more serious in the tropics than in temperate zones. In Cuba the most serious weed is the legume *Dichrostachys nutans*, known as *Aroma marabu.* Since this plant regenerates vigorously from cut stumps, its eradication by continued cutting is almost impossible. In experiments carried out at the Atkins Garden and Research Laboratory of Harvard University, at Soledad, Cuba, several preparations and methods of spraying of 2,4-D have been tested on plots of large, well-established plants from cut stumps. Although delayed regeneration is still not entirely excluded, the following approximate figures for apparent kills in 4 weeks have been obtained:

TABLE 1

Treatment	Per cent apparently killed	Per cent probably alive
1. 2,4-D sodium salt, 0.2%	18	21
2. The same applied twice, 5 days apart	76	8
3. The same, 0.3%, applied once	62	8
4. The same, 0.3%, plus Carbowax 1500, 0.5%, applied once	87	1
5. 2,4-D ester, 0.3%, applied once	94	4

Since the plants die slowly, the percentage kill increases steadily with time, and a number of plants have to be classed as doubtful for a month or more after treatment. On balance, treatment No. 4 was considered the most effective, although No. 5 gave the most rapid defoliation. The volumes used were about 100 gallons/acre.

Plants in the shade were only slightly less affected than those in the sun. Spraying on the underside of the leaves did not increase the toxicity.

Another troublesome plant, *Comocladia dentata* (Guao), having a toxic action on the skin like that of poison ivy, was also studied. In this case the ester preparation ("Weedone") was definitely more effective than either the salt or the free acid, probably because of its better adherence to the vertical glossy leaves, from which aqueous sprays ran off rapidly. A concentration of 0.3 per cent gave about a 75 per cent kill as determined 6 weeks after spraying.

These experiments, which give promise of possible reclamation of land up to now considered virtually unavailable, are being continued.

Note on the Theory of Radiation-induced Lethals in *Drosophila*

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A rather complete theory of induced lethals in *Drosophila* which was proposed by Lea and Catcheside (*5*) has met with objections in private discussions. As this theory is now embodied in a comprehensive book (*4*) (reviewed in *Science*, April 25, p. 454), it may be advisable to publish some comments on the matter.

The frequency of x-ray–induced, sex-linked recessive lethals in *Drosophila* is experimentally known to be accurately proportional to the x-ray dose, at least up to about 5,000 r. The presence among these lethals of a large number which are located at points affected by chromosomal rearrangements creates a well-known difficulty for the interpretation of the dependence of frequency on dose (*2*). If it is simply assumed that this fraction of lethals is a by-product of the rearrangements, the total frequency of recessive lethals should increase faster than in proportion to the dose. Lea and Catcheside made the alternate assumption that the recessive lethals and the rearrangements result independently from a single type of primary effect. This primary lesion, the frequency of which is assumed to be proportional to the dose, may or may not, according to chance, lead to a recessive lethal and/or to a rearrangement. Such a common ancestry accounts for the observed coincidence of recessive lethals with rearrangements. It must also cause, however, a parallel frequent coincidence between the recessive lethals and those rearrangements (e.g. dicentrics) which are unviable ("dominant lethals") and thus escape detection. The latter rearrangements thus make an inroad in the observable recessive lethals, which should become increasingly important with increasing dosage; consequently, the frequency of recessives should increase slower than in proportion to the dose.

This nonlinear effect, embodied in Lea and Catcheside's detailed theory, leads to a very significant discrepancy between this theory and the experimental data. The authors merely discount the discrepancy because they reckon on having overestimated it by an undetermined amount (*5*). It is proposed here to give a minimum estimate of the importance of this discrepancy, using general arguments.

Lea and Catcheside classify the recessive lethals as class *A* (associated with no rearrangement), class *B* (associated with a minute rearrangement), and class *C* (associated with a viable gross rearrangement). This latter kind of rearrangement will be called *VGR*. We shall also consider class *D* lethals, *i.e.* those associated with an unviable gross rearrangement (*LGR*).

The various symbols will be used to indicate the corresponding frequencies, but it should be noted that the frequencies of *C*'s and *VGR*'s *among viable sperms* are, respec-