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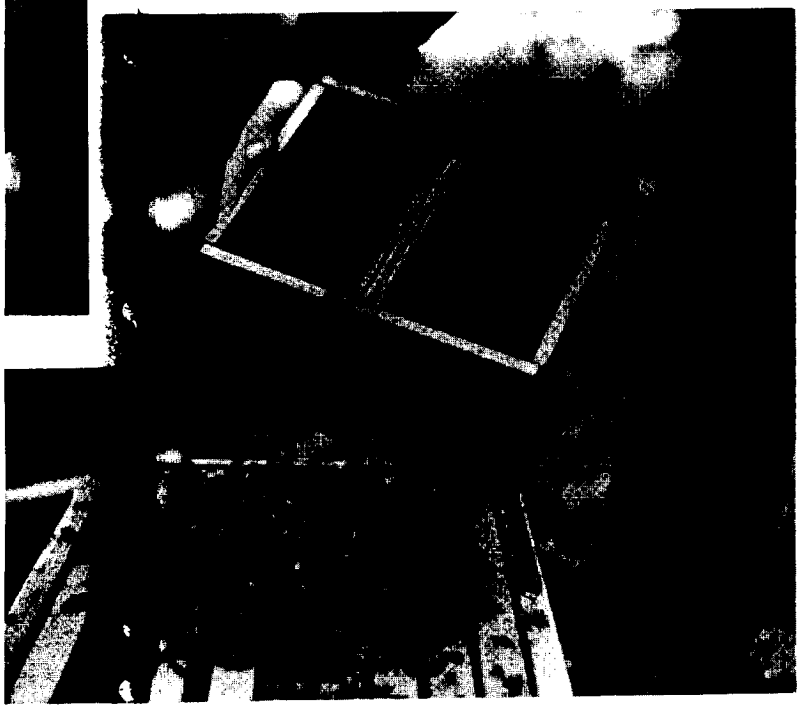

honey. It also should not be put into direct contact with wax cappings or comb refuse to be rendered, because it can cause permanent damage to the wax if melted with it.

If paradichlorobenzene is used to protect stored combs, for example over winter, the combs should be aired for a day or more before they are placed on colonies.

See also FUMIGATION AND STORAGE OF COMBS.

Paralysis see **Viruses attacking the honey bee**

Parent colony Like much of beekeeping terminology, the term parent colony is borrowed from ordinary life and given a specific meaning in beekeeping. A parent colony is a colony from which a swarm has departed, and it may be of any size. Since the old queen leaves with the swarm (if she is capable of flight) the parent colony is left with queen cells, or a virgin queen, and a depleted population.

Parthenogenesis is egg development without fertilization. The eggs of vertebrates and most insects die if they are not fertilized with a sperm cell from a male. However, the unfertilized eggs of most, if not all, insects in the order Hymenoptera (the ants, wasps and bees) develop into males if they are not fertilized. This, of course, includes the honey bee, and in some other groups of insects females develop from unfertilized eggs. A few insect species reproduce entirely by parthenogenesis: females produce females, and males are not even known to exist.

Drones (males) in a honey bee colony are produced by parthenogenesis; workers and queens are produced from the fertilized eggs (see SEX DETERMINATION). A queen can control the release of sperm from her sperm storage organ (spermatheca), so that when she lays in a worker-sized cell she releases sperm and causes fertilization of the egg just before it is laid; when she lays in a larger drone-sized cell, she does not release sperm and so lays an unfertilized egg.

Workers also produce eggs under certain conditions (see LAYING WORKERS), and since these eggs are not fertilized, they develop parthenogenetically into functional drones.

On rare occasions unfertilized honey bee eggs develop into females. These can usually be seen if cells of capped brood from virgin queens are examined. For example, if one frame of capped brood is examined from each of five colonies having laying virgin queens, it is likely that one or more worker pupae will be found. Genetic studies have shown that such workers, like all drones, have developed parthenogenetically. JRH

Peace River beekeeping see **Canada**

Pellett, Frank Chapman 1879-1951. Pellett is best known for his book *American Honey Plants*, though in all he authored 13 books and contributed to many more. He practised law, participated in the Chautauqua lecture series, was State Apiary Inspector for Iowa for several years, and was Field Editor and, later, Associate Editor of the *American Bee Journal*. He established a honey-plant test garden in Atlantic, Iowa, where he tested plants grown from seeds sent to him from all over the world. Pellett was also interested in disease resistance by bees, and was one of the first to demonstrate that it was possible to develop strains resistant to American foulbrood.

Pesticides, effects on bees Poisoning of honey bees is mainly caused by the insecticides used in crop protection. Fungicides, herbicides and other pesticides, as well as poisonous plants and industrial pollutants, are of much less concern to the beekeeping industry. Therefore we will define poisoning as 'the accidental killing or debilitation of bees caused by the use of insecticides for crop pest control.' Most beekeepers in the western United States cite poisoning as the most serious problem they face.

Bee poisoning typically occurs when foraging