A PICTORIAL HISTORY
OF PINEAPPLE MECHANIZATION

R. R. OWEN

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The Killefer stump splitter, developed in the early 1920's is still standard for the industry. Each implement weighs about 8000 lbs and consists of 2 gangs of 32" straight disks.
The PRI shredder, constructed in 1923 by A. F. Stubenberg. The machine consists of a peg tooth cylinder and hopper into which plants are manually fed.

The CPC shredder, developed in the mid 1930's picked up the standing plants and ran them through a peg tooth cylinder. Power requirements were high and breakage from stones was excessive.
The PRI chopper, developed in 1949 was very efficient in chopping plants held against the ground. However, the chopped stumps were very effective seed pieces under favorable weather conditions and there was excessive volunteer growth. This might have been solved by immediate plowing but blade breakage from stones was excessive.

The Bushwacker, purchased and put into use by Maui Pine in 1951. This followed development in 1950 of a Pinebuster which consisted of chains and hammers which flailed the standing plant. The flailed
material was further chopped by stump cutter knives. The flailer was side mounted on a stump cutter frame. Neither the Pinebuster or the Bushwacker have sufficient power to adequately flail the mother stumps near the soil surface, though the latter uses a 225 HP engine on a 6 foot swath.

The PRI Crusher, developed in 1950. This machine passes plants through between two fluted rolls, one of which is spring loaded. Breakage and vibration was excessive.

The CPC modernized Killefer type stump splitter developed in 1954.
The gang shafts are close enough to cause meshing of knives and reduced fouling. The machine is turned over onto the rubber tired wheels for highway moves. This machine was patterned after an earlier Hawaiian Fruit Packers machine which is interim between the early versions and this machine.

The PRI chopper-tiller, developed in 1954. It consists of knives cutting in the vertical planes and hoelike knives to cross cut and mix soil and trash.
A preliminary version of the PRI lifter-crusher-chopper under development in late 1955. The lifter portion is borrowed from a plant harvester project. The remainder is a trailer mounted square-bar crusher and with rotary knife cutter beneath.
The Davis plow, standard for the industry since the 1920's. Its major deficiency is the difficulty of incorporating heavy surface trash, requiring 4 or more plowings.
The side plow, probably first tried by Libby but abandoned and then perfected by Hapco, starting in 1945. This is the modern version, using a stump splitter with offset hitch (not shown here) to offset side draft of the plow, and trash moving wheels. Under favorable conditions, the only subsequent tillage required is harrowing and subsoiling. This tool combines knockdown and plowing and the plowing might be considered almost free. However, maintenance costs and lost time from the plowing portion of the machine are such as to often refute this observation.
The PRI belt plow, developed in 1947 and 1948, using a powered rubber belt for a moldboard. This achieves complete coverage in one plowing and made quick cycling possible.

The PRI powered disk plow, developed in 1949, using a powered 42" disk for a moldboard. Because of slightly greater power requirement and
less effective trash coverage, the plow was abandoned in 1950 in favor of the belt plow. It was resurrected at the station in late 1955 because of excessive maintenance costs of the belt plow.

The Towner Jumbo plow came into limited use in 1954. It was thought to be capable of duplicating PKI belt plow and side plow performance with a wider swath, greater daily production and lower costs. This has not been demonstrated with conventional knockdown but might be so in the future with knockdown by a machine like the chopper-tiller. As shown here, an engine is mounted on it to drive trash pickers between each plow disk which are employed to get better trash coverage.
The Stubenberg subsoiler, widely used since the 1920's.

This was the harrow available until the late 1930's when a heavy Rome harrow became available. Since 1946 a heavy harrow has been manufactured by Towner and due to its lower cost, it is gradually replacing older equipment.
Subsoil and smooth board, the last operation before papering, used by several companies. Probably adopted in the 1930's.

**Paperlaying**

The mule drawn paper layer, developed in the 1920's.
The CPC trailing paperlayer, developed in the 1930's is probably typical of machines used in the era of transition from animal drawn to tractor mounted machines.

One of the more complex mounted paperlayers, developed by CPC in the early 1940's. This machine drills fertilizer and injects fumigant as well as laying paper.
One of the simpler 3 bed machines, developed by HAPCO prior to application of fumigant under paper.

The CPC line marker, developed in the mid 1940's. This avoids cumulative error and "pinching" of lines to compensate. It has not been adopted by other Companies.
The PRI paperlayer developed in 1952 primarily for testing soil fumigation equipment. This is too light for general field use but has stimulated simplification of plantation machines.

Trash Mulch
The trash-mulch machine, developed in 1949 by PRI and improved in later machines such as this Hapco machine. Major changes involved the rototiller which was replaced by a gyrotiller in Libby and CPC machines. This machine cleared and tilled only the bed area.
The CPC machine developed in 1952, mounted on a D-8. This machine cleared and tilled the entire 5 foot swath. Since the D-8 was wider than 5 feet, it was necessary to shift the paperlaying, fumigating and fertilizer machinery on each new pass by means of hydraulic cylinder and slides. This proved too much for the D-8 and the operation was made into two machines; the first to sweep and till, the second to fertilize, fumigate and paper. This was a long jump from the original one pass TD-14 machine.
Planting

The Maui Pine Seed Spreader, developed in 1947, with the advent of mechanical fruit harvesting, the machines became available to gather planting material, replacing the bagging, carry out and manual handling. Those companies having conveyor bottom trucks found it economical to spread seed with a machine of this sort. Other companies continue to use drop side gates on the truck and manual rake off into piles along the block edges.
The CPC planter, started about 1942, showing versions of early and late 1946. This machine was reconstructed in 1955, incorporating the PRI type seed bin and an improved feeding mechanism.
The Hapco planting aid, under development since 1950.

The PRI planter with the latest version of the "jaw" or planting cup, under development since 1952.
The Libby planting aid, constructed by Stubenberg in 1952 and abandoned after brief trials.

The PRI Hi Lift Dump Truck, constructed in 1953 and patterned after similar trucks constructed on the mainland. This is used for rapid resupply of planting machines.
The stroller, originally mounted on a mule drawn wagon was used for many years for mealybug spray and later for weed sprays as well.

The use of tractor weed sprayers became widespread as wheel tractors became available in the mid 1940's. Some development work was completed in the early 1940's. The use of wheel tractors for this purpose is now considerably displaced by boom applications.
The Hapco planting aid, under development since 1950.

The PRI planter with the latest version of the "jaw" or planting cup, under development since 1952.
An early boom sprayer. Originally developed in the mid 1930's, boom sprayers came into general use in the late 1930's. High pressure, low volume pumps were used and dosages were high making ground speeds very low. The treatments then used for mealybug control required oscillation of the nozzle drops.

The double boom sprayer, the first models of which were developed by Napco on Lanai in 1946. The latest versions of this machine make full use of the advantages of low volume, low pressure requirements by using high volume centrifugal pumps and maximum safe driving ground speeds. These machines are now used to apply separately or in combination solutions of iron, fertilizer, hormones, insecticides and weed sprays.
First experiments with irrigation by Hapco in 1946 were with conventional irrigation equipment. Water utilization efficiency was poor and use of this equipment is now limited to areas having ample inexpensive water available.

The truck irrigator was developed by Hapco in 1949. This uses portable pipe laterals to feed the hose carried on the truck reel. Latest developments are semi-attended machines which are steered by a guide wheel running on the laid out hose and propelled by a water motor.
The escalator and conveyor bottom truck, developed by Maui Pine about 1940.

The Maui Pine harvester, developed about 1945.
The Hapco parasite type machine came into general use by that Company in 1946. This machine may have been patterned after an early Maui Pine machine.

The CPC tractor type harvester, developed in 1946.
The Hapco parasite type machine came into general use by that Company in 1946. This machine may have been patterned after an early Maui Pine machine.

The CPC tractor type harvester, developed in 1946.
Many refinements have been incorporated in later machines but they are generally similar to one of the 3 preceding machines.

Conveyor bottom truck handling of fruit developed by Maui Pine in the early 1940's.
Straddle truck handling of fruit introduced by Hapco in 1946.

Fork lift truck handling of fruit introduced by CPC in 1946.
Plant Harvesting

The PRI plant lifter under development in 1955.

The PRI square bar stump stripper being towed by the lifter, under development in 1955.
The PRI plant mower, under development in late 1955 as a means of reducing the volume of plant matter run through the stump stripper.