Project Name: Vortex Gun for Harvesting Mummy Almonds
Project Number: 82-HA2

1982 ANNUAL REPORT Projects 81-IA1
82-HA2

PROJECT LEADER

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OBJECTIVES

81-IA1

To produce a conceptual design for a vortex gun which can rapidly and easily remove mummy almonds from the tree.

82-HA2

To build a prototype vortex gun based upon the conceptual design produced under 81-IA1 and to evaluate the performance of this prototype device by field testing to determine its ability to harvest mummies.

INTERPRETIVE SUMMARY

A vortex gun is a device which shoots puffs of air known as vortex rings. These rings have the ability to travel a considerable distance without spreading out and can be shot hard enough to deliver an impact to a small area, much like a bullet. It is also possible to entrain powders, aerosols and gases within vortex rings and deliver these materials to a target.

A conceptual design for a propane powered vortex gun was produced and submitted to the Almond Board during July 1982 under project 81-IA1. This gun was relatively simple to build and had the ability to fire in the multi-shot mode, with the time interval between shots limited mainly by the rate at which propane and air are delivered to the breech. A fast firing rate is possible with a rapid gas delivery system.

A prototype model of the propane vortex gun was constructed under project 82-HA2 with final assembly completed on Thanksgiving day. This gun has been test fired in the horizontal position against a vertically hanging canvas tarp at a distance of 18' from the muzzle. Each vortex ring was observed to hit the tarp in a small area approximately 5" in diameter with an impact which appeared similar to that produced by a punched fist.

EXPERIMENTAL PROCEDURE - RESULTS TO DATE

The vortex gun has been tested in the horizontal position by resting the gun on a flat firing table. The muzzle is always placed beyond the table edge so that the ring formation is not impeded by the supporting surface.

The gun has been tested at barrel lengths up to 50" and with varying rates of air and propane delivery.

Initially, the gun would not fire due to improper air-propane mixing within the breech. This problem was corrected by modifying the gas jets.

The test results to date indicate that the strongest impacts occur with long barrels and high gas delivery rates to the breech.

The gun seems to be noisy and tends to generate complaints from residents of nearby homes. A sound muffler for the vortex gun is easy to design.