

Aeronautics Authority. Also, the maintenance man should know the rules requiring approval of work by a licensed mechanic, and on government inspection. The requirements are not unreasonable but they can cause a lot of trouble to people who are unfamiliar with them.

The problem of equipment should now be considered. Flying equipment, towing equipment, and tools for service and repair are necessary. The instructor, or some experienced pilot should be the final authority on this matter.

As has been stated, the utility glider is the ideal club ship. It is safer than the primary, and its use is not limited. Also, when the students have learned to fly, a set of high performance wings can be made for it, and the club will own a sailplane.

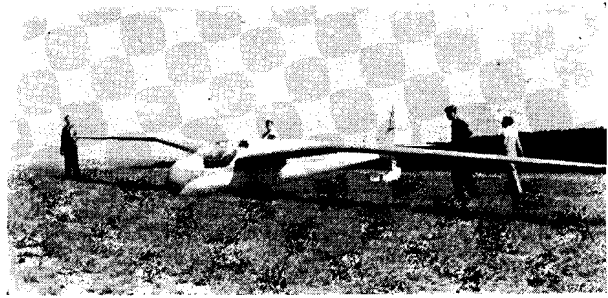
The towing may either be done by an automobile or winch. The winch is not as suitable as the automobile for primary training, but it is much better for high altitude flights on short fields, and can be used where the ground is too rough to drive a car at high speeds. An automobile must be used to retrieve the rope, whether or not a winch or an automobile does the towing.

The chief considerations in selecting a tow car are acceleration, ruggedness, and visibility. A model A Ford in good shape has just about enough power to get by. Many cars will be satisfactory in a mild breeze, but will not have sufficient speed in a dead calm. Acceleration is more important than high speed or excessive power. The clutch, transmission, and differential, should be in good shape and very rugged. A special car should be used for this purpose, since the rough driving will soon loosen up all the joints in the body and ruin it for use as a private car. The visibility in most closed cars is unsatisfactory. The only exception is the pick-up truck, which makes an ideal all-around car for club use. Many clubs remove the bodies from their tow cars and add only enough ballast to the rear end to prevent excessive bouncing.

Most winches consist of a drum attached to the rear wheel of an automobile, with a hand operated winding guide for the rope. There have been all manner of more complicated designs attached to the car to accomplish the same effect, and to save wear and tear. There are also winches mounted on trailers with their own power supply, so that only one automobile is necessary. There are others which use the power from the tow car but still leave it free to retrieve the rope. There are none built commercially. The Soaring Society will gladly furnish further information that cannot be included here. The most important design features are the guillotine, to cut the tow line in case the release on the glider should fail, and a rugged differential. In some cars, changes must be made which lock the differential to one wheel and disconnect it entirely from the other one.

The requirements on tools for maintenance and repair are fairly simple. There should be a good selection of the simpler wood working and metal working tools and a complete set of wrenches. A small circular power saw is practically essential, but no other power tools are really necessary. If there is an experienced welder in the group, an acetylene welding outfit will be most valuable. If welding can be done, a steel tube fuselage will be easiest to keep in condition. Otherwise all wood construction will be most suitable.

The selection of a field for training will bear some comment. Take-off runs of at least 2000 feet should be



The Ross Sailplane

available in the direction of the prevailing winds. The approaches should be free from trees for a couple of hundred feet outside of the boundaries. There should be several fields outside of the training field where safe landings can be made in an emergency. The field itself should be free from obstacles and obstructions. Unless the drainage is adequate it will be impossible to drive on it during the wet periods of the winter and spring.

Some clubs have been unable to operate on airports, and have rented farmers' fields at very reasonable rates. In other cases, groups of clubs have joined together and rented airports. In one case the hangar rent charged for both gliders and airplanes has paid entirely for the rent of the field and various improvements.

Cost: Our last consideration will be that of cost. All expense items may be divided into two classifications, original cost and upkeep. Upkeep includes depreciation.

The cost of new gliders runs from \$600 for utilities to \$1500 and \$2000 for sailplanes. However, prices are gradually dropping. Some gliders are sold in kit form for prices from slightly under \$400 to \$600. In these kits most of the highly skilled labor has been completed, and the assembly of the completed parts is all that remains to be done.

Reliable tow cars may be obtained for under \$100 and a good mechanic can usually find one for less than \$50. The cost of winches varies from \$10 to \$15 for the simplest types to over \$100 for some of the more complicated. This is assuming that the members do most of the work.

On upkeep, experience has shown that the cost will vary from 10 to 30 cents per flight. If the maximum use is obtained from the equipment, the cost per flight will be low. If it is allowed to stand idle, the cost will go up. The amount of work done by paid mechanics will also be an important factor in the expense account. It is usually customary, however, for members to pay by the month or year, rather than per flight. The average club charges initiation fees of \$10 to \$50 and monthly dues of \$1.00 to \$5.00. Some charge per flight as well but this is not general practice.

We have covered most of the general considerations that exist, but we realize that countless questions will arise which would require several volumes to answer. We are limited here for space, but we will be glad to discuss either personally or by mail, any problem which you may have.