

Other Realms of Model Aeronautics

So far specific discussion has been confined largely to more or less conventional types of heavier-than-air model aircraft and, in the case of flying models, to the by far most popular forms of power, rubber and internal-combustion reciprocating engines. This is not the whole story by any means, for working model aircraft may include less well-known prototypes, other forms of power and, of course, lighter-than-air as well as heavier-than-air machines. The topic of model rockets is in itself somewhat broader than may appear at first glance, and embraces certain categories other than what appears, at the time of writing at least, to be the mainstream of this subject, the solid-fuel rockets described in detail in the following chapter. Thus while this chapter must serve somewhat as a repository for a collection of somewhat varied material that must be assembled somewhere in order that the present book may live up to its title, it serves also somewhat as a bridge between airplanes and rockets.

This is not to imply that many of the in some cases relatively unrelated topics covered in this chapter are of a purely minor key, save insofar as certain of them may have, for any one of a number of reasons, a somewhat limited number of active enthusiasts at the moment. Take, for example, the autogyro, the helicopter (not the simple "flying top" of this name, but models of the actual aircraft of this type), and the ornithopter. All are extremely interesting models to build and fly, and

all are provided for under the competition rules of most of the contest governing bodies. Each has, indeed, an enthusiastic following both in the United States and in Great Britain, although possibly there is somewhat more activity in these fields in the latter than in the former at the present time. The ornithopter stands somewhat apart from the others, representing man's ages-old natural conception of the means by which he could obtain flight, yet never fully realized in prototype machines. (Experiments continue to this day, although some may question their practicability.) The position held by the ornithopter in the world of models is somewhat paradoxical, for it is not at all difficult to build a successful flying model of this type that functions in miniature exactly as would a man-carrying machine if the latter existed. Yet there is no such thing as a prototype ornithopter; therefore the hobbyist who produces one has a working model in the sense that he has built a functional miniature but not in the sense that "model" implies a small reproduction of a larger object.

ORNITHOPTERS, AUTOGIROS, AND HELICOPTERS

Many model ornithopters have been and continue to be built and flown. In many cases, rubber power is employed, usually attached to a light-

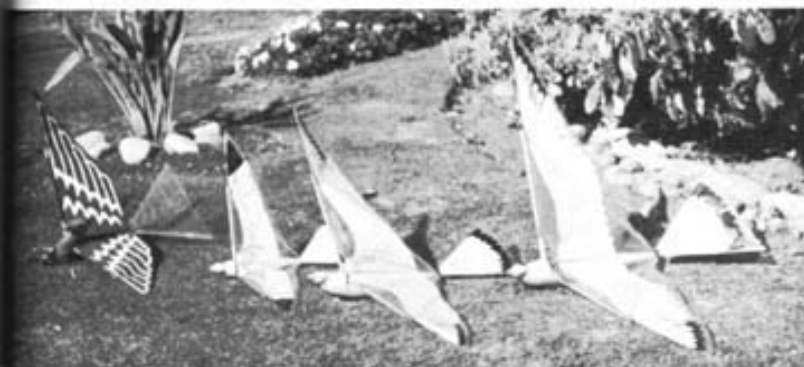


Fig. 110. P. H. Spencer, a pioneer pilot and designer of such real airplanes as the Republic Seabee, is an enthusiast of ornithopters, or beating-wing machines. He is seen here fueling and launching one of his models. At the bottom are four of his internal-combustion reciprocating-engine ornithopters, a flying horse and, left to right, bird-shaped ornithopters with .020, .040, and .15 cubic-inch engines.

P. H. Spencer

weight crankshaft that imparts the movement to the wings. Internal-combustion reciprocating engines often also are employed. In fact, some quite large successful model ornithopters have been built, proving the practicability of the type in the eyes of its aficionados. Around 1935-1936 Harry D. Graulich, an alumnus of the pioneer New York Model Aero Club, pioneer pilot, and a lifelong worker in and about aviation who has been associated with a number of leading aircraft companies, built and successfully flew in tethered flight a "half-size" ornithopter powered with a four-cylinder air-cooled engine at Walden, New York. "Half-size" refers of course to the size of the model in relation to that of the man-carrying ornithopter that it was proposed eventually to build along the same lines; the model had about a 16-foot wingspan. Experiments with and enthusiasm for ornithopters continue unabated. Perhaps the leading enthusiast for model ornithopters at the present time is P. H. Spencer, another pioneer pilot and longtime airplane designer whose work includes the design for the Republic Seabee Amphibeian. Mr. Spencer has been developing and building model ornithopters, both rubber- and engine-powered, since 1930, ranging from about 18-inch to 8-foot wingspan. The Whamo Bird, a rubber-powered ornithopter of which hundreds of thou-

sands were sold around 1960, was his creation. He has since developed and currently is anticipating commercialization of free flight and control line ornithopters using internal-combustion reciprocating engines as small as .020 cubic inches. It is obvious that there exists an enduring fascination connected with the building and flying of model ornithopters—they invariably arouse much spectator interest—both because of the unusual mechanical design itself and also because of the fact that every man evidently carries within himself a subconscious primitive urge to be able to fly by beating wings as birds do.

The model autogiro (from the trade name Autogiro), which in prototype practice combines a somewhat conventional wing and propeller power with nonpowered vanes that rotate in the airstream, is not too difficult to build and fly. Such a model, whether powered with rubber or with an internal-combustion reciprocating engine, flies much as does any model airplane, with the addition that the vanes turn in the airstream and possibly produce some additional serviceable lift in the process.

The helicopter is the most difficult of all models to get any real results from. It is quite easy to build a model helicopter, again usually rubber-powered but not necessarily so, that will