Schulter's Cobra

"The model is really semi-scale and uses the American Bell Huey Cobra helicopter as a starting point. This model has been utilized because I think that the dimensions of the man-carrying version have about the same relations which, according to my own many experiments, seem to be ideal for an RC helicopter. The helicopter, itself, has a relatively narrow but high fuselage, which provides the necessary side area. The model, with approximately 800 cc of fuel, had a take off weight of 5 kilograms. Controlled by a Grundig four channel proportional system, the first channel controls a throttle to operate the vertical movement. This works with a simple operator in combination with an exhaust throttle. The second channel controls the tail rotor; the blades of the latter can be controlled collectively, thereby the torque can be counteracted and the helicopter held on course. There is a special arrangement of the tail rotor in combination with the main drive so that torque during lift off is very well compensated for and take off can be accomplished without any additional controls or use of any auxiliary control by gyro. The pilot has to perform only small corrections. The third function controls, through a swashplate, the main rotor system, while the fourth channel controls the main rotor in a forward-backward direction. The main rotor is supported through a specially developed pure mechanical stabilization system. The control of the main rotor system is supported aerodynamically by two auxiliary blades and works very rapidly without any time delay. Only by this method was it possible to control the helicopter at all because all formerly used control systems had quite some time delay and, practically, that meant that the model was virtually always over-controlled. This was quite pronounced during gusty or windy weather. Today this is no problem at all. I can fly the model without any trouble even at wind speeds up to 10 meters per second. The behaviour of the helicopter is, of course a little bit wobbly, and looks better if there is only a moderate wind, or even better with no wind at all. But generally speaking, it is not at all difficult to fly this model. We tracked the helicopter up to a speed of about 60 kilometres per hour. That means I can hover the model over one spot even in winds up to that velocity."

Insofar as technical data is concerned, the overall length of the fuselage is 1800mm., with a depth of 120mm., and a height of 480mm. Rotor blade diameter is 1720mm., with two rotor blades. The rotor head diameter is 320mm., with a main rotor area of 3.32 sq. meters. Take off weight with a 5OOcc tank is 4.97 kilograms. The main rotor area load is 2.14 kilograms per square meter. The power plant is a Super Tiger G60, which provides a power output of approximately 1 horsepower. The power-to-weight ratio is approximately .2 HP per kilogram. The four channel proportional system used is a Grundig TX14RX14. One channel is used for throttle control of the vertical movement; the second channel operates the collective rotor to control torque and to control around the rotor axis; the third channel provides cyclic control for the main rotor (forward-backward); the fourth channel provides cyclic control of the main rotor in the right-left direction. Auxiliary controls: the main rotors are controlled over cam plates with auxiliary blades to support the control forces. Mechanical equipment include the main power plant with engine-blower; starter; centrifugal clutch; main gear box with overdrive and connection for rotors; head rotor drive over flexible shaft from main rotor drive; collective blade control for main rotor; main rotor shaft with detachable rotor heads; tumble disc for transfer of side lever of blade control; main rotor head with central gimble superimposed for servo control construction; floor clutch; main gear box; tail rotor box; tail rotor blade connectors; main rotor shaft; tumble disc and rotor head, which are reduced in single units on standard metal working machinery; plus standard off-the-shelf bearings and screws. The main and tail rotor blades are of simple construction from conventional balsa with spruce main spars. The blades are covered with epoxy. The main rotor blades are dynamically balanced at the rotor head. The fuselage is of normal ply-balsa construction including a blower housing, which is also made from wood. All parts of the power train can be mounted in the fuselage since it is open at the bottom. The radio components can be reached through the removable cabin hatch. The main landing gear and tail wheel are fabricated from steel music wire. The main landing gear and three-point suspension are made of 10 x 10mm. spruce with telescopic springs.

As an interesting sidelight the main mechanical parts which would require extensive machining, such as the blower, clutch, main gear, tail rotor gear, tail rotor connections, the rotor mast, swashplate, and complete rotor head, as well as a new polyester fuselage may soon be made available commercially in this country.