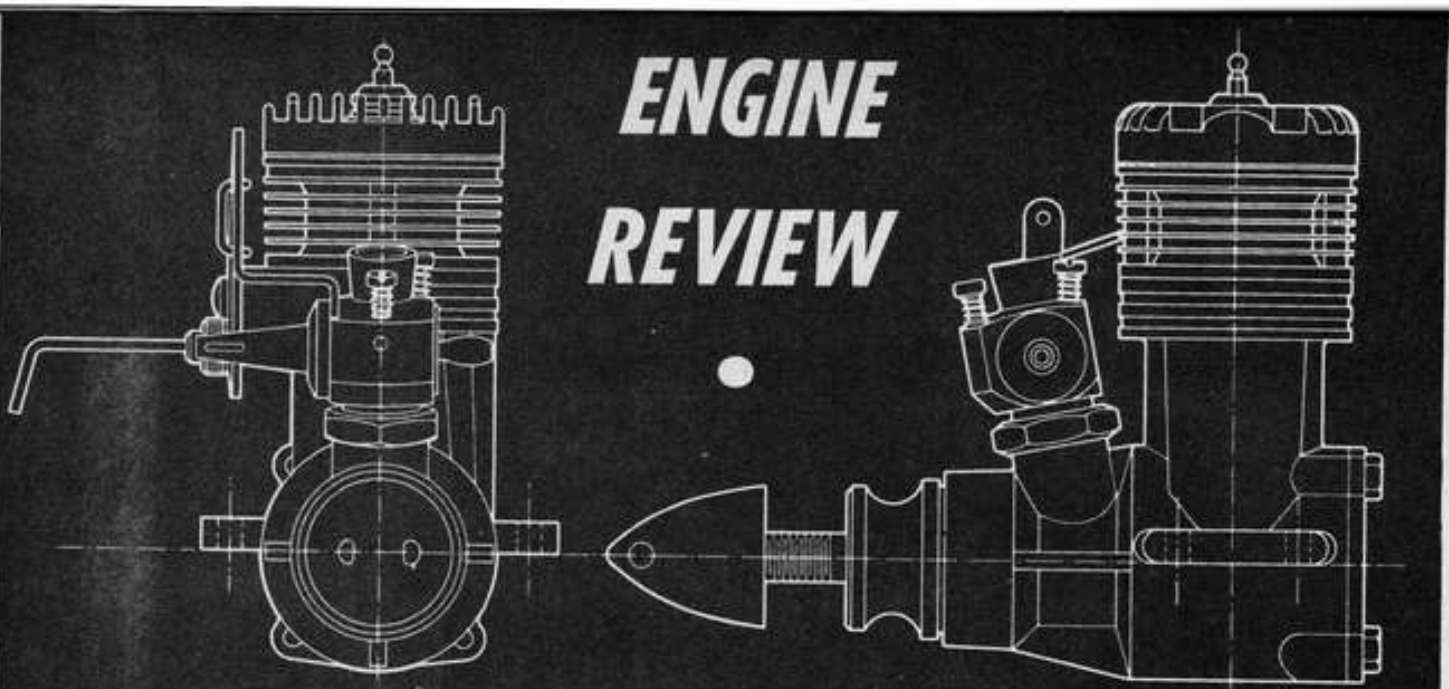
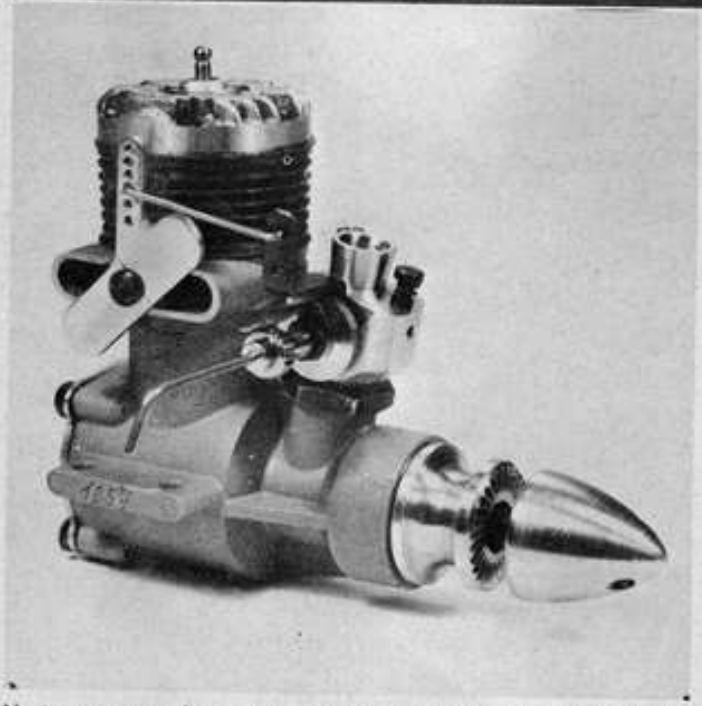
ENGINE REVIEW

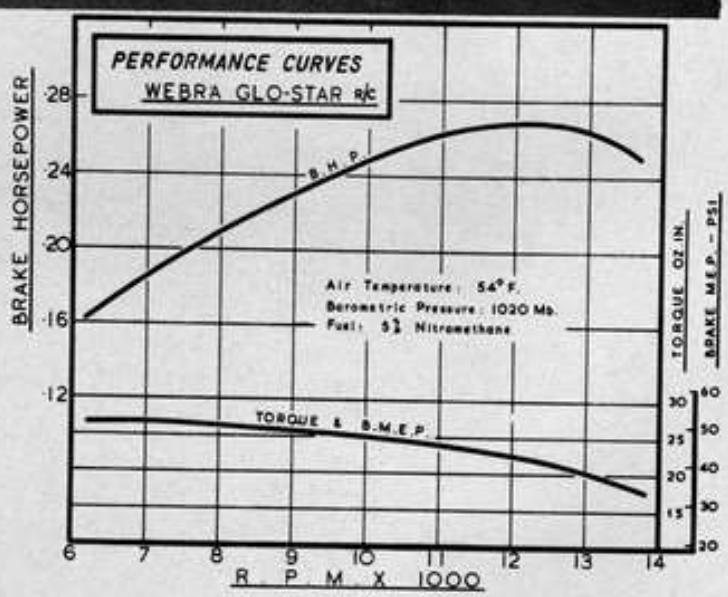


Webra Glo-Star R/C



Neat appearance distinguishes Glo-Star. Spinner-nut is a standard item.

Basically orthodox design shows detail refinements on close inspection.



By PETER CHINN

FIRST IMPORT FROM GERMANY TESTED IN OUR ENGINE REVIEWS, WEBRA 21-RC HAS 2-BB SHAFT AND EXCELLENT THROTTLING.

► This engine, the first German product to be featured in the "Engine Review" series, was introduced to the European market just two years ago and is currently distributed in the U.S. by Westee Hobby Imports. It is manufactured by Fein und Modell Technik of West Berlin, who have been making Webra engines for the past fifteen years, and was designed by Guenther Bodemann. Bodemann is possibly Germany's leading model engine designer and was responsible for many of the early Webra engines, including the once-famous "Mach-1" diesel, which had considerable international free-flight contest success in the mid nineteen-fifties. Later, at the Hans Hoernlein engine plant, he designed the Taifun "Bison" .22 glow and "Orkan" .15 diesel currently manufactured for the large Johannes Graupner hobby organization. Three years ago, Bodemann returned to Webra, to embark on a program (*Continued on page* 48)

Skypirate

(*Continued from page 45*)

elevator horn length is used, there is quite a bit of elevator travel, and while we never got up the nerve to try it, we have no doubt that the ship can be looped. This maneuverability was deliberately built in to permit quick takeoffs and rapid changes of direction, but is rarely used. The McCoy starts quickly after a prime, and the engine should be revved to the ultimate before launching. A properly working pressure system will keep the engine running at any speed and in any position the ship will normally assume. If the engine quits repeatedly within half a lap of the deck, or slows down in flight, check the system for leaks. All the causes for such engine behavior will be found in the pressure system. If you're new to Navy carrier, be careful of over-controlling, especially at launch. You've got a ship that will be moving at a terrific rate of speed, and you can't give it full up and forget it for a couple of seconds. If you've been faithful in maintaining zero incidence in building, the Skypirate will fly as if on rails at all speeds. We found this to be so even with the decreased line pull obtained by our slightly inset engine. Make sure that the control handle is set for high speed flight before being launched, give the elevator a quick blip to get the ship off the deck, and level off for your fast run at about 15 feet(the rules say not over 20 feet). Count seven laps and push the Roberts trigger away from you to shift to low speed. Use your free hand to insure that the trigger is out of its full travel. By the second lap after completing your high speed run, the ship will have slowed enough for your low speed laps. Count seven completed laps again (it's easy to get confused at this point by starting your count of one when you *begin* timed, low speed flight—if you make this mistake, you will only have flown six laps when the count of seven comes up), and get lined up, with the help of your crew, for the landing. Approach the deck for landing at a low altitude, taking advantage of the Skypirate's superior flying characteristics, and fly gently onto the deck. If this is only practice, tighten up on the trigger and the ship will clean herself up for high speed flight again.

You have a model that will score well over 500 points consistently. Knowing your ship and engine will make the difference, and this knowledge is gained only by practice. Get to work, and good luck.

Why Not a Team Effort!

(*Continued from page 29*)

and I truly enjoy the social aspect of the clubs and our combined activities."

"When the fellows meet at my house, it's really nice to greet them now; I feel that I know them all so much better because I know so many of their wives."

"Well, I joined out of self-defense. I belive if you can't lick 'em. Join 'em."

Another much appreciated comment was, "R/C is not just a common hobby. When you talk to one of the neighbors about your husband being out flying R/C models or being in the basement working on R/C, they are more apt to wonder what kind of a nut you're married to, since nearly all of their husbands fish, boat, golf, do gardening, or go in for sports for their hobby—if they have any at all. It is great to get together with a group of women who have a vague idea about trim, engines, dope, receivers, proportional, a Taurus and terms connected with R/C, and really understand what it's like to be married to an RCer."

Another summed up, "I think mainly the reasons we formed the club were because the fellows encouraged us to get to know each other better since we all had them in common; also, because they wanted the wives to run a refreshment stand at the fall contest, and also provide some combined activities—as we do now —that would include husband and wife and at times, the children. I think they really wanted to include their wives and children in their hobby, occasionally, that is! My husband likes togetherness, but not too much."

We feel that our husbands get a lot more fun out of R/C because of our wives club and the activities which are engineered and controlled by the wives;

EASTER EGG HUNT. Here, all the small fry get a chance to hunt eggs and stuff themselves on cookies and Kool Aid while the parents visit over coffee, cookies, some of them with a tyke on the arm—too small for the Hunt. There are prizes for all children.

CLUB PICNIC. Once each year we have an annual club picnic for husbands, wives and children at a large park, with a tempting barbecue menu for all—plus generous amounts of sunshine and fresh air. There are also games and prizes for the children.

FORMAL CHRISTMAS PARTY. The husbands and wives truly enjoy the annual X-mas party usually attended by twenty or more couples. It is the best event of the year for husband and wife. It gives them all a chance to dress in their Christmasy "glad rags" and have dinner by candle light with dancing and socializing. During the evening we have a master of ceremonies and installation of officers for both clubs.

REFRESHMENT STAND AT THE BIG 2-DAY FALL CONTEST. Each fall the wives engineer and man a refreshment stand on the flying field for the big fall R/C contest, sponsored by the MAC Men's Club for both local and out-of-town contestants, with some assist from the men on heavy work. For the first time last year, however, the men took over the management of the stand and we assisted them. It puts some strain on the wives since the contest has been extended to two days.

TALENT AUCTION. To the benefit of our club treasury, each wife contributes a "talent" (including anything from needlework to cookery or an occasional "white elephant") to a yearly club auction to which additional guests are invited. With proceeds from such we invited our R/C husbands to accompany us to see the movie, My Fair Lady. It was a far cry from a R/C contest, but the smiles of enjoyment looked real R/C to me.

Our club has been very successful and the greatest proof of all is that nearly all of the old charter members are still active and the ones who have moved or been transferred to other cities miss the club so much. Also, we feel that the men's club has greatly benefitted from having the wives interested enough to have their own club and to provide activities for both.

Like it or not, wives' attitudes can affect RC. Therefore, we wish to urge other men's RC clubs to get the ball rolling in helping their own wives to start a club such as ours with an emphasis on combined activities for both clubs. Each month, in a member's home, we conduct a regular business meeting according to parliamentary procedure, after which we socialize over coffee and dessert, occasionally play bridge, or have a special invited guest speaker. We have elective offices of president, vice-president, secretary and treasurer, all of which involve hard work. Indeed, so does being a member of the Model Wives Club. Hard work and activity plus fun makes success.

Engine Review

(*Continued from page 16*)

of modernizing the Webra engine range. This has included upgrading the company's bread-and-butter line of popular diesels, the introduction of a successor to the Mach-1, appropriately named the "Mach-II," and the development of the present Glo-Star model.

Actually, the Glo-Star is available in two types: the R/C version, with which we deal here, and a standard, non-throttle-equipped model for free-flight, C/L stunt, etc., which has a trumpet pattern venturi with peripheral jets, in the Cox tradition. There is also an extensive range of conversion parts and accessories for these engines, including a 1½ inch flywheel and a water-jacketed cylinder and piston assembly for adaption to marine use, a high-compression cylinder head, an exhaust extension and, for use in conjunction with this latter, a muffler which

can be mounted separately from the engine. We shall have more to say about the muffler in a moment.

The displacement of the Glo-Star, derived from a bore and stroke of 16.5 x 16.0 millimeters, is 3.42 cubic centimeters or .209 cu. in. This puts it just outside the Class A limit of .200 cu. in. for free-flight and, incidentally, outside the R/C pylon race regulations as well. In the majority of cases, however, it will be applicable to model designs intended for 19 class engines. It is of similar size and weight to existing 19's and, as we shall see, has comparable performance.

The construction of the Glo-Star R/C is, for the most part, orthodox, but with neat refinements here and there. The engine is of the usual 2-port design with the exhaust port on the right-hand side, diametrically opposite the bypass port, and with induction through the crankshaft. Two ball journal bearings support the crankshaft and the carburetor is of the barrel throttle type with stationary spraybar, adjustable airbleed and coupled exhaust restrictor.

The crankcase is an aluminum pressure casting, strongly braced with webs to the integral front bearing housing and with an internally threaded boss into which the carburetor is screwed. The case extends upward to just above cylinder port level where it includes a short exhaust stack with a center post for added strength and to which the aluminum blanking-plate type exhaust restrictor is fixed with a pivot screw. The rear of the crankcase is sealed by a very deep pressure cast cover and a paper gasket, attached with four hexagon head screws.

The crankshaft is hardened and ground and has a 10 mm. (.394 in.) dia. journal and 5 mm. dia. crankpin. The crankdisk is milled away each side of the crankpin to provide counterbalance and the shaft journal runs in two 10 mm. i.d. x 19 mm. o.d. 11-ball bearings. Beyond the front bearing, the shaft has an 8 degree tapered section, to which a machined drive spool is accurately mated. The intake aperture in the crankcase has parallel sides and registers with a rectangular valve port, 10 mm. long, in the crankshaft. Measured valve timing on our test engine was 48 deg. ABCD to 48 deg. ATDC. Gas is admitted to the crankcase via a 7 mm. crankshaft bore.

The cylinder is of leaded steel with integral fins and has a diecast aluminum head attached with six screws, two of which pass through the fins and into the crankcase casting to tie down the complete cylinder assembly. A graphited asbestos type gasket is used under the cylinder head and a paper gasket under the cylinder base flange. The cylinder head has a centrally located plug in a wedge shaped combustion chamber. The cylinder ports are rectangular and measured port timings on our test sample were 56-56 degrees bypass and 66-66 degrees exhaust. The piston is of mechanite, with a thin straight baffle on a flat crown, and skirt diameter is relieved approximately .0005 in. below the wrist-pin holes. Wrist-pin bosses take the form of a continuous band, 2.5 mm. thick, the wrist-pin itself being 4 mm. dia. and full-floating. A machined duralumin conrod is used. Incidentally, in addition to a relieved piston skirt, the Glo-Star has the cylinder bore relieved below the ports.

The carburetor is of neat design and nicely made. The body is machined from bar stock and contains a ground steel throttle barrel. The barrel is permanently attached to a cranked steel throttle arm, which operates in a slot in the carburetor body, to set the limits of throttle movement. Adjustment of the idle setting is provided for in the usual way, by a vertical screw just behind and to one side of the intake. Adjustment of the idling mixture is via another vertical screw just in front of the intake. The spraybar passes axially through the throttle barrel but aided by a large diameter flange and a machined aluminum retaining plate, tightens, not onto the barrel but onto the carburetor body. A neat refinement is the insertion of a felt washer in the recessed back of the retaining plate, which allows free movement of the throttle but provides an effective air seal.

Webra were among the first European makers to offer mufflers for their engines. For the Glo-Star and Glo-Star R/C, this takes the form of an exhaust pipe and an absorption type muffler and is quite unlike the systems adopted by other manufacturers. The Glo-Star muffler is of the "straight-through" pattern in which gas is exhausted through a straight perforated tube that is, itself, enclosed in a cylindrical outer chamber packed with absorbent material.

Webra make this muffler in two sizes, 20 mm. and 30 mm. diameter, approximately 3½ and 4 in. long and weighing, respectively, just over 1 oz. and just under 2 oz. The idea is to mount the muffler on, or below, the fuselage and to connect it to the engine with a length of synthetic rubber tube which Webra supply for the purpose. For connecting this to the exhaust, an angled stack extension, with 7 mm. i.d. outlet is supplied. This is of diecast aluminum, attached with a single screw, in place of the coupled blanking plate. It looks very neat indeed.

The advantage of a "straight through" type muffler when fitted to an automobile is that the relatively free passage of gas

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through it, when compared with conventional baffle type mufflers, results in reduced power loss. Our tests on the Webra muffler indicated very little power loss through the muffler itself. For example, on a 9x4 Top-Flite prop, which the Glo-Star turned at 11,200 rpm with no silencer fitted, there was a loss of 500 rpm with the stack extension, large muffler and an 8-inch length of tube. Of this 500 rpm loss, however, only 200 rpm was attributable to the muffler and the rest was lost in conducting the gas from the exhaust port to the muffler.

As is usually the case with a muffler equipped engine, the Glo-Star required a leaner needle-setting when operating with the muffler, indicating reduced charge loss through the exhaust port and improved fuel consumption. Against this is the muffler's tendency to collect waste oil rather rapidly, which, since this soaks into the packing material instead of being blown out, can only be removed by detaching the complete muffler and immersing it in a suitable solvent. There is, perhaps, some consolation in the thought that, because of this, less oil gets plastered on the model.

The handling characteristics of the Glo-Star both with and without the muffler, were good. The engine started easily from cold and would restart quickly with the throttle in the idle position when warm. It would then pick up instantly, without fuss, when the throttle was opened, and it would do this at any time after a protracted period of idling except when props of under 9x4 were used. The engine had a notably low idle on the bench—as low as 1800 on the larger prop sizes—and having fairly good fuel draw, seems likely to have a safe minimum of around 2500 in flight on appropriate prop sizes. Throttle adjustments were not at all critical and were arrived at quickly after break-in.

Actually, two engines were used in the tests and neither called for a lengthy break-in. There was about 400 rpm difference between the two at around the peak power revolutions after 2 hours break-in on each engine. The following prop/rpm figures are based on the averages of these two engines: 9600 on a 10x4 Tornado, 10,300 on a 9x5 Top-Flite wood, 11,000 on a 9x4 Tornado nylon.

The best of the two engines was then dynamometer tested with the following results. Maximum torque was in the region of 7000 rpm where it reached 26.5 oz. in. Torque declined evenly as rpm were raised and resulted in the maximum bhp being generated at about 12,200 rpm (the peak of the curve was fairly flat) with an output of just under .27 bhp. All these figures were recorded with the engine in standard trim, without muffler.

Summary of Data

Type: Loop-scavenged two-cycle with shaft type rotary-valve induction. Twin ball-bearing crankshaft. Throttle type carburetor with coupled exhaust restrictor. Optional muffler assembly.
Weight (as tested): 6.2 oz.
Displacement: 3.422 c.c. = 0.2088 cu. in.
Bore: 16.5 mm. (0.6496 in.)
Stroke: 16.0 mm. (0.6299 in.)
Stroke/Bore Ratio: 0.97:1
Specific Output (as tested): 1.28 bhp/cu. in
Power/Weight Ratio (as tested): 0.69 bhp/lb.
Price in U.S.: $19.95
Manufacturer: Fein und Modell Technik, 1 Berlin 36, Oranienstrasse 6, German Federal Republic.
U.S. Distributor: Westee Hobby Imports, 5720 W. Chicago Avenue, Chicago, Illinois, 60651.

VTO

(*Continued from page 4*)

up by adding or removing a little nose weight—being careful not to move the CG far from the 50% point. The final glide circle is obtained by twisting the tail boom to change the amount of stab tilt as desired.

OUTLINES MADE EASY

From the pages of *Indoor News and Views comes* the garget for mechanically forming Indoor model surface outlines that was designed and developed by Don Larsen of the McDonnell club in St. Louis. The device is shown with a circular form like that used for trailing rudders, but this part can be any shape as long as the movable circle is, able to touch the form all around. Hard cardboard can be used for all the pieces. The edges of the forming roller and the form should be waterproofed with glue or wax to preserve their shapes and keep the wood strip from sticking.

In use: the balsa strip is soaked in water in the usual manner, one end of it is then wedged in the slot in the form and the form started to turn. As soon as the strip moves between the roller and form, a smooth, even tension and pressure is applied to the strip. Continue to turn the form until the strip is all around it. Leave the strip on the form until dry. It may be necessary to adjust the tension of the rubber band the first few times the device is used.

SIMPLIFIED INDOOR SCALE RULES

Last spring Walt Mooney proposed a simplified method of scoring for the San Diego Orbiteers' Indoor Scale contests. In its first trials, the new system has worked out well; providing a good balance between scale and flying qualities. At one meet, for instance, the top scale plane didn't finish in the top six when it couldn't cut the mustard in the air, while the plane turning in the highest flight time finished no higher than third due to a low scale placing.

Basically this system calls for a single scale judge to arrange the models in order of quality and assign them corresponding numbers. Best model gets number one, second best two, etc. The models are then flown for duration, with the top time getting number one, second two, etc. Following this the scale and flight position numbers are added together for each model. Lowest total wins. In the event of a tie the model with the higher flight time takes precedence.

To permit the Juniors and Seniors to compete on a more even footing with the Open fliers a handicap system is provided whereby Jrs. may *subtract* five points and Srs. two points from their total scores. And to encourage new models, by keeping an expert from using one super model, at contest after contest a plane winning first place in a previous meet must *add* two points to its score for *each* win.

A recent issue of the *Orbiteers Newsletter* mentioned that they were going to use a similar scoring system at their FF Scale contest.

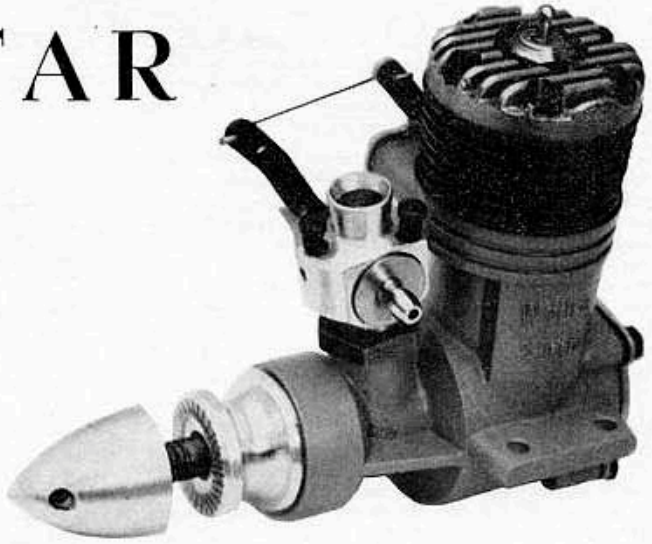
MORE FROM OBSCURE

The "all-sheet" category for Indoor Flying Scale is really the answer for the inexperienced Juniors and "tired businessmen" with little spare time, says Bill Hannan of Obscure Aircraft. Much less delicate than the "stick-'n-tissue" models, the all-sheet balsa construction of these models offers maximum fun for minimum effort. The popularity of this event has been shown by the interest generated through the meets held for it in Wilmington, Calif. Now other groups are beginning to add the event to their schedules.

GLO-STAR

WEBRA 3,5 cc

MOTEUR A GLOW-PLUG



une étude de

Pierre Delfeld

Après un passage assez court dans l'usine de Hans Haernlein (qui fabrique les moteurs de la série Taifun pour Graupner) au cours duquel il dessina le « Bison » et l' « Orkan », Gunter Bodeman a rejoint Fein und Modell Technik, mieux connu sous le nom de Webra. En premier lieu il dessina le successeur du Webra Mach I, le Webra Mach II lequel ne semble pas avoir autant de succès que son prédécesseur bien que ce moteur, d'après nos tests, soit d'excellente qualité. Suivit ensuite le Webra Glo-Star que nous essayerons aujourd'hui.

A certains points de vue le Glo-Star est une exception dans la série Webra par son cylindre intégral dans lequel les ailettes de refroidissement sont parties intégrantes, ayant été usinées hors de la barre. C'est une technique que la firme O.S. a pratiquée pendant de longues années et maintient encore pour ses plus petits moteurs.

L'avantage que l'on peut en retirer est que le cylindre est, en principe, mieux refroidi, se déforme moins. Apparamment il n'est pas moins coûteux à produire.

Webra offre deux versions du Glo-Star. Nous les examinerons toutes les deux car elles ne diffèrent que peu. Il est aisé de passer de l'une à l'autre. La version R/C était celle que l'usine nous a adressée en y ajoutant le venturi voulu pour passer à la version standard.

Le carburateur de télécommande est d'un modèle assez classique. Il s'agit d'une barre ronde forée dans son axe pour le passage des gaz, usinée à la base pour **se visser** (blocage par contre-écrou) dans l'ajutage du carter. La partie centrale a été usinée sur trois côtés formant un carré surmonté d'un dôme. Les deux côtés parallèles entr'eux sont traversés par un alésage dans lequel pivotera le tambour des gaz. Sur le côté de ce tambour est fixé un levier de commande. Dans le corps du carburateur, du côté du levier est fraisé un secteur dont la profondeur correspond à l'épaisseur du levier. Ce creux est recouvert par une grande rondelle maintenue en place par le gicleur qui traverse le tout et fait office de boulon. De cette façon le levier peut décrire un peu moins d'un quart de tour mais se déplace très librement sans jeu axial.

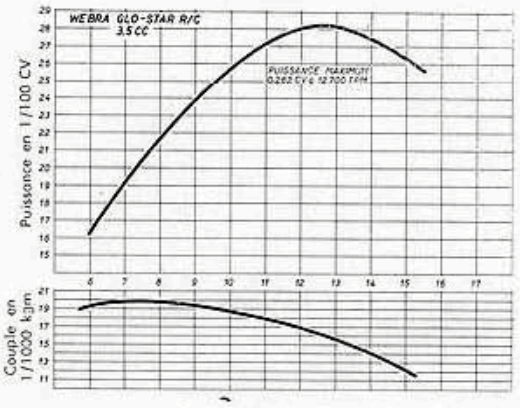
Sur le corps du carburateur sont placées deux petites vis freinées par ressorts. L'une sert à régler la course du tambour, l'autre contrôle la petite entrée d'air supplémentaire de réglage du ralenti. Etant donné la structure générale du carburateur il n'est pas possible de retirer celui-ci sans le démonter à peu près complètement.

Le levier du carburateur est accouplé de façon classique à un papillon des gaz brûlés, en tôle d'aluminium, pivotant sur une vis centrale à épaulement.

Le carburateur standard est du type à alimentation tangentielle. Le venturi est sorti d'une barre de dural et offre sensiblement les dimensions du venturi Cox .15. Il est dommage que la clé Cox ne puisse être utilisée. Paradoxalement, celle-ci a une ouverture de 10 mm très exactement (métrique) et la clé pour serrer le carburateur Webra devra être une 10,6 soit environ 27/64 de pouce. Le corps tangentiel est en métal injecté. Le pointeau, très aigu, bien poli et bien centré est le même dans les deux cas. Il est du type écrou.

Le carter est du type semi-intégral. Il est coulé sous pression et comporte deux roulements à billes spéciaux de 10 mm d'alésage, 19 mm de diamètre, 5 mm de large. Ils comptent 11 billes. Le transfert des gaz (placé à droite) et la canalisation des gaz brûlés (à gauche) sont venus de fonderie. Toute cette coulée est très nette.

Le transfert s'évase légèrement vers le haut. Il a une section de passage d'environ 50 mm2. Il débouche net en haut du carter et ne s'infléchit donc pas pour guider les



gaz qui viendront buter contre le joint qui est placé entre le cylindre et le carter.

Le canal des gaz d'échappement est muni en son centre d'un pilier dans lequel, suivant le cas, viendra se visser le pivot du papillon des gaz brûlés ou la vis de fixation du collecteur des gaz qui mènera au silencieux.

Le bouchon de carter se fixe au carter par quatre vis à tête hexagonale prenant une clé de 5. Remarquons à ce propos que les écrous du gicleur prennent une clé de 5,5. Sachant en outre qu'il faut 2 épaisseurs de lames de tournevis pour démonter la culasse (0,9 mm) et la vis du papillon des gaz (0,6 mm) nous constaterons qu'il ne faut pas moins de huit outils pour monter et démonter le moteur (bouchon de carter, vis de culasse, vis du silencieux, écrous du carburateur, corps du carburateur (2), glow-plug, broche pour le nez). C'est beaucoup. Un peu de standardisation serait la bienvenue.

Le vilebrequin est en acier trempé et rectifié. Il est équilibré par ablation des masses latérales de part et d'autre du maneton de la bielle (Ø 5 mm percé d'un trou de 2,5 mm). Le diamètre de l'axe est de 10 mm. Le passage central est de 7 mm. L'entrée des gaz frais est de section rectangulaire (6 x 9 mm). Le plateau d'hélice se fixe par cône autobloquant. Le nez d'hélice est de forme ogivale à serrage par broche (3 mm), la vis étant standard (6 mm au pas de 100).

Le cylindre est en acier mi-dur non trempé ,ailettes faisant parties intégrantes de l'ensemble. Les lumières d'admission et d'échappement sont rectangulaires et usinées vraisemblablement par brochage (outil droit ayant une forme correspondant à l'usinage désiré). Le piston est en fonte. Il est décolleté et ne comporte pas d'effort d'allègement notable. Il faut remarquer cependant que les portées de l'axe de piston dans celui-ci sont assez faibles, le porte-à-faux de l'axe du piston étant compensé par le large dimensionnement de la tête de bielle. La hauteur du piston est assez importante : sans compter le déflecteur, rapport 1,1/1 avec l'alésage. Le déflecteur, fort mince, est sorti de la masse.

L'axe est plein et ne comporte pas les habituelles protections en matière moins dure. Aussi, force est de constater que le cylindre a été rayé ce qui, toutefois ne semble pas avoir d'effet sur le piston. La bielle est en dural décolleté. Sa tête est sphérique. A l'endroit où elle est percée par l'axe du piston elle a une largeur de près de 9 mm. Le pied est, par contre, très usiné. La paroi subsistante a une épaisseur de 1,2 mm. Il n'y a pas de trou de graissage.

La culasse est coulée sous pression. La glow-plug est centrale. Six vis la fixent au cylindre. Deux de ces vis passent à travers les ailettes pour aller s'ancrer dans le carter. Résumons nos impressions concernant la construction : ce moteur est bien fait, les usinages sont soignés, les pièces d'exécution très nette. On discerne cependant, çà et là, des traces d' «économies de bouts de chandelles» !

L'équipement du moteur comporte un silencieux. Nous en avons déjà parlé à de multiples occasions. Un collecteur des gaz se fixe par une vis placée à l'endroit où s'installe le pivot du papillon des gaz qui disparait en cette circonstance. Le silencieux est relié à ce collecteur par un tube de caoutchouc synthétique. Il s'agit d'un cylindre fermé, traversé par un tube lequel est percé de trous et est entouré de matière poreuse. Le gaz passe en direct à travers le tube le bruit étant amorti par la matière poreuse.

Le rodage du moteur ne nécessite guère plus d'un litre de carburant standard (25 % huile de ricin - 75 % méthanol). Le démarrage es tde bonne qualité même à froid. Une simple «bistouille» par la pipe d'admission ou un pompage, air bouché, papillon des gaz ouvert suffit.

L'aspiration du moteur est excellente (le moteur s'arrête après 38 à 39 secondes niveau du réservoir 15 cm sous celui du carburateur). A l'inverse, le réservoir peut être remonté à 25 cm environ avant qu'il ne s'arrête noyé. Dans les deux cas cela dépend du réglage du pointeau.

Le ralenti est excellent, lui aussi : environ 1.800 t.p.m. sur une hélice 10x4. Son réglage est facile et sans problème. Lorsqu'on utilise le silencieux les résultats sont sensiblement les mêmes. La perte de puissance est de l'ordre de 5 à 6 % avec un excellent ralenti.

La version sans contrôle des gaz est encore plus facile. Par rapport au graphique de puissance établi pour la version R/C, la puissance augmente d'environ 10 % avec une réduction de 5 à 6 % sur le total en cas d'emploi du silencieux.

TABLEAU DES ESSAIS			
8 x 6	Tornado Ny.	11.600	3.500
9 x 4	Top Flite	11.200	2.100
9 x 6	Top Flite	9.700	2.200
10 x 4	Tornado Ny.	9.450	1.800
10 x 5	Power Prop	8.900	1.800
10 x 6	Top Flite	8.800	1.950

Carburant utilisé : 20 % huile de ricin, 80 % méthanol pur.

Conditions de l'essai : Température **16°C.** Pression barométrique **754 mm de mercure** - humidité relative : **55 %.**

Poids du moteur : 175 gr. - **Cylindrée** : 3.42 cc - **Course** : 16 mm - **Alésage** : 16,5 mm.