BOAT SPORT

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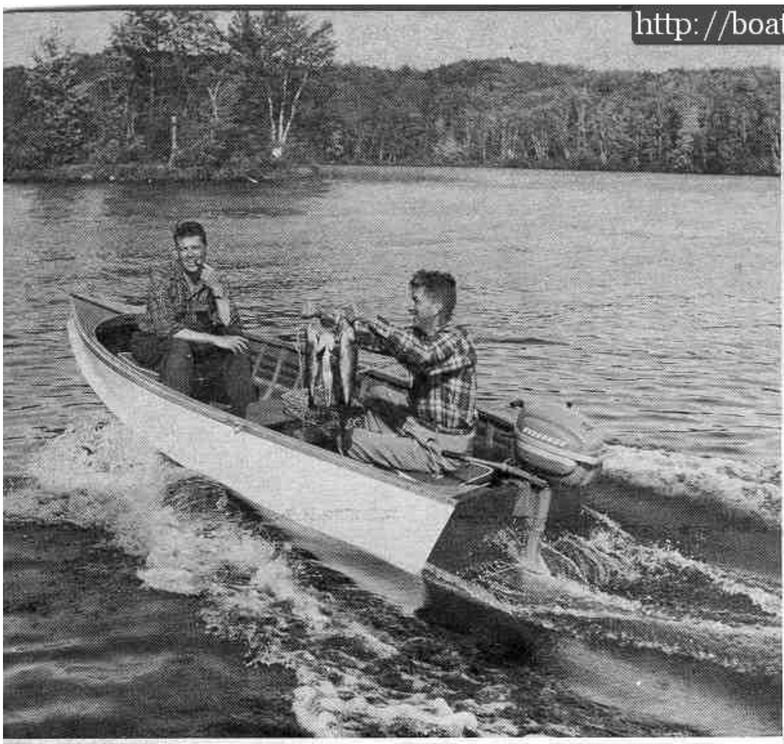
OUTBOARDS AND INBOARDS:–
HYDROPLANES, RUNABOUTS, UTILITIES
RACING–HOPUPS–SERVICE



(Left) No doubt about it, the trim, little, comparatively-inexpensive powerboat is here to stay! And how! In addition to hulls and engines built for speed — and more speed — there is a wide variety of boats for those of us who like fishing and hunting, going on cruises, enjoying water sports, or just taking a spin for the sheer fun of it. Nothing delights a fisherman, for example, any more than to get where he wants to go and back again, and have 'em bite the way he wants 'em to. This neat craft Evinrude powered will do all his heart desires except catch the fish!

(Right) Versatile is the word for the modern motor! It's right at home on the family runabout, pleasure, utility or racing hull. Pictured here is a Scott-Atwater engine driving a Thompson boat across the lake at a fast clip. It's a speed merchant, or a lazy troller, and it's equipped with a complete shift and other features. You can put it in the back of your car wherever you want to go. Whether you own a boat or rent one, all you do is thumb screw the motor in place, give her the gas and you're off!

(Left) If it's water skiing that interests you, an outboard motor is just thing. It is one of our most popular sports. There is even an American Water Ski Ass'n to supervise sectional and national events. Aquaplaning and water polo enthusiasts look with increasing favor on the Johnson and other engines for nimble maneuvering and rapid pick-up. With any of these sports, once you've learned the know-how from a competent instructor and can depend on the driver you're in for the thrill of your life.

BOAT SPORT

May, 1952 Vol. 1 No. 1
(Whole number one)

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Photos in this issue by: H. Wieand Bowman, Bob Ruskauff, Abbie Rowe, United Press-Acme, Milwaukee Sentinel, R. Rendell Williams, Evinrude, Scott-Atwater, Mercury, Johnson, Gulf Oil Corp., Seattle Times and Robert C. Rowland.

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This Month's Cover . . .

RONNIE GRAY has been racing since he was 12 years old, mostly in the Indiana-Ohio Outboard Circuit. He comes from a part of the country where there are at least 25 teen-agers who go in for stock utility racing, three or four of whom are in the 12 to 13 bracket. Ronnie, now aged 15, is a sophomore in the Hagerstown, Indiana, High School. His dad, a boat and motor dealer, bought his first outfit for him. After 3 years use and some plain and fancy horse trading (with no additional cash involved), Ronnie showed up for the Winneconne Championships with a brand-new Rinker boat and a Mercury 7½ HP Hurricane motor. Both boat and motor were strictly stock in accordance with APBA rules—both fresh out of the shipping crate.

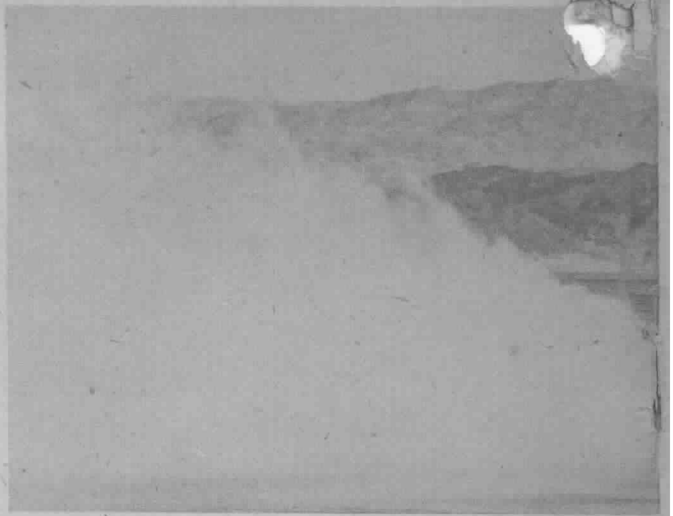
Ronnie races in Class A, the class for motors over 10 and up to and including 15 c.i. of piston displacement. At Winneconne he placed 3rd in both heats, yet took a 4th for the race on the point basis by which place is determined. He was in 2nd place in the second heat at the time he spun out on the turn as shown in the full-color picture on the cover. Our cover shot, incidentally, was taken by Trammell Pickett and is reproduced by the courtesy of Kiekhaefer Aeromarine Motors, Inc.

Following the Winneconne event, Ronnie entered and won a race at Madison, Wisconsin, on October 12th of last year. At this event he was clocked over a measured mile inboard course at 43 m.p.h. This would have established a new record if the race had been sanctioned.

(Present AU mile record holder is Robert Batie, Seattle, Washington, with 41,277 m.p.h.)

Young Ronnie has 11 trophies to show for his 3 years of racing. . . . He does all the work on his own outfit, and in his off-school time he handles his dad's outboard repair work.

SPEEDBOATING ROUNDUP



IN 1906 THE 60 M.P.H. SPEEDBOAT WAS CONSIDERED A MADMAN'S DREAM. 200 M.P.H. ON WATER IS POSSIBLE IN 1952. WHAT HAPPENED TO BOAT SPEED IN LESS THAN FIFTY YEARS IS TOLD HERE . . .

THREE hundred miles an hour in a speedboat!

"Impossible," say the Yacht Club wardroom sailors. Maybe so—this is only 1952—but what was it the elbow-bending, serge-coat and white-flannel set had to say just forty years ago? Wasn't it something to the effect that sixty per was a madman's dream?

Uh-huh, the swizzle stick boating crowd looked on the "Auto-Boat Contest" held on Decoration Day, 1904, as the beginning and end of speed on water. When F. H. Waldorf helmed his 39' *Japansky* to a 20 m.p.h. victory at Port Arthur, New York, in America's first organized speedboat race, the savvy boys on the bank figured *Japansky* was about as fast as anything on water ever would be.

Two years later, with America's speedboating enthusiasts still working along the lines of greater length, narrower beam and more power, it appeared that the know-it-alls might be right. In 1906, a feature writer, H. H. Everett, writing for Cosmopolitan Magazine, stated, "Motor boat experts regard the mile a minute boat as beyond the realm of possibility."

The following year Scientific American, not given to pulling too many technical boners, stated, "Powerboat racing, except for sensible cruising craft, died naturally something over a year ago."

So be it, but in 1951 there were more speedboat races in the United States than during any year in speedboating's relatively brief history. —And the hot design and engine boys are now looking for the three-mile-a minute power plant and design. In fact, plans already exist on drawing boards for better than 200 m.p.h. hydros which are anything but beyond the realm of possibility.

One phase of speedboating began shortly after the two large national magazines had signed its death knell. Ole Evinrude, a stubborn Wisconsinite who refused to be disheartened by ridicule, created and successfully operated his homemade "detachable rowboat motor" during the summer of 1909. Basically, Ole's rowboat motor was not unlike the outboard engine used for racing today. His original 1½ h.p. single cylinder egg-beater when turning 900 r.p.m. was able to kick his boat along at eight miles an hour.

Thirty years later, Frenchman Jean Dupuy with a six-cylinder version of Ole's original mounted on a Jacoby-designed hydroplane, skimmed over a measured mile course on the Seine River, Paris, at 79.04 m.p.h. This established a world's record for unlimited outboard hydroplanes that still stands.

Although the world's record for outboards has remained unbroken for thirteen years, this has been true largely because interest has been concentrated on competition model racing outboards rather than on boats and motors designed purely for one-mile record breaking. Few Class X (unlimited outboard motors) are in existence today yet it is wholly possible that even in 1952 an outboard motor could be designed to break the 80 m.p.h. mark.

However, from Ole's humble start, outboard racing in its various present forms has been derived. Early in the nineteen twenties outboard clubs came into being. These were dubbed poor men's yacht clubs and for as little as $500 or less a man could rig himself out with a brand new outfit and enter into the impromptu Saturday and Sunday afternoon competitions. Actually, the first outboard racing was done with stock power, motors unchanged from factory design, and boats, factory-made or home-made, with no great know-how in their design.

In 1928 the first official records were established and a glance at these early records will show how far outboards have advanced in less than twenty-five years.

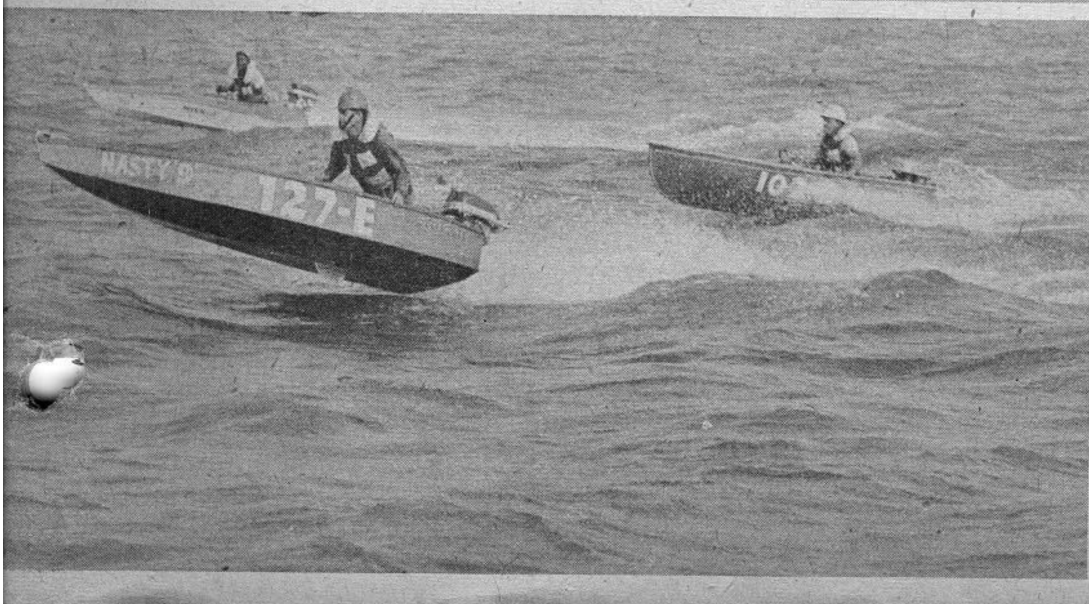
Class A outfits for boats powered by engines of twelve or less horsepower were turning fairly fast. G. Pickard held the record at 25 m.p.h. The sixteen-horsepower motors were placed in Class B and Champion K. Jenkins led the field with a 33.58 m.p.h. Twenty-four horsepower jobs were listed in Class C with Charles Holt and 38.436 m.p.h. mark topping the list. Eldon Travis was the speed king that year with his four cylinder thirty-two horsepower Class D that had practically scorched the water at 41.748 m.p.h.

Outboard motor manufacturers saw the advertising value of placing their products in the record-holding

(*Turn to Page 6*)

(Left) Slo-Mo-Shun, Stanley B. Sayre's holder of the world's unlimited water speed record at 160.323 m.p.h., "cruising" at approximately 110 m.p.h. at Lake Mead.

Ollie Prather's 225 c.i. hydro, Li'l Injun, goes in to a high speed wing-ding in corner at Long Beach Marine Stadium, Calif. (See below)



(Left) Newest members of the American speedboating family are the harem scarem outboard utilities. These mon-plane hulls offer plenty of exciting action and are rapidly becoming more and more popular everywhere.

SPEEDBOATING ROUNDUP . . . .

(*Continued from Page 4*)

Lou Meyer, Jr. shows some real flat out speed in his mighty atom 48 c.i., hydroplane. He is holder of scorching world mark of 61.77 m.p.h. for 5 miles in competition.

brackets. Drivers were handpicked and given factory support. The factory pros moved about the country copping most top positions at regattas and at the same time stimulating interest in the game. To the newcomer to outboarding, the names of the motors of that day may be strange ones. Caille Motor was a big name in the early days; the twin-carb. tractor unit C was plenty hot. Many old timers at the sport can remember their own Lockwood Ace or Chief, both good jobs. There was a gigantic five-cylinder radial set-up engine that never did much racingwise, made by Cross motors, but the same outfit decided to get into the field with their class C Seagull specially designed for racing. The Seagull had a short and unsuccessful career. Other veterans had their start with the one-time king of the fours, the Elto Quad, a job that had a sing to it that will live long in the memory of outboard enthusiasts.

The Johnson engine made its bid for outboard racing supremacy. Billy Frey and other Johnson factory drivers barnstormed the circuit with the early KR, SR and PRs. Johnson motors were the leaders in A, B and C classes with a few Evinrudes sticking along with the fast Johnson PRs in Class C. The Midget Class boats for engines of 7.5 cubic inch piston displacement or less were raced exclusively by Evinrudes and the giant 60 cubic inch Class-Fs were powered by the 4-60 Evinrude and Eltos, with Evinrude taking over the class exclusively in the late thirties.

A look at the record for the racing outboard hydros today, twenty-three years after the first marks were racked up, show some startling changes. Mrs. Eleanor Shakeshaft holds the mile mark for the tiny Ms with a speed of 42.303 m.p.h.—faster than the largest of the racing motors of 1928.

Class A hydros have more than doubled their 1928 speed with Tom DeWitt as the titleholder with a speed of 50.281. Jack Henckels in a Class B outfit hit a two-way average through a measured mile of 57.234 m.p.h. and Doug Creech in a Class C last November averaged 64.888 m.p.h. at Salton Sea, Calif. Jimmy Mullen in his 4-60 Class F skimmed the water at Port Mercer, N. J., at 66.234 m.p.h.

It is interesting to note that the last record breaking run in outboard hydroplanes was made in 1951 but the bulk of the present records were established in 1945 or earlier. There is a definite reason for this.

A specially-designed-for-racing outboard engine requires more careful and finished machining than a service engine that is not expected to perform at peak r.p.m. during most of its running hours. Fewer racing engines were made than service engines yet the price differential between the racing and service engine was relatively slight. With the contrast of demand for racing engines as opposed to the demand for service engines a great one, manufacturers weighed the advertising value of continuing to produce racing irons against factory cost. The result was a decision that racing motors had played their part, an important one in making popular the rope-started, sometimes balky kickers, but the need for such advertising was a thing of the past. So, the last factory-built racing motors were made in 1940. Present day outboard racing engines are mainly hangovers from the '40 or before years, or rebuilt jobs put back into competition shape with parts made by small racing parts specialists.

Today, and for the past several years, it has been possible to buy completely new racing Class B and C motors which closely resemble Johnson PRs and SRs. Parts again are readily available to build up Class A, B or C which are the three most popular classes.

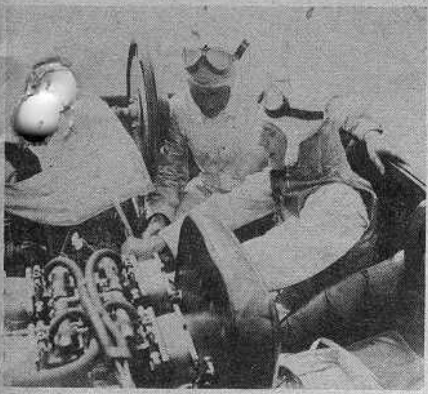
Two major means are at hand today to get added speed from known models, on which at some time or another every trick in the sport has been tried to give added speed within the rules. These are hull and propellor improvement.

In recent years the fast boys have leaned heavily on these two recourses to gain more speed, but hull alterations and prop testing both require time and money consuming experiments. Results are usually carefully guarded secrets and understandably so.

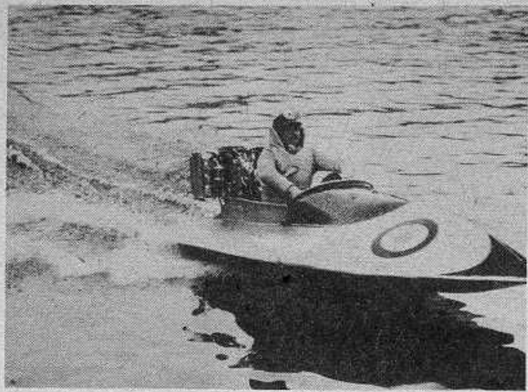
Many outboarding enthusiasts have wondered what would be the result of an engine designed along the lines of the Norton "Manx" of motorcycle fame adapted for outboard use. Present rules preclude much radical experimentation, but with the entry of stock utility racing (referred to officially now as stock outboards) into the post war field, progress could be made in the strictly racing field by continuing a limit on cubic inch displacement in each class but opening the gates for extensive motor modifications and creative adaptations. Too, the once popular Class F, one of the best competition classes, could be revived by the simple expedient of permitting Fs to use C lower units or any pusher type unit.

OUTBOARDING history is filled with outstanding racing performances. Some of the names that crop up in any conversation of outboard racing feats are those of C. Mulford Scull and his famous Mickey Mouse and Shooting Star boats, or Fred Jacoby, Jr., who at one time or another won practically every major title in the books.

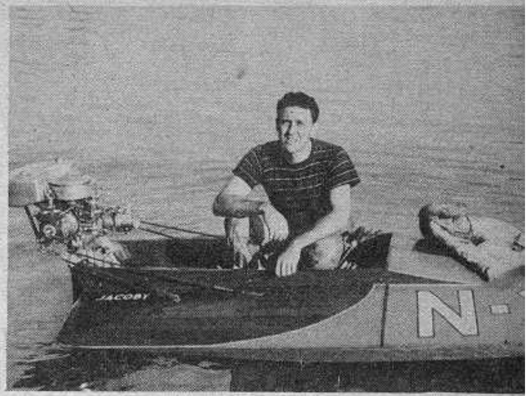
Many old timers remember Clint Ferguson and his Eldredge-designed Class X motor that hit 78.44 m.p.h. just failing by a few r.p.m.s to knock Jean Dupuy's record from the books; Loretta Turnbull of California, one



Gar Wood takes the President's Secretary, Marvin McIntyre for a spin in Miss America X. Shortly after this, Gar Wood attempted to shatter his own world record; in two runs he reached average speed of 118 m.p.h.



Jean Dupuy, photographed as he broke the world's speed record for outboard motorboats last year on Seine River near Suresnes, France. His average was 75 miles per hour.



Vic Scott, two-time winner of Albany-New York outboard utility marathon and three-time SCODA high-point champion on East Coast. Scott held world's competitive record in Class C at 57.325 m.p.h., from April, 1946 to Nov., 1951, when Bud Widget in Concord set a new record of 57.508.

of the first and best of the women drivers; Horace Tennes of Chicago, who ran wild with a tractor-unit Caille in the early thirties; Joel "Silver Dollar" Thorne; the Tysons (Tommy, Molly and Elise); Ken MacKensie, Dick and Malcolm Pope who parleyed their interest in racing into full-time promotion based on watersports at a now popular Florida resort; Detroit's Dean Draper and his motor hop-up know-how, or Ruth Herring who back in 1938 drove her Flowers hull to an A National Championship.

Many of the old timers have stayed with the sport. Jack Maypole, called the boy wonder fifteen years ago, is still active and recently won the Class C National Title, just one of the many titles Maypole has garnered during his period of interest in the game. Dick Neal, the Kansas City driver, who pushed 'em as hard as anyone in the game and now builds one of the best of the outboard hydroplanes as well as engaging in some Grade A hop-up work; Frank Vincent, who gave the Class C pros plenty of trouble for years now makes some of the finest racing parts to be had; or Pep Hubbell who used to campaign through Pennsylvania and presently is the country's single largest racing parts manufacturer with his headquarters on the West Coast.

Drivers who were prominent in the sport are numerous and they all gave the game something if only a great competitive spirit that has made outboarding grow. Paul Sawyer, who today holds the world's speed mark for 225 c.i. hydros, can be remembered when he was making his start in speedboating via his outboards; Don Frazier of Illinois who topped the two Swedish champions, Sture Selande and Gunnar Faleij, in straight F heats at the Internationals in Milwaukee in the late thirties and is still tough to brush. Walter Everett taught many of the tricks of motor refinement to newcomers and veterans; Freddy Nickell and Bedford Davie represented U. S. in the Spreckles Trophy Race in Paris; and more recently drivers like Gil Petermann, Bobby Meyer, Doug Creech, Bud Wiget, Paul Wearly, Vic Scott, Tommy Haygood and the 1951 National High-Point Champion, nineteen-year-old Dave Livingston of Lake Village, Ark., are keeping the sport growing.

In all of speedboating's development, the creation of a surface-riding rather than displacement type boat has been speedboating's greatest forward step to date. The idea of a hydroplane rather than a displacement boat however is not a new one. M. de Sanderal in 1876, a year before the first U. S. auto wagon was built, drew up designs for and unsuccessfully tried a surface-skimmer boat on the Seine. Weight was de Sanderal's downfall. His skimmer was a raft with a propellor at each corner to give lift and a fifth prop to give the rig its forward motion. But in the actual tests the rig barely moved.

In 1897 the British Admiralty backed another Frenchman, Count de Lambert, with a catamaran (boat with two parallel planing surfaces and motor suspended between) designed on the skimming principle. In tests on the Seine in 1898 the boat peaked out on plane at better than 20 m.p.h. The overall weight of the boat was 3307 pounds and considering that it was powered by a 50 h.p. motor that turned 1000 r.p.m., this meant moving 66 pounds per horsepower.

In 1905 the French continued to lead in high-speed boat design. Bonnemaison boatbuilders built the first two-step hydroplane, the Ricochet-Nautilus, which with a ten horsepower three-cylinder air-cooled Buchet engine pushed Ricochet at 29.825 kilos or about 18 m.p.h.

Ricochet was followed by Antoinette built by Levavasseur and equipped with a 50 h.p. motor. Antoinette looked like a dragon fly and although no accurate report exists on her speed it was considered to have been "terrific" and has been estimated at about 25 m.p.h.

AMERICAN designers clung to the displacement design for some years largely because of the international success of such boats as Dixie and Dixie II. And the exceptionally rugged riding qualities of such internationally famed hydros in the first decade of the 1900s as the French Fauber-Labor-Motobloc and Ricochet XII, both were probably faster than any other boats of their era but unsuited to rough open water such as was encountered at international events of that day.

Through to the present seven different types of hydroplanes have been used for inboard racing: stepless; single-step; multiple-step; three-point suspension, two points forward; three-point suspension, two points aft; inverted V-bottom and hydrofoil or movable foil type hydroplanes.

With sufficient power to weight ratio, primary wave-making resistance is of no concern to the speedboater as this is a pre-planing resistance automatically overcome by anything that could be classed as a racing boat. Wetted surface drag, air drag and resistance of underwater components such as struts, shafts, water scoops, rudders, etc., are the principle limiting factors in speedboats today. In Gar Wood's era with Miss America X, a 7200 horsepower behemoth that stirred the imagination with its fire-belching stacks, its colossal 480 quart per hour oil consumption and 48 cylinders with 96 spark plugs creating nearly 125,000 sparks a minute (enough to form a bolt of lightning) little had been accomplished in the refinement of hull design. Configuration to reduce air drag to a minimum wasn't given consideration.

(*Turn to Page* 28)

YOU AND YOUR OPINION

BOAT tests and trials are packed with expectations, hopes and worries. A new hull design, a different cam, an altered shaft angle of attack, a newly hopped-up motor. . . . Any of these can mean months of preparation, hours, days and weeks of painstaking labor, but the final answer is never learned until after launching and a test run.

Sometimes a new racing outfit requires many changes during shakedown trials before the rig finally performs in the hoped for manner.

Just so with a new magazine. BOAT SPORT is new. This is its trial run. We expect that changes will be necessary.

In planning BOAT SPORT we visualized a specialized magazine for speedboat drivers, owners and fans. No sailboats, no cruisers, no yachts — just outboards and inboards built for speed and pleasure.

We are going to help you with hull design, motor hop-up and racing problems. We intend offering plenty of news reports on major regattas and backyard races as well. In turn we ask you to help us.

Take off a couple of minutes and check the questionnaire below — then mail it to us. If we get plenty of mail in a hurry it will aid us in building the next issue around your answers and any other comments you care to send along.

Can we take criticism? Surest thing you know. Criticize like mad. We can take anything but a lack of response . . . and we promise you a steadily improving BOAT SPORT each issue as the result of your cooperation.

Please check the following items of interest to you and mail as quickly as possible to BOAT SPORT, Room 1904, 215 Fourth Ave., New York 3, N. Y.

	YES	NO
1—I think there is a need for a specialized magazine devoted to speedboating.	____	____
2—Count on me to buy the next issue of BOAT SPORT from my local newsstand	____	____
I wish to subscribe, mail me an order blank!	____	____

HOW MANY OF THE FOLLOWING TOPICS INTEREST YOU?

OUTBOARDS: Check below

- (*a*) *Racing hydroplanes* ____
- (*b*) *Racing runabouts* ____
- (*c*) *Stock utilities* ____
- (*d*) *Stock utility marathons* ____
- (*e*) *Competition news* ____
- (*f*) *Club news* ____
- (*g*) *Mile record breakers* ____
- (*h*) *Other topics not listed above* ....

....

INBOARDS:

- (*a*) *Gold Cup class* ____
- (*b*) *7-litre* ____
- (*c*) *225 and 266 cubic inch hydros* ____
- (*d*) *135 c.i. hydros* ____
- (*e*) *48 and 91 c.i. hydros* ____
- (*f*) *48 c.i. runabouts* ____
- (*g*) *Service runabouts* ____
- (*h*) *Racing runabouts* ____
- (*i*) *Jersey speed skiffs* ____
- (*j*) *Pacific one design hydros* ____
- (*k*) *Other topics not listed above* ....

....

MARK YOUR CHOICE ON THESE:	Prefer	Like	Dislike
(1) *Articles on hull construction*	____	____	____
(2) *Information on motor hop-up*	____	____	____
(3) *News reports on regattas*	____	____	____
(4) *Biographies of outstanding drivers*	____	____	____
(5) *Articles on past races, famous boats and descriptions of their motors and hulls*	____	____	____
(6) *Action pictures*	____	____	____
(7) *Pictures and information on how-to-do-it*	____	____	____
(8) *Information on coming events*	____	____	____
(9) *Swap columns*	____	____	____
(10) *Information on new racing products and parts*	____	____	____

	YES	NO
(11) *Are you interested in new boats?*	____	____
Secondhand boats?	____	____
Do you want to build your own boat?	____	____

COMMENTS IN GENERAL:

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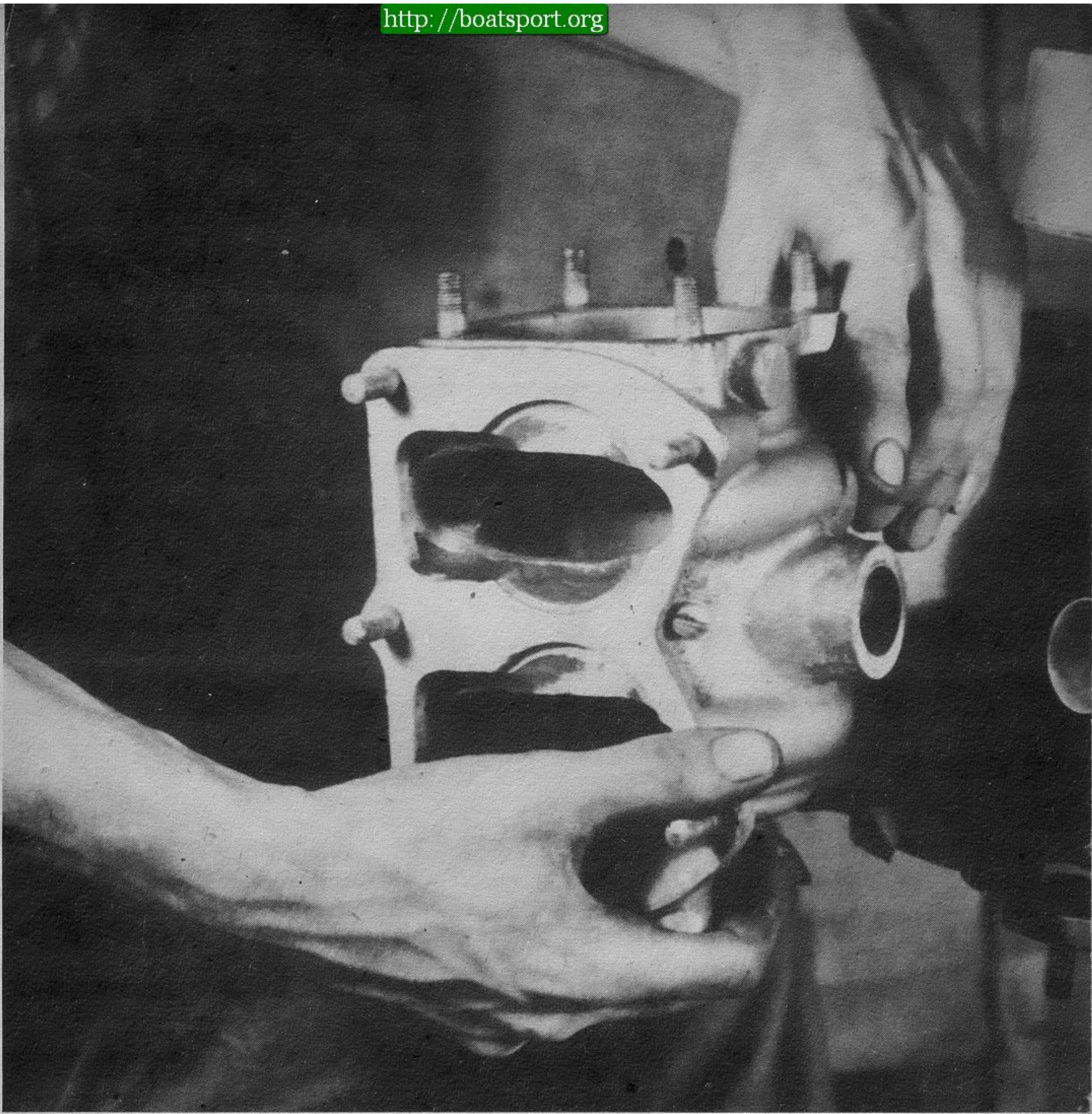
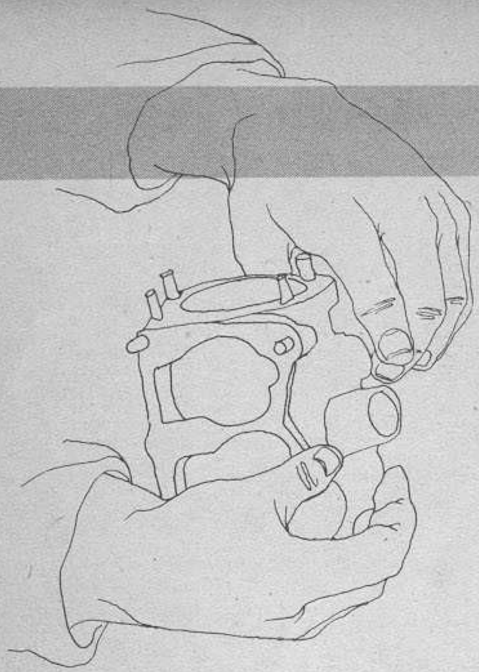


"Billy" pump case.

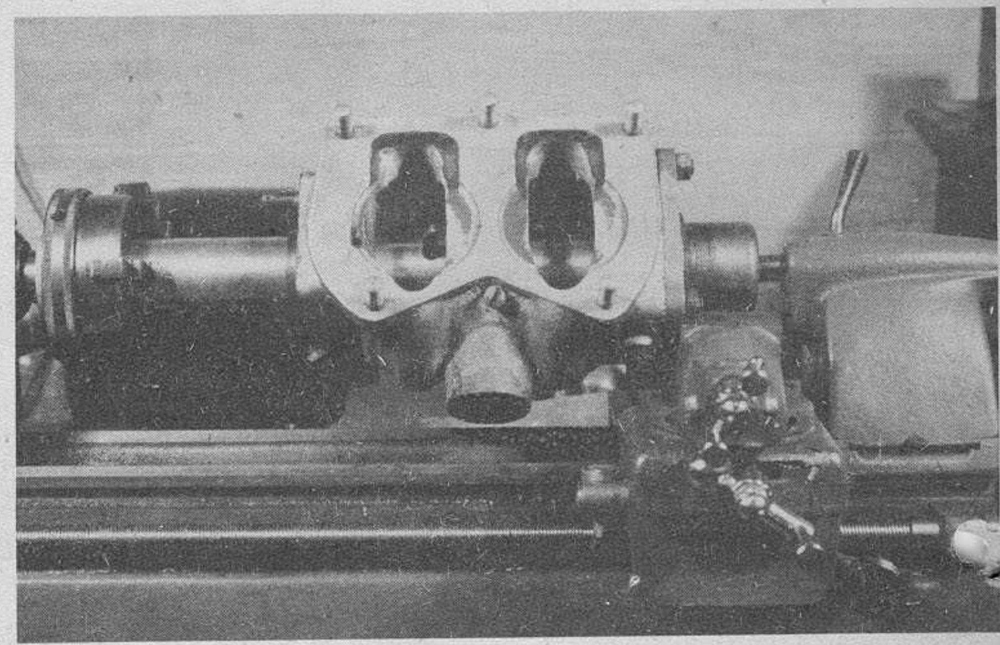
BUILDING UP A "CLASS A" RACING ENGINE

Tiny 100-pound outboard hydros have topped 50 mph for the mile. Speed like this comes from attention to details. Here's how—spelled out for you on the following pages.

BUILDING UP A "CLASS A" RACING ENGINE



(Below) "Billy" pump crankcase set up for reboring of center seal. Note cutting blade in lower crank port. Screw located above carburetor throat is one of three tapped through center of case to secure inner bronze seal. Securing of seal is not recommended for a new case as the possibility of seal breaking free in a well aligned case is extremely remote.



ENGINES designed-strictly-for-racing and service (utility) outboard engines both operate on the two-cycle principle. Both have the same general appearance, but that's where the comparison ends. In performance an outboard racing engine bears about the same resemblance to a service job as a Meyer-Drake Offenhauser would to a Ford V-8 60 in a midget racer. The Ford and the service outboard both originally were designed for utilitarian purposes, not racing. Even with their greater c.i. displacement, the utility engines cannot, and should not, be expected to perform with the racing jobs.

If you plan to enter outboard hydro racing, don't think you can do it with a hopped-up service rig and finish heats within waving distance of the fast boys. In racing you'll be competing with hopped-up special racing outfits.

How to build up a Class A racing engine from scratch, and how to further refine the Class A racing engine, is the subject of these articles.

If you want fast, closely contested racing, Class A is a good starting point. You'll find one or more regattas within trailering distance of your home nearly every weekend from Spring until late Fall and purse money to shoot at to offset your expenses.

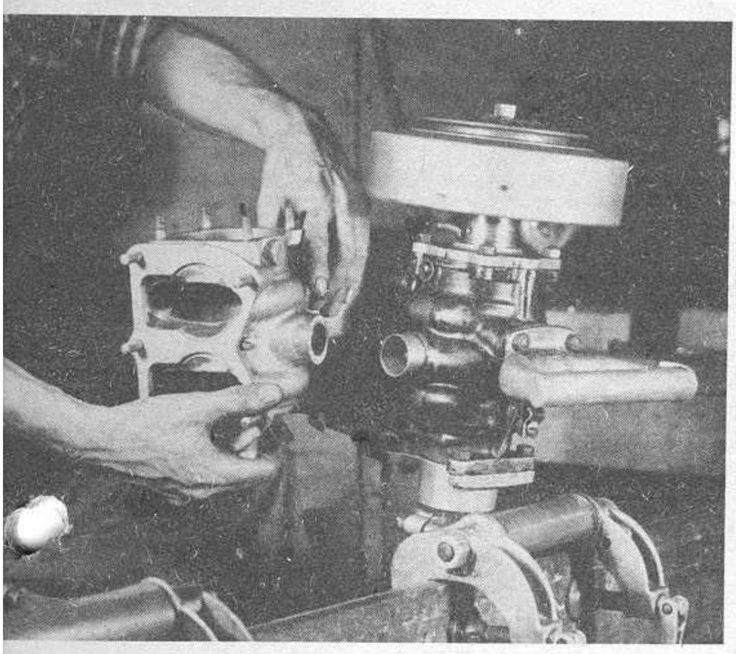
Class A rules require a minimum 100-pound hull (hull designs will be covered in future issues), 250-pound minimum overall weight (driver and boat—but *not* including engine) and an engine of 7½ to 14 cubic inch piston displacement. The Johnson-type KR-55 and later models are most universally used in Class A. The last KR engine turned out in 1940 (KR-10) is little changed from the first really fast moving KR model (KR-55) turned out in 1931.

The record for Class A is 50.281 mph for one-mile straight-away and 47.344 mph in five-mile competition. If you can set up a 47 mph, or better, Class A, you'll have an engine that, with proper driving, will put you up into the front money ranks. And 47 mph in Class A competition holds plenty of thrills.

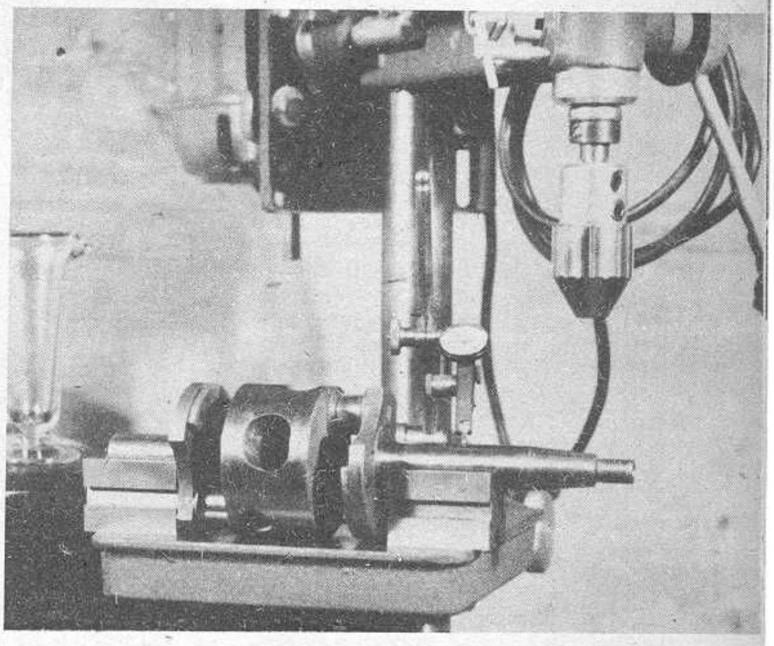
Picture riding on your knees, steering one-handed (the other hand grips the throttle), in a 9 or 10 foot shingle that requires the deft touch of a tightrope walker to keep right side up, no brakes, knife-like stinging spray in your face from the guy ahead and a skipping, pounding motion like driving a jeep at 60 mph over railroad ties. Imagine using your body weight to hook and slide around turns with the character ahead trying to cut off your nose at the buoy and the joker on your tail looking for a chance to get an inch or so of his bow inside on the turn so he can ride you off. That is Class A racing.

Sometimes you'll flip. Water at 40 mph, and better, begins to harden up like packed clay. Othertimes you'll haul a couple of hundred miles to a race and pull a handful of blisters without ever getting your engine to fire on two. But once you've entered hydro racing, like the rest of the outboard racing hydro gang, you'll undoubtedly become fanatical about the sport to the point even of testing new engine set-ups in February, the first day ice melts from your local lake—or buying a new set of rods with money earmarked for the slacks and sport coat for your wife or gal friend.

PART I



"Billy" pump case being held up for inspection. Note difference in carburetor throats—need for adaptor alteration, as shown in text is obvious. The Tillotson racing carburetor fits readily to throat on this standard Johnson crankcase at right. "Billy" pump case must be altered to take the Tillotson.



Crankshaft being checked for alignment; using a pair of Z-blocks and a drill press can be used as surface plate if in good condition.

Outboard hydro racing isn't strictly for the man with the pot of gold and some of the best in the game have to scratch and save to get each spare part. The silly part of this racing business is that it can become a tougher habit to cure than smoking. On the other hand it is probably no more expensive and, in the long run, better for the lungs, if not always as easy on the disposition.

To get started, you can build your own engine from scratch or look one up already set up and flying. There are some around ranging in price from $350 to $800 depending on who set them up and how willing the owners are to part with them. The cheaper way, of course, is to build up your own which can be done for $300 or less.

The exact cost of a home-built A engine will depend on whether or not you can scout up a Navy "billy pump" as a start on parts, plus how much of the set-up work you do on your own.

The U. S. Navy uses several types of portable fire-fighting and bilge pumps for shipboard damage control. Navy Type NY (nick-named Handybilly) has a two-cycle engine which develops 9.8 hp at 3500 rpm, designed on the plans of the original Johnson KR-55. Hundreds of these pumps, in new condition, were sold as surplus at the close of the war. These have been resold to the public for prices, including the pump, ranging from $25 to $125 each. Some still are to be found at marine salvage and second hand machinery outfits.

How much you pay will depend on your ability but at $125 or less, (for a new one) you will be grabbing a bargain that will save plenty in basic parts assembly. The following are useable parts you can strip from the Handybilly with their approximate minimum replacement value if bought from a racing parts supplier:

Crankcase	$50
Crankshaft	$50
2 Connecting Rods	$24
Wrist pins	$ 2
Flywheel	$25
Magneto complete	$40
	$191

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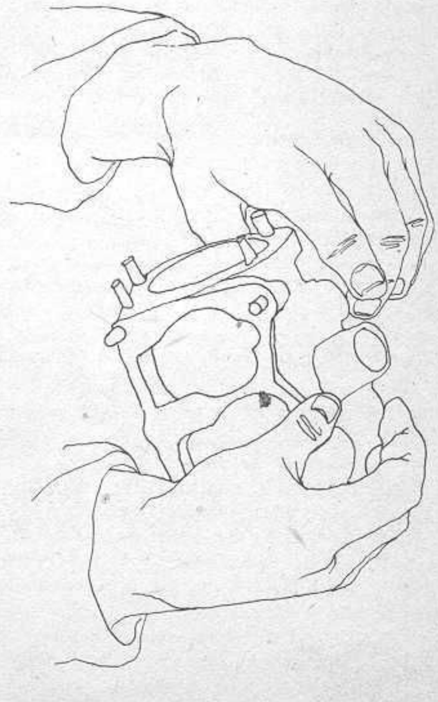
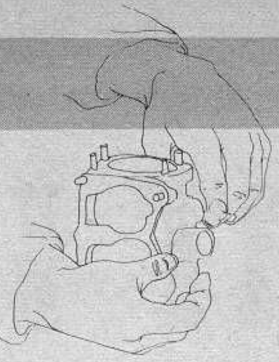




THE Navy handybilly carburetor and the stock Johnson KR carburetors of 1936 and earlier vintage are not suitable for present day racing with the alcohol-blend fuels in standard use. Most racing Class A engines are equipped with Tillotson model E-626J carburetors. Racing suppliers handle this model, 31/32" (bottom of bowl marking) venturi lift, priced at $15 or less. Earlier Tillotsons have a 29/32" marking and although not generally used are just as efficient.

Although no alterations to this carburetor are mandatory, several changes are recommended. The high-speed needle valve (left of two adjustments viewed from front of engine) is awkward to adjust underway. Easier handling is possible by brazing or silver soldering an approximate one inch extension and by replacing the small brass rod finger grip with a larger flat grip. Cut off one side of the new flat finger grip, or design it with two differently shaped sides so that by feel you may differentiate between half and full turns. In a race you have no time to look back at a needle setting. The larger grip will eliminate much blind groping.

To permit a more ready flow of fuel, many drivers remove the needle and enlarge the hole. The stock Tillotson hole measures .104". This can be checked by inserting a No. 37 drill into the hole, which should enter without forcing. Increase the hole to .110" with a No. 35 drill.

Close the low speed jet with a screw driver and reopen it to ¾ turn setting, where it may be tightened for a permanent positioning.

Two and a half turns on the needle valve is a good starting point for the first trial of your engine when it is ready for test, but the exact needle setting can only be determined by experiment and will vary dependent upon race site elevation and humidity. During testing, to be certain that your carburetor is passing sufficient fuel, you may gradually open your needle valve when the engine is at full throttle. If the engine four cycles and slows down you may be sure the carburetor is passing enough fuel. If the engine neither slows down nor four cycles, then either the jet needs additional reaming, the fuel line is restricted or some other blockage exists.

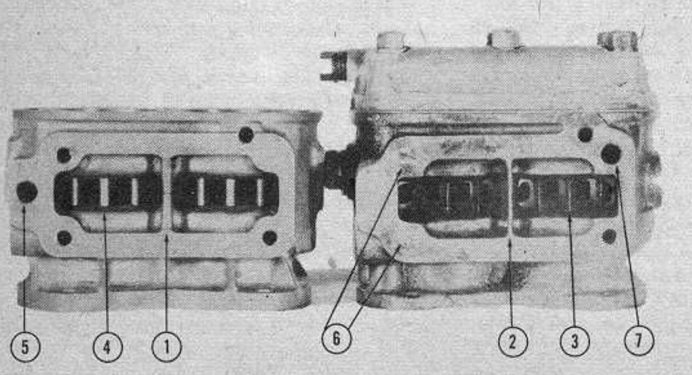
Hand choking with the stock gooseneck airhorn intake on the Tillotson is difficult. Washouts are infrequent in Class A competition because of the side-of-engine location of the carburetor so this right angle design is unnecessary. I suggest the gooseneck be discarded and replaced by a two-inch long stainless steel intake of straight tubular design. The tube offers all necessary protection against a washout and is simple to hand choke—and more important, when using a squirt gun to case prime, you can see whether or not the rotor is open. If rotor is closed, squirt priming is largely ineffectual. Benzol makes an excellent squirt liquid as it is used both for priming and to clean slightly fouled plugs.

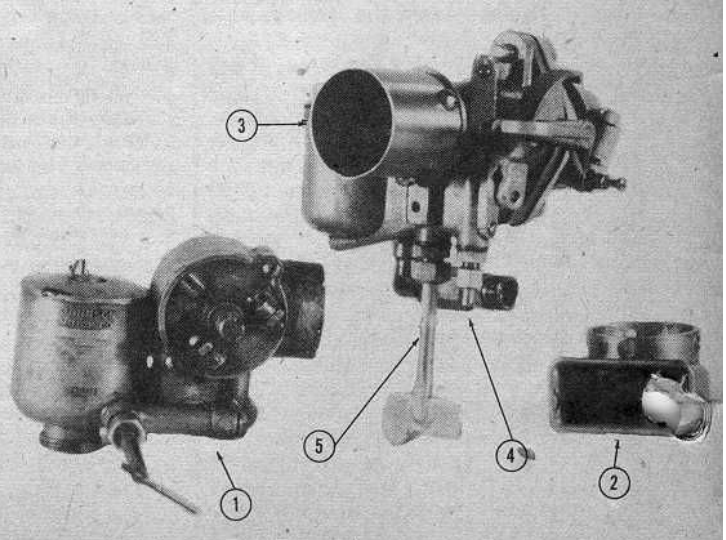
Alcohol fuels call for larger passages than do gasoline mixtures. A ⅜" inside diameter copper tubing is satisfactory or standard neoprene beer hose may be used; neither is adversely affected by alcohol-blend fuels.

Recent APBA rules changes permit any type of fuel tank. If you cannot locate a cheap second hand Johnson K or KR tank ($10 to $15 is a fair price) you may substitute a home made tubular tank of stainless steel or copper. An important point is to be sure your tank is mounted sufficiently high to give an adequate flow of fuel at all times. Check a service Johnson K installation and

(Below) Exhaust port side of new untouched block left and used block at right. Compare (1) and (2) to illustrate how central web has been filed and tapered. A comparison of (3) and (4) will indicate refinement of webs on used block. Outlet hole at (5) on new block will be tapped and plugged. Location (6) on old block will be drilled, tapped and used to support exhaust bracket. Outlet (7) will be plugged. It originally supplied water to water jacketed exhaust housing. Note the added web supports on new style block to strengthen ears where blocks are most prone to break.

(Below) Racing Class A power head. If old style (4) exhaust housing is to be used it is recommended that an outlet hole be drilled at bottom of housing (1) to prevent water from sloshing into lower cylinder. Tank bracket breakage from vibration can be offset by use of heavier right angle aluminum tank brackets (2). Mounting brackets designed to raise tank level for use of alcohol-blend fuels is shown at (3). Conventional KR head (5) using old style cooling method. For conversion a Y fitting would be used on head with water intake taken to head from location (6) drive shaft housing.





PART II

make your tank mounting 1¼" or more higher. As a guide, I use a set of brackets that places the bottom of the tank 2½" above the top of the cylinder head. This set up is about ½" higher than the usual racing mount.

Racing suppliers handle standard aluminum castings that form a combined exhaust header and two-stud tank mount. These cost from $3 to $5 and are well worth the price. However, if you have an old style water-cooled exhaust housing, you can use it. Because of its design it tends to scoop in water when stopping or when boat is idle at the pits. A ½" hole drilled through the bottom of the housing—or cutting away entire bottom of the housing—will eliminate wetting down difficulties.

If you have a tank installation with a shut-off valve I would suggest eliminating the valve. Races have been lost by pit crews or drivers forgetting to open shutoff valves. There is usually enough fuel in the carburetor bowl to get you away from the dock. Then when the engine stalls, it is often too late to open the valve and get underway again.

Finally, before installing the tank give it a thorough cleaning. Hot water

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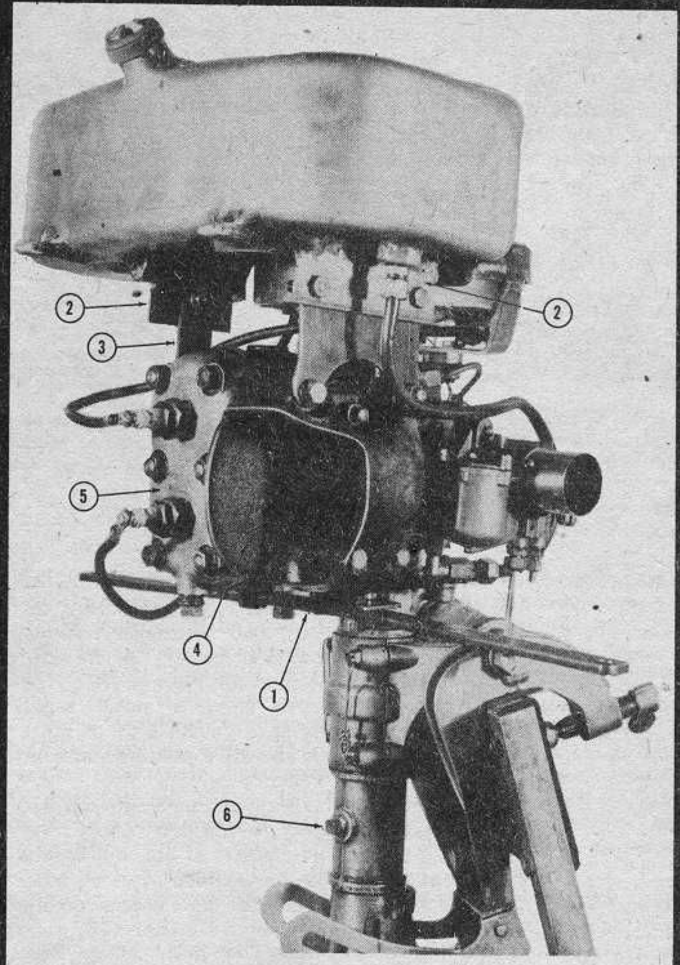
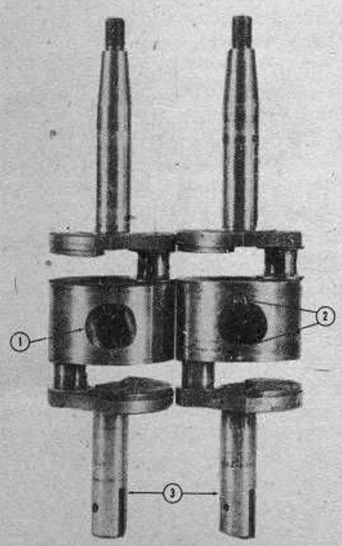


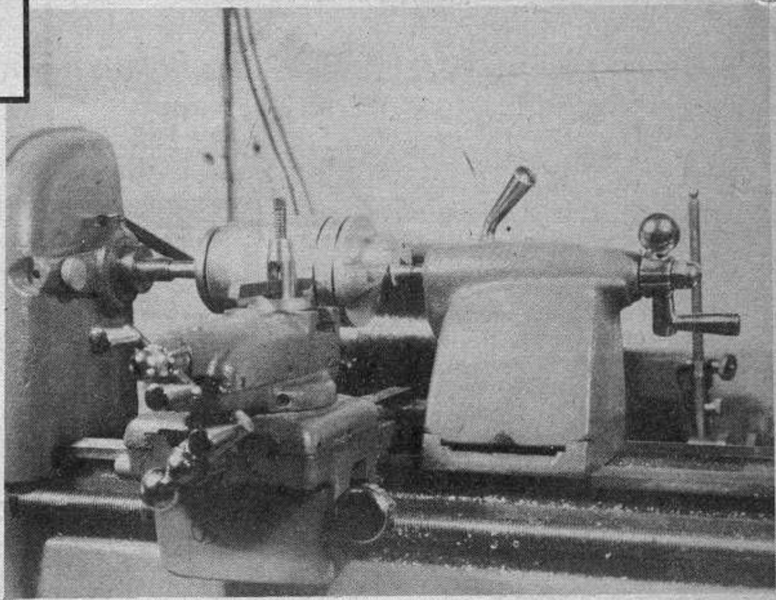
(Above) The old style Johnson carburetor which was the original KR Class A installation is shown at (1). It is unsuitable for alcohol-blend fuels and should be discarded in favor of Tillotson carburetor pictured in center. Tillotson elbow designed air intake (2) which blocks inspection of rotor port. Air intake similar to (3) is recommended. Low speed idling jet (4) should be locked in position at ¾ turn open. High-speed needle (5) has added length brazed to it for easier handling underway. Note variance in design of left and right half of finger control. This is done so that half turns may be located by feel without taking eyes off the course.



(Left) Two "billy" pump drive shafts. Shaft at left has been ported. Note larger clean rotor opening at (1). The two heart-shaped obstructions left after factory machining are shown at (2). Lower end of "billy" shaft must be cut off and internally splined. (Outboard specialists do this job for $10 and it is recommended that the splining be done by the specialist).

PART III

BUILDING UP A "CLASS A" RACING ENGINE



To turn tapered piston on small hobby-type metal lathe, taper is obtained by trial and error method by moving tail stock. Shops specializing in piston turning use an automatic taper adjustment. (See text for details)

RACING pistons may be obtained in one of two conditions: semi-finished (i.e. about .040" to .050" oversize without ring grooves cut) or completely finished for proper cylinder fit, with ring grooves. If you have a small bench lathe, you can save yourself $7 or more by buying semi-finished pistons and completing the work yourself.

Opinion is about equally divided among outboard racing drivers concerning the relative merits of die-cast versus sand-cast pistons. Both types have staunch supporters. The choice is one for you to make because there are good and poor pistons of both types. Best pistons are those with the lowest rate of expansion. Buying from a reputable supplier is the best assurance of proper alloy being used.

The piston fit is the all important item. Most heat and the greatest degree of expansion occurs at the crown of the piston with temperature and resultant expansion diminishing somewhat toward the skirt. To obtain a snug, but not a sticking-tight fit at high speed, a tapered finish is used. Clearances and the degree of taper depend on individual owner's ideas—and these should be based on experience with his own blocks and the known expansion values of the pistons.

If your blocks are seasoned, you may reasonably try the snuggest possible fit. As a start, for seasoned blocks with good quality pistons, I suggest you have your pistons machined with the skirt .002" smaller in diameter than the diameter of the bore of your block, .004" smaller a quarter of the distance toward the piston top, .006" at the mid point and .008" at the top ring land.

If after testing, this set up causes no trouble then when you have your blocks ground or a new chrome job and need a new piston set-up, you can safely use a snugger .002", .003", .005" and .007" taper—that is if you are assured the new pistons have the same expansion coefficient as the originals.

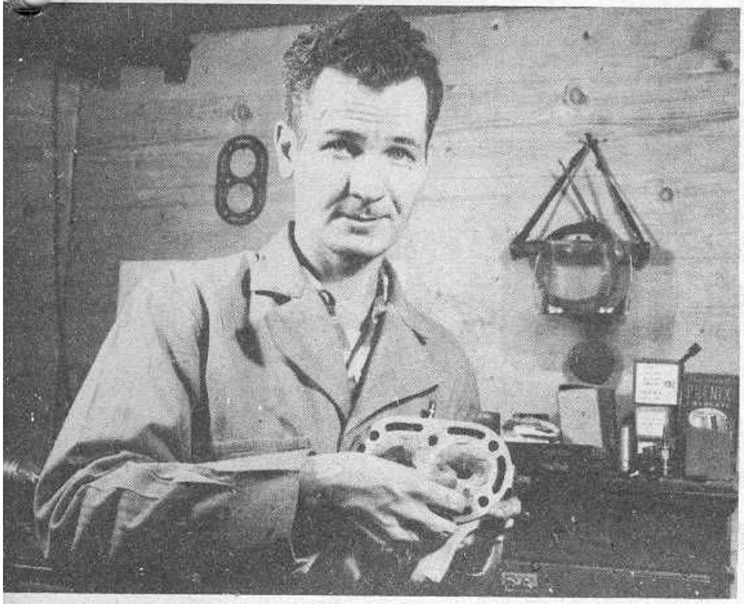
With an untried block I recommend a taper of .0035", .0055", .007" and .010" as safe to avoid possible sticking.

A badly stuck piston is simple enough to spot. If you've been winding nicely and suddenly the engine just runs down like a clock with a busted main spring, that's it. If you are lucky, you can start up again, but once you've stuck a piston badly enough to stall your motor; the smallest repair item you can hope for will be a new set of rings. Post stick-up troubles can range to bent rods, scored block, broken pistons or even a bent crank.

Minor sticks are noticeable in breaking in a new engine set up when the motor's revolutions drop off and then pick up again without a complete stall.

The number and type of rings is also a matter of choice. Some drivers use three-ring pistons, others use only two rings. Both ⅛" and 1/16" rings are raced and ring tension used varies from 5 to 15 pounds. I recommend the use of two 1/16" rings per piston with a tension range of 7 to 10 pounds. The 1/16" rings should be replaced more frequently, preferably after each regatta, but the narrower rings offer less power loss by friction than the wider rings.

(Below) Doc Williams, an outstanding driver on the SCODA circuit and standout Class A racer, demonstrates how modeling clay is placed in the head prior to making compression chamber balance check.



After check is made, note impression of piston in modelling clay and see also test cuts Doc Williams has made to check chamber balance. Filing away high spots from the piston crown will correct any inequalities revealed.

Pedrick and Perfect Circle are both used with good success. Ramco makes a 1/16" ring with a tapered surface that is certainly worth trying. These Ramco rings are made with a distinct top and bottom. When filing pin grooves, be sure to observe the markings and groove on the proper side.

Rings must seat properly in ring grooves as they serve as the seal to prevent compressed gases from blowing by the piston. A mild abrasive such as Bon Ami and light engine oil can be used to lap the ring into the groove to assure a perfect seat.

You will note that the wrist pin hole is located so wrist pin ends do not pass over the intake or exhaust ports. In pinning the rings, stagger pin location on opposite sides of the piston over the ends of the wrist pin.

A safe rule to follow in ring end-gap is to allow .002" for each inch of cylinder diameter. Thus in a standard 2¼" diameter cylinder, an end-gap of .0045" to .005" is ample. If your bore is oversize, be sure to order oversize rings or you will find your end gap clearance is too great and your engine will lose power because of excessive blow by.

Two types of grooving or notching of rings are used. Be sure to note that for the recommended type No. 2, the groove is readily filed with a small rat-tail file by permitting the rings to spread approximately .020" and stroke evenly across the gap. The resultant notch will conform neatly to the ring groove pin shape.

Since the wrist pin hole is so located that the wrist pin does not pass over either intake or exhaust ports a floating wrist pin installation is simplest. Use either aluminum button ends that press fit into the wrist pins or preferably the lighter composition ends such as those made of formica.

Volume equalization of each cylinder is of the utmost importance because compression ratio is dependent upon firing chamber volume. One point to firmly establish in your mind is that although a standard bore "A" block will have a volume of 13.9 cubic inches, this figure represents an overall volume and is not the volume of the working stroke.

To determine the working stroke volume of your engine (important in establishing a correct compression ratio) you must obtain a cubic centimeter tube capable of holding 150 c.c.'s or more (priced at $1 and upwards at a pharmaceutical supply house). With you engine cocked forward on its stand so that the face of the cylinder head is level, remove spark plugs, rotate the flywheel until one piston has just closed over top of its exhaust port.

Make a solution of light engine oil cut with gasoline and fill c.c. tube. Pour solution through plug hole being careful to avoid spillage and fill cylinder to level of top thread in plug hole (i.e. to level of plug gasket seat). This volume will be somewhere in the neighborhood of 120 c.c.'s dependent upon how near standard your bores are, and on the contouring of pistons and inner surface of cylinder head. Record this figure.

Flush the measuring liquid from the cylinder, rotate the flywheel until the same piston arrives at T.D.C. Then repeat the measurement. This volume will be approximately 12 c.c.'s, plus or minus as much as 3 c.c.'s.

Repeat process on the other hole. These four figures give you only a rough starting point. If you are exceedingly lucky, the working volume of both bores and the T.D.C. volumes will be the same.

The next step is exceptionally important and is frequently overlooked or not taken into consideration by many mechanics. Make certain of your head contouring.

Buy a small supply of modeling clay, the type used by children in kindergarten and early school grades. Spread a thin layer of the clay, about ¼" thick evenly over inner surface of both head chambers. Place head on block without gasket and tighten down snugly.

Rotate the flywheel several times so that both pistons make a firm impression on the modeling clay. Then with a reasonably sharp, fine tool (a meat skewer will do) scratch carefully through clay to head metal along impression made by crown of piston. Any appreciable variance in top plane of piston will show by greater depth on one side of chamber than the other.

For example, if an inspection shows that an impression of 1/16" deep was made ½" from center of one side of head, the depth ½" to other side should correspond. If it does not, then with a file, you must carefully remove sufficient metal from the high side of piston crown (which would be the side of the deepest impression) to give a proper firing chamber balance.

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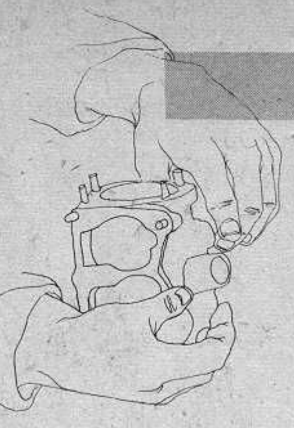
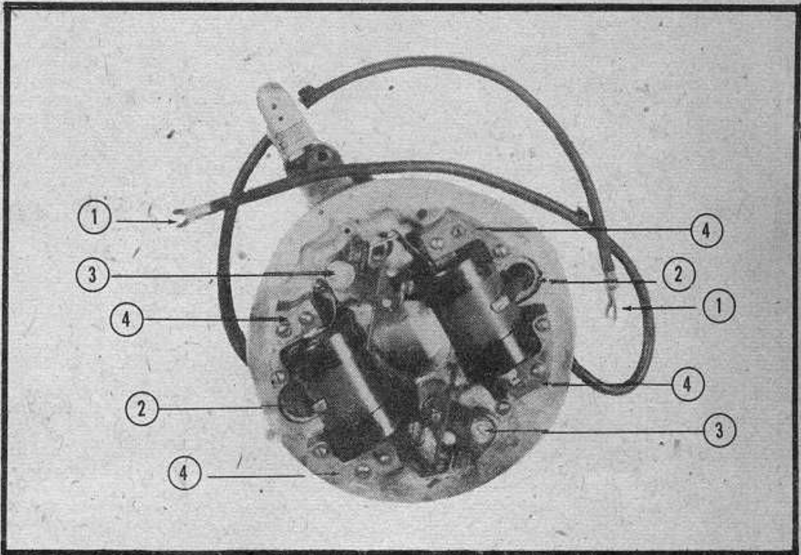




(Right) Top view of Class A magneto. When installing replacement coils, use paste—not acid core—solder when connecting the high tension leads (No. 1) which pass through holes in the armature plate (No. 2) as undue heat or acid may cause damage to new coils. Adjustments for timing are made by loosening the screws (No. 3) and shifting the breaker cam. Always be sure the heel plates of coils (No. 4) do not strike against the flywheel poles.

(Far right) This simple coil testing circuit will save a lot of time. It consists of a 6-volt hot-shot battery (A), a knife switch (B), a 5-ampere ammeter (C), a standard Ford vibrator coil (D), three spring clips (F), and three needles (G) which are inserted through a piece of bakelite or hard rubber. Remember to place strips of paper between the breaker points of the magneto to test spark.

SEVERAL types of Johnson KR flywheels have been made. The earlier models were designed with a Lynite hub which tended to break out at high speed. This flywheel had a tapered hole with the outer taper I.D. of the hole measuring ¾". Early style KR engines were made with smaller diameter to the top tapered pin. Should you have an old-style crankshaft (see Part I of this series) with an aluminum alloy hub, it is recommended that you install a flywheel catcher (shown on opposite page) as a protection against possible sheering off of the hub.

Late model KRs were factory-equipped with a steel hub. The outer I.D. hub hole is ⅞" in diameter, designed for heavy crankshafts. Such a flywheel has seldom been known to tear apart at the hub. The billy pump flywheels, designed for speeds up to about 3,500 r.p.m., are aluminum-alloy hubbed but have a special added steel ring. These are considerably stronger, but also have been known to fly apart.

Since a catcher is simple to make, or inexpensive to have made up for you; we suggest installing one regardless of the type flywheel hubbing used. However, since proper balance will make for longer engine life and can frequently add r.p.m.'s to a poorly balanced flywheel, I recommend having a steel hub installed at the time of balancing. One West Coast racing parts supplier specializes in the installation of steel hubs and static and dynamic balancing. The entire job, including the replacement, runs to approximately $25.

Should you plan to have your flywheel balanced, be certain to include the pulley plate and screws. Scribe marks should be made on the plate and flywheel so that the wheel, balanced with the pulley plate, is always replaced in the same location. Some drivers even go as far as weighing the three screws separately, recording one base weight they plan to use and grinding replacement screws when needed to match the recorded weight.

You may have noted that, in the illustration of the three flywheels, the two wheels in good repair had metal bars bridging the pole shoes or magnets on the flywheel. Whenever you remove the flywheel from your motor, always place a piece of steel as a keeper so that the magnetic strength in the flywheel magnets will not be dissipated.

Periodic recharging, or "bumping" as it is called, is important for easy starting and proper ignition at high speed. Should the flywheel be dropped or suffer a heavy blow, the magnetic field may be disrupted, and it may be advisable to have the flywheel recharged. Usually one charging is sufficient for a year's racing activity.

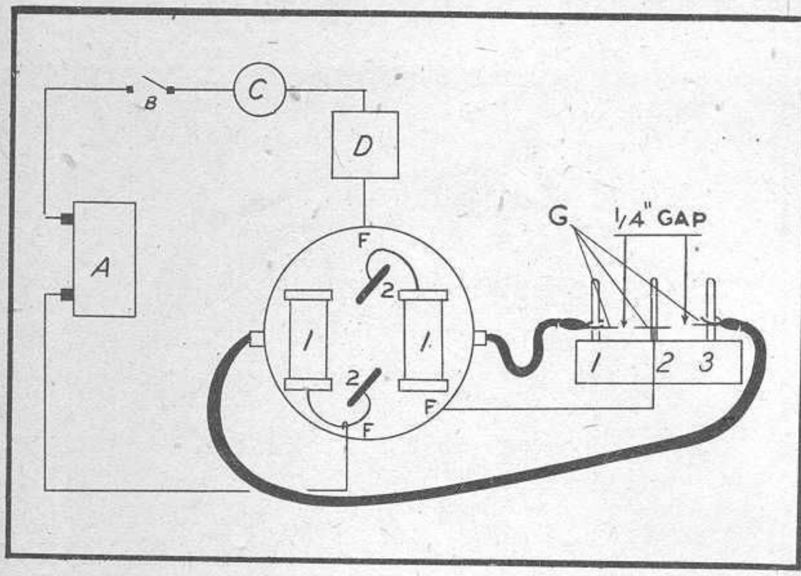
LOWER UNIT: If you have a second-hand unit, check for possible streamlining improvement. Pay special attention to the warning concerning the size of the original casting and exercise caution in approaching any of the minimum limits outlined. Although the stock-racing lower unit has a bronze bushing to carry the top of the pinion shaft, rules permit substitution of a more efficient ball-bearing in this location. While many drivers use a sealed ball, we recommend an ordinary ball-bearing to relieve pressure.

Remove the plug in the bottom of the driveshaft housing to permit the escape of any lube and water pumped past the bearing or bushing, so that this excess won't be pumped on up the shaft and perhaps forced into the crankcase.

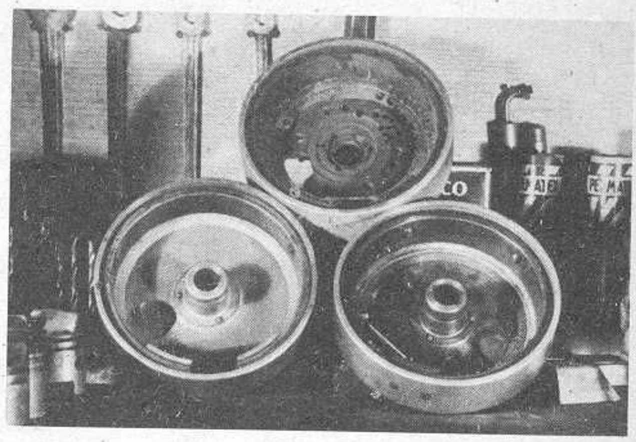
All bearings in a used unit should be checked for wear. There are three ball-bearings in the gear housing: one on the forward end of the propeller shaft and two on the after end. On a used unit, it is also well to check the condition of the teeth on the propeller shaft bevel gear and on the pinion gear. A matched set of pinion and prop shaft gears costs approximately $30.00. It isn't smart economy to run chipped or badly worn gears as a new lower-unit gear case is a $25.00 item. If you run gears in a dangerously worn condition and a tooth lets go, you may expect to replace not only gears but also the case, as a tooth breaking off at high speed is quite likely to be thrown through the case.

A new completely set-up, ready-to-operate lower unit costs slightly more than $125 and should never need replacing if it is given proper care. In transit, for better protection of your entire engine, and for convenience in handling, most drivers disassemble the lower unit from the driveshaft hous-

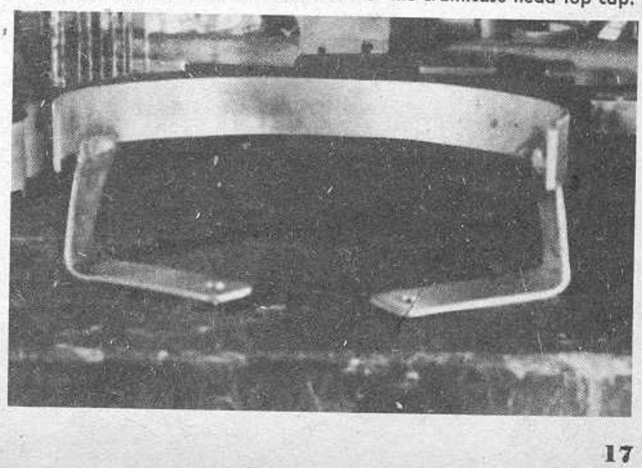
PART IV



(Below) Topmost of the three flywheels shown below is an old style Johnson flywheel, on which the Lynite hub sheered off completely. Holes drilled in the inner surface of this flywheel were for the purpose of balancing. In this instance the expense of balancing was wasted through the false economy of not installing a steel hub. Flywheel 2 is a Billy pump wheel, equipped with a metal strengthener ring at the top of the hub. This is stronger than the original Johnson KR hubs, but a steel hub is recommended. Flywheel 3 is a steel-hubbed wheel. The hub is riveted to the surface of the wheel and the entire piece is made of a machined section. Note keepers (metal strips) placed between pole plates.



(Below) An easily made, inexpensive flywheel catcher, which should be installed on Class A outboard racing engines as a safeguard to the driver against possible disintegration of the flywheel. Three sections of ⅛" x 1" cold rolled steel are required, and two spot welds. Arrange two angle braces to fasten the flywheel catcher to the two rear studs of the crankcase head top cap.



ing. Take a section of hardwood approximately 3" wide x 8" long x ¾" thick and drill two holes corresponding in location to the two studs used to secure the unit to the shaft housing. Countersink a hole of sufficient depth and diameter to give clearance to the pinion shaft. In storing or transporting, secure this block to the top of the lower unit to prevent the gear case from separating from the pinion case, and also to keep dirt from entering through top of the pinion case.

If a skeg (a fin-like projection from the bottom of the gear case) is on your unit, although some drivers remove this, I would suggest you leave it on, as it gives added straightaway stability and offers better turning characteristics without undue drag.

SPARK PLUGS: Any spark plug used effectively in the KR will be a cool plug. But, within the cold plug range, you should choose the proper plug only after experimentation.

Doubtless the terms "hot" or "cold" in reference to plugs are already familiar, but a word or two on what they are and how they function may save you later grief during testing and racing. We have seen many drivers, through some sort of phony pride, sit out races at the dock because they wouldn't try a warmer type plug when their iron failed to fire up on the R2 plugs their hop-up mechanic recommended.

The difference between the two types of plugs is simply this: the hot plug is designed to retain a goodly portion of its temperature to aid in warming the incoming fuel mixture before the next firing of the plug. A longer and thinner insulator is used to accomplish this. Too much heat reflected to the incoming fuel will cause pre-ignition, as well as overheated and burned pistons. The proper plug must be sufficiently cool to avoid this.

Cold plugs have shorter insulators, which dissipate the heat more rapidly to the cylinder head. With a racing engine, high compression ratios pre-heat fuel by pressure.

Compare a hot plug and a cold plug and you will note that the insulator of the hot plug is not recessed as deeply into the plug body as the cooler plug. In really hot plugs the

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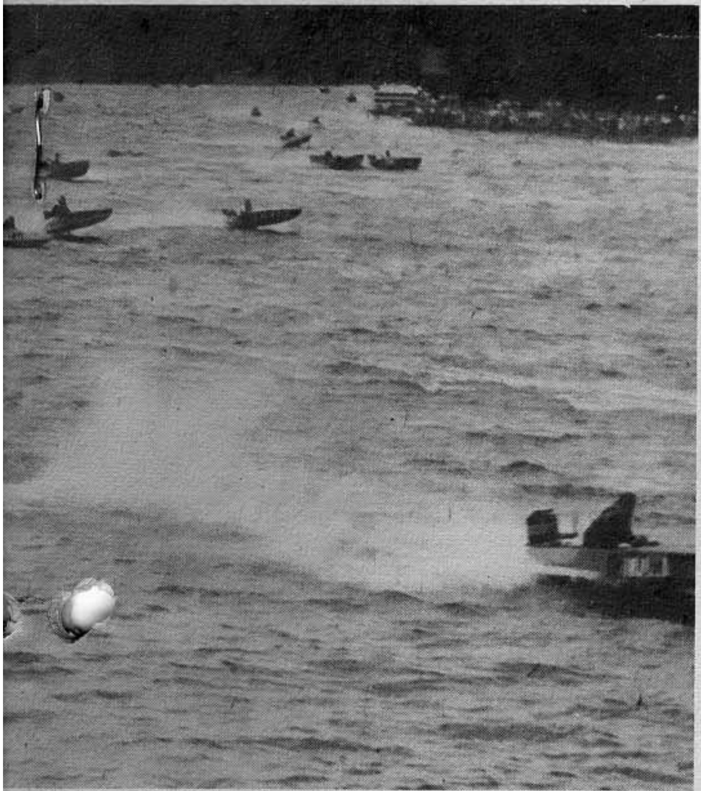
(Left) Give 'em the gun! Race morning dawned bright and clear, and the drivers were down to the pits early for last minute adjustments and test hops. By noon, a strong wind was churning the course into a navigator's nightmare, but most of the 228 drivers entered were among the starters.

(Left) The anguished expression on the face of D-77V's passenger is not affected—he didn't know his picture was being taken. Driver is Tom Russell, a Chicago entry, who dropped out of the race somewhere between Oshkosh and Fremont. Photographer caught 'em as they passed through the comparatively calm water of the Fox River at Oshkosh.

(Left) Marilyn Donaldson put in 4 hours and 11 minutes of racing on the roughest waters in marathon history. But she was still able to smile in response to the thunderous ovation accorded her at the finish line. Marilyn finished first in Class A with a *Swift* boat and Mercury motor.

78,000 SPECTATORS CAN'T BE WRONG!



(Above) Under ominous skies and with a 35-mile tail wind whipping them over the starting line, the first wave of boats (classes C, D, E and F) started at 1:00 pm, an hour behind the time that was planned.

WHEN the turbulent waters of Wisconsin's famed Lake Winnebago calmed down last June after the third running of the annual Milwaukee Sentinel-Winnebagoland Outboard Marathon, there was no doubt in the minds of officials, sponsors, participants, and spectators, that this was indeed the greatest outboard classic ever run in the United States.

In just three short years, the Sentinel classic has climbed to the top of the heap as far as outboard marathons are concerned. Neenah, Wisconsin, site of the start and finish of this great race, is the mecca for which the country's top drivers head each year.

There are many reasons why the Winnebagoland event has reached such astronomical heights in its few short years of operation. Surely it's not because the course is an easy one to traverse. Boats, motors, and men take such a pounding on the course that it's amazing that anyone finishes at all. Only 42 out of 228 starters finished in 1951, only 49 out of 184 in 1950, and only 42 out of 111 in 1949.

The 92 mile course stretches from Neenah to Oshkosh on Lake Winnebago, up the Wolf River past Winneconne, through Lakes Winneconne and Poygan to Fremont. Turn-around point is at Fremont, and the boats retrace their wakes to Neenah.

Many skilful exhibitions of sheer nerve and raw courage occur during a race of this sort. For instance, Al "Squibby" Heinrich, the West Allis, Wisconsin, pilot drove more than half of the course holding on to his auxiliary gas tank, with the top off. Every time the boat bounced, and he met five foot waves going and coming on the treacherous course, he received a gasoline facial. He finished the course, but passed out from exhaustion and gas fumes the moment he left his rig.

Little Marlyn Donaldson, the plucky Dayton, O. 13-year-old, and only female in the race, was thrown from her rig three times during the race. Each time she got back in, bailed out, and kept on going. She wound up Class A champion.

Many other drivers were not as lucky, and the list of those who dropped out reached an amazing mark before the Marathon was half over.

The Sentinel Marathon is co-sponsored by the Milwaukee Sentinel and the Neenah-Menasha Chamber of Commerce. Registration, promotion, publicity, and such arrangements are the Sentinel's responsibility.

The Chamber of Commerce, working with the city official and police department of Neenah, set up the course and facilities at Riverside Park, Neenah, site of the race start and finish. The Marathon is conducted by the Wisconsin Stock Utility Outboard Racing Association and sanctioned by the American Power Boat Association.

Facilities at Neenah are excellent. Drivers have plenty of room to work on their rigs. Motor service and repair trucks are pulled into the pit area, and launching a boat is comparatively simple.

Special pains are taken so that drivers enjoy their stay in Neenah. The Chamber of Commerce finds hotel and motel accommodations for them and their families. A big party, including free lunch, soft drinks, and a display of prizes and trophies is held the night before the race for drivers, pit crews, and relatives.

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INBOARD RUNABOUTS

WHAT TO LOOK FOR WHEN BUYING A SECOND-HAND BOAT AND WHAT IS LIKELY TO GIVE YOU THE MOST TROUBLE IN RECONDITIONING IT. . . .

FOR the boating fan interested in active racing competition, who prefers sit-down driving to kneeling in the outboard hydro style, inboards should get the nod. According to pocketbook and intestinal investiture, inboards can be had with speeds from 45 to 160 m.p.h. at prices ranging from $600 to $200,000. So, as the talented talkers of the carnys say, "you pays your money and takes your choice." In the more moderately priced field, toward the lower end of the peak speed bracket, are the racing inboard runabouts.

Competition in the inboard classes is keen. Regattas are plentiful and don't think 45 to 70 m.p.h. on water is for sissys. The sensation of speed is multiplied many times over land and air speeds. Nerve and skill are as important winning factors in runabout races as hull design and engine tune-up. But a combination of all four wins races.

At one time or another during the past five years Pop Glazier-designed-and-built racing inboard runabouts have held practically every record in the books. In each class two official records are recognized—the one-mile straightaway and the five-mile competition marks.

Class A racing runabouts for 100 c.i. engines no longer is an active class, but Bombita, a Glazier-built hull was the last record holder at 47.629 m.p.h.

At present the most active runabout classes are Class B, with engines to 136 c.i.; Class C, up to 175 c.i.; Class D, to 222 c.i.; and Class E, to 350 c.i.—top maximum displacement.

The hull of a racing runabout is of the monoplane displacement design. This means the hull, when waterborne and at rest with full equipment and driver aboard, may not be interrupted in bottom design longitudinally or transversely by any step, break, hydrofoil or other device that would present a multiple planing surface. Lapstrake (i.e. clinker built) or its reverse may be utilized if the underwater laps are approximately parallel to the fore and aft centerline of the hull and the laps not deeper than ¾" and edges rounded at least one-half the depth of the laps. Fins, non-trip chines not rising less than three inches every 12 inches (Glazier hulls do not have non-trips) are permitted and the section where the non-trip meets the bottom may be squared or rounded.

Hull restrictions with measurements given for the waterline of the boat at rest but fully loaded are as follows. Class B requires a minimum of 15′ length and minimum beam

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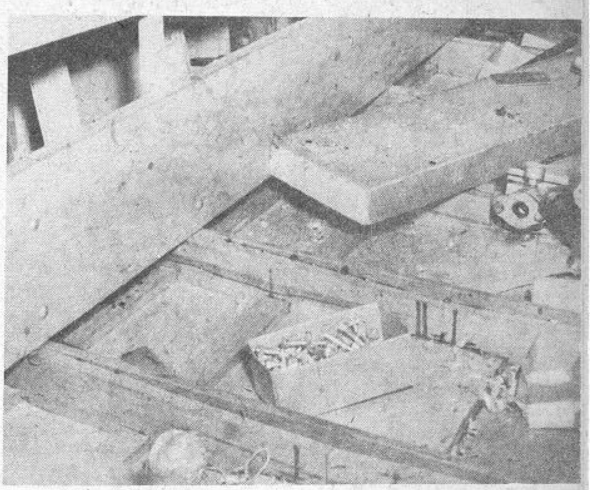
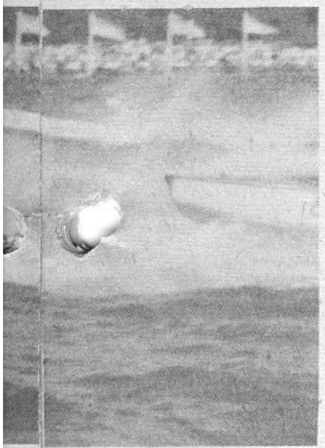
(Above) Pop Glazer's sons, John and Jerry, putting finishing touches on a new Class E racing inboard runabout, Sunny Bee II. Complete hull, less engine, cost $1,300. The super-modern, streamlined aluminum deck would cost up to $1,500.

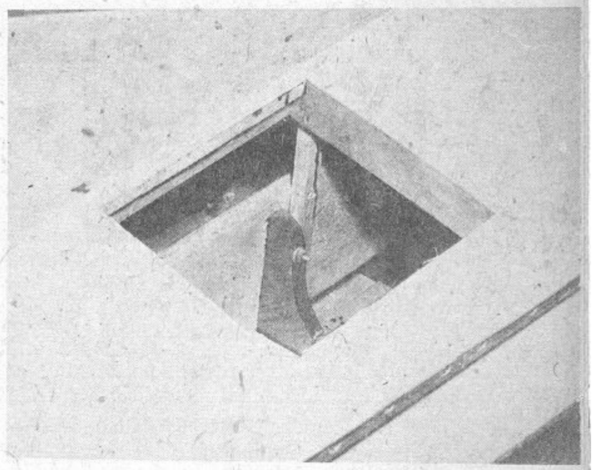


(Above) Engine stringers are of vital importance to strength of a racing boat. Stringers should always be bolted and not fastened only by screws.

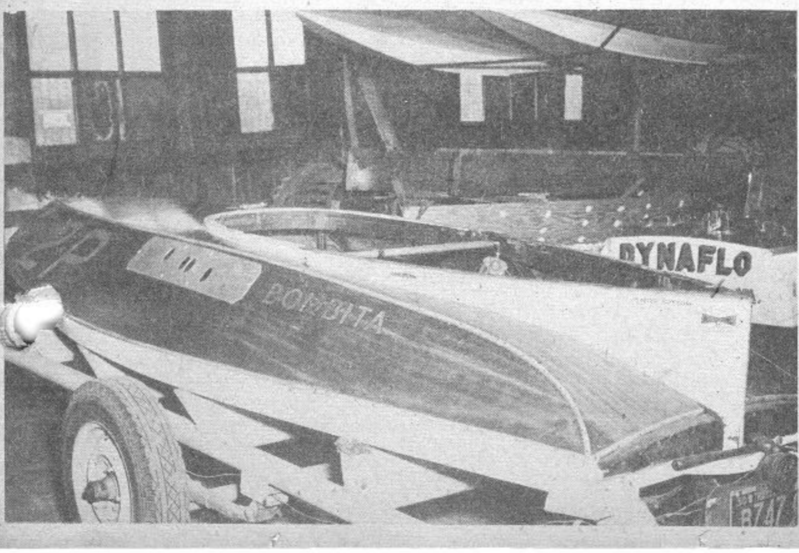


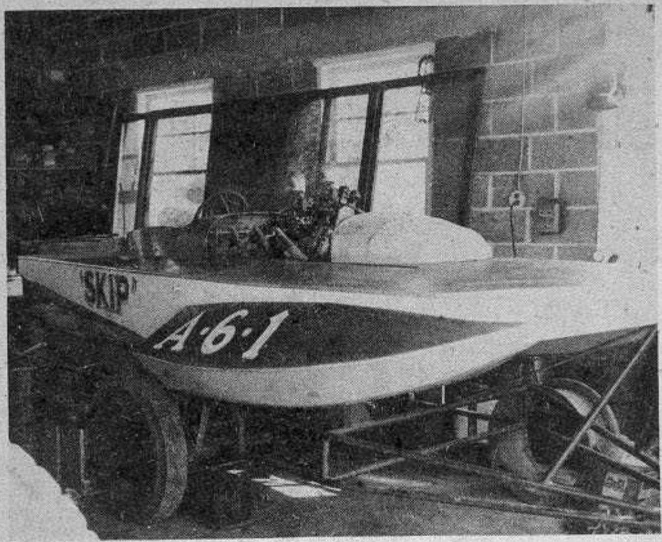
A group of Class F Service Runabouts offering the spectators real bounding action at Presidents Cup Regatta, Washington, D.C. Service inboard runabouts must carry at least two persons in competition. The letter M following number indicates boats are Class F which permits a c.i. piston displacement of 370 c.i. maximum.

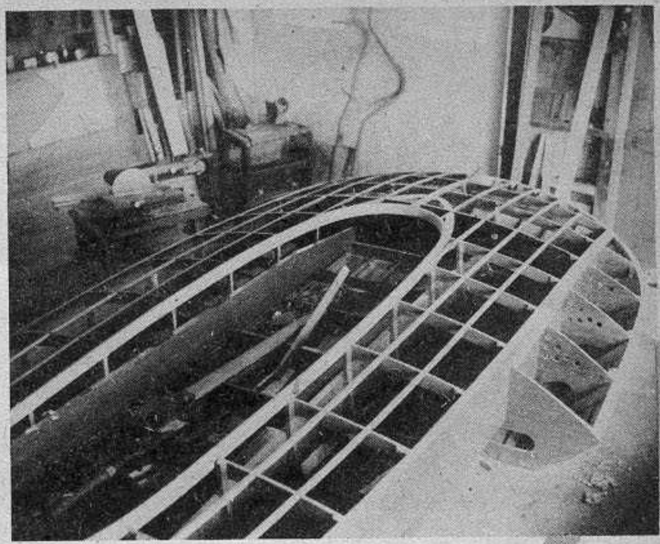
(Below) In buying a secondhand boat an important feature to check is the type of construction used on the knees. Darker border on knee is plywood lamination.



(Below) Bombita, Class A racing inboard runabout, world's record holder at a hot 47.629 m.p.h. Shown undergoing repairs and conversion to a larger class. At time she established record Bombita was powered by a 100 c.i. Gray.

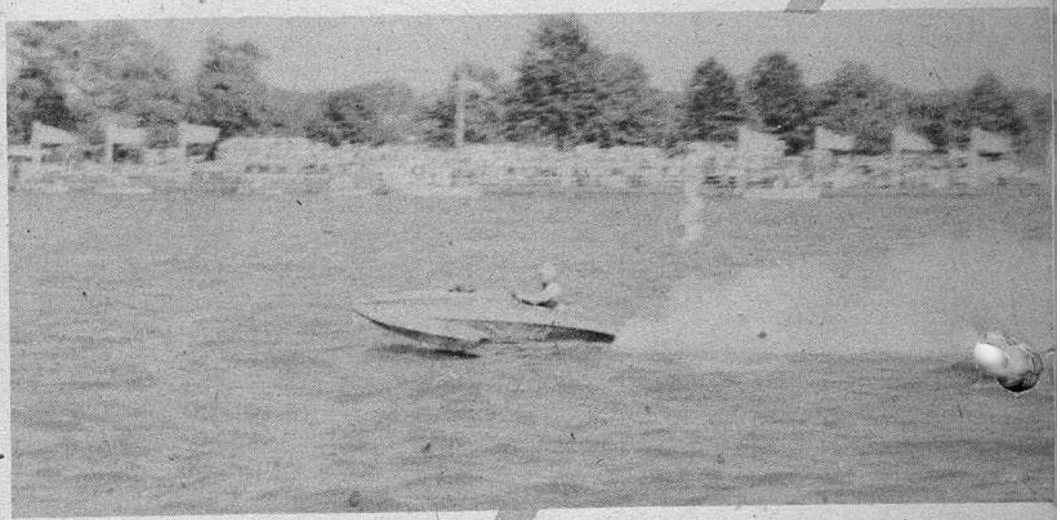






(Above)
Partially completed 135 c.i. hull. Note here how the sponsons permit entry of water when boat slows or is at rest. The forward motion of the boat siphons off water in sponsons. This hull is complete except for ⅛ in. mahogany plywood decking which will offer strength as well as watertight integrity. A halved and longitudinally split aircraft belly tank will be utilized as an engine cowl. Motor is mounted on used brackets to fore-and-aft stringers. (See text for the full details)

(Above, right)
A-61 varies from Champion blueprints only in added one half inch planing angle to rear of sponsons to alter angle of attack of forward planing surfaces. In hauling a speedboat, adequate support is essential so that it will not lose the designed shape. Even slight distortions to the planing surfaces caused by improper support may result in considerable loss in top speed.



Modified Ford V-8 60 gives 135 cubic inch hydros power-packed action at close to 100 m.p.h. clip.

DURING the past year speedboating, both inboard and outboard, has made tremendous strides. The most startling performance was Chicago Jack Maypole's astonishing unofficial Class D outboard hydro mark of 70.88 m.p.h. two-way average over a measured mile. Maypole's fastest mile run was at 72 m.p.h., just short of phenomenal when you consider the power plant was a four-in-line alternate firing modified Mercury 25, slightly under 40 cu. in. piston displacement.

The runs were made in a Class C 3-point hydro of Swift design. The engine was altered from stock by the substitution of a Quicksilver lower unit (small, well-designed, streamlined 1-1 gear ratio torpedo unit), open muffler, and a replacement heavy steel flywheel, plus altered fuel lines and carburetor jets for alcohol-blend fuel.

Paul Sawyer, Jr., one-time outboard hydro star with his fleet of Sunny Girl boats, is the first non-Gold Cup class driver member of the exclusive 100-Mile an Hour Club. The club is open only to speedboat drivers who have topped 100 m.h.p. in approved mile trials or competition. Sawyer Division I, 225 cu. in. hydro, Alter Ego, was clocked over a mile run on Salton Sea at 115.045 m.p.h. to officially break the 100 m.p.h. mark for the first time in a boat other than an unlimited job. The Sawyer boat is a Hallett designed three pointer, i.e., two planing sponsons forward and one aft, but like all the recent record breakers, Alter Ego is a prop rider meaning that she barely touches the water at the stern and maintains water contact with prop alone. Although the class is termed 225, it is divided into two competitive divisions, I and II, with division I permitting an engine of up to 266 cu. in. displacement. Clay Smith, the Long Beach, Calif., mechanic who set up the Grant Piston Ring Special in which Walt Faulkner clocked a new Indianapolis one-lap record of 136.013 m.p.h., built up Sawyer's modified Ford which on its fastest run hit better than 117 m.p.h.

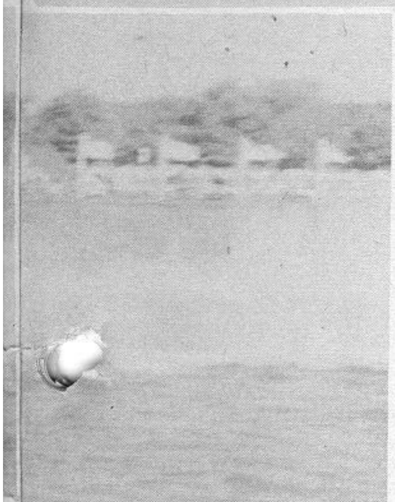
In the East Bob Rowland of South Norfolk, Virginia, with a combination Lauterbach three-pointer, full-race Merc. and Rowland (ex-outboard hydro star) skill at the helm, made an enviable record of wins all season to hit his high point at New Martinsville, W. Virginia on September 9, 1951, when he established a new world's five-mile competition mark in his boat *You All.* He then averaged 83.488 m.p.h. for the distance to lead home Phil Rothenbusch, Cincinnati, Ohio, in second spot and Gib Bradfield, Barnesville, Ohio, who ran third.

Two other inboard sensations were Stanley Sayres' performance in Slo-Mo-Shun IV, in which he set a new world's one-mile mark for unlimited hydros at 160.323 m.p.h. Later, in defense of the Harmsworth Trophy, this same 28½-foot, aerodynamically-designed hydroplane driven by Ted Jones, her designer, won the Gold Cup Race and turned in a new 90 mile average mark of 78.216 m.p.h. in competition. Lou Fageol then helmed the Slo to Harmsworth victory and set a scorching 40 mile closed-course mark of 100.181 m.p.h.

On August 12, 1951 at Seattle, Washington, in winning the second heat of the Seafair Trophy Race on a five nautical mile course, *Slo-Mo-Shun IV*, piloted by Lou Fageol, Cuya-

HURRY UP HULLS!

GOOD BASIC DESIGN, CONSTRUCTION, MAINTENANCE ARE FACTORS THAT WIN ON WATER.



hoga Falls, Ohio, set a new world's competitive mark for unlimited inboard hydroplanes with a 111.742 m.p.h. average. Ted Jones, designer of *Slo IV*, racing in his latest designed inboard *Slo-Mo-Shun* V scored two firsts and a second to win the Trophy giving the *Slo's* owner Stan Sayres of the Seattle Yacht Club a new record with the IV and a trophy with the V in competition with nine of the country's top unlimited behemoths of the waterways.

Much of Slo-Mo-Shun's success is attributed to its surface propeller. With this type design the propeller blade only, not the shaft and hub, enters the water. A fully immersed wheel of the conventional type has approximately 30 to 50 percent slip dependent upon angle of attack, design of shaft struts and other factors. This means that with a propeller of 24" pitch only a fraction of the pitch is effective. While theoretically operating in the fashion of a screw the 24" pitch prop should advance the boat 24" with each prop revolution, it does in fact advance only 12 to 18 inches. The "Hi" Johnson designed surface propeller on Slo-Mo-Shun is reportedly far more efficient and in actuality added 26 m.p.h. to Slo's peak speed in early tests.

The greatest relative record jump was that turned in by Lou Meyer, Jr., son of the famed "500" driver, who upped the 48 cu. in. hydroplane record from the old mark of 59.995 m.p.h. set by W. W. Scott in his Ballerina II to 71.85 m.p.h. in Lou Kay, a Crosley-powered job. Lou Kay's record adds another token of respect for the tiny 45 cu. in. Crosley conversion.

For the newcomer to inboarding who wants top speed in a highly competitive class, the 135 cu. in. class is suggested for anyone not afraid of average speeds above 70 m.p.h. (the record for 5 miles in competition is 75.157 held by Roy Skaggs in Mighty Chevron).

The one-mile straightway record for this class is 97.350 m.p.h. held by Sid Street in his homemade Ford-powered Gee Whiz.

Any converted automobile engine (excluding overhead valve and supercharged installations) of not over 136 cubic inches piston displacement can be used. Ford V-8 60s are the most popular engine and with midget auto racing what it is nowadays, an already modified V-8 60 can be had readily and in good condition for as little as $150 and up. The hull, three-point suspension design, is nearly universal and can be home built for under $300, including hardware.

Boats competing in the class must be a minimum length of 13 feet 6 inches and must be equipped with at least one water-tight bulkhead.

Actually a maximum price limit of $1,000 is established by APBA rules for motor and all modification parts. The boat A61, pictured herewith, is a typical home-built 135 cu. in. Its owner, Ardson Bozarth of Vineland, N. J., is a newcomer to speedboating. The A61 represented his first inboard. It was built from Champion blue prints, oak framed and covered with birch plywood. The power plant is a Ford V-8 60 with dual Ford 97 carbs, Edelbrock manifold, Edel-

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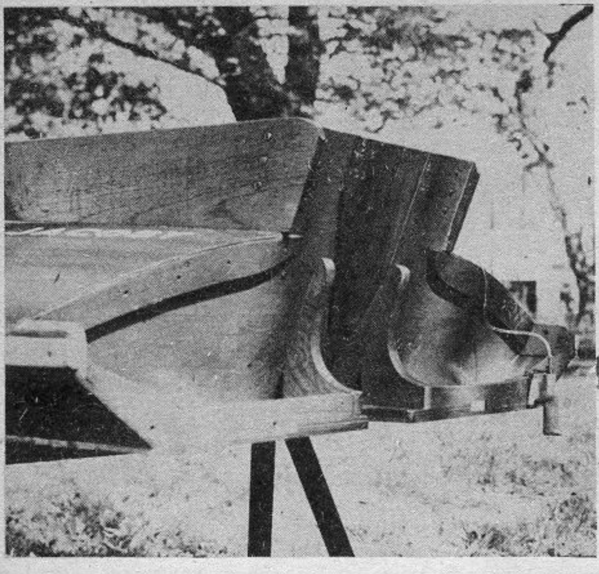


Water disturbance will not effect reading with a Pitot tube well out on edge of the bottom plane.

Maizie Rogers, Silver Spring, Md. woman Class A and B hydro racer leads Ed VanHouten of Kearney, N. J. in a fast and breathtaking turn.

TESTING an outboard speedboat properly may mean the difference between races won and lost. Haphazard testing by contrast is of little or no value. For the driver who is content just to run at the rear of the pack, all that is necessary is to hang the motor on the stern of the boat, pull the starting rope and if she goes, that's it. But for the racer who has visions of copping first place, exhaustive tests can be invaluable in gaining the few miles an hour that make the final difference between a race won and an also-ran.

Although the speed checking information concerns racing outboard motors and boats, much of this same data can be applied to service equipment.

Once an engine is newly setup, it must be run in before it is raced if the owner wants to be sure he won't stick the engine in competition. The simplest way to break in a new engine is to run it in a tank. A test tank that will serve adequately can be made of scrap lumber. No set dimensions are required.

An open topped box 4' high, 4' wide and 6' long is suitable. A garden hose will serve as the source of water supply with several filled buckets to maintain the level. When the engine, complete with lower unit is hung into the tank, the tank level (i.e. the height of water on drive shaft housing) should be the same, or nearly that, of the engine when running in your boat. For an A engine, which for illustrative purposes was used in this article, the water level should be 11½" below the top of the tank, or about 1½" above the anti-cavitation plate.

Several methods may be used to keep the water level stable. One is to cut an overflow slot at the desired level and add water by bucket or hose if any splashes or leaks from the tank. A control must be used. To cool the engine during break in, water must be kept flowing through the engine. While most service engines, with a test wheel will pump and dispel water, on racing models KR-SR or PR, a special water cooling set-up must be created. As the cooling will come from an outside source, an overflow, or scavenge valve, must be used to get rid of the excess water. This is a simple matter that can best be worked out by the individual for his own installation.

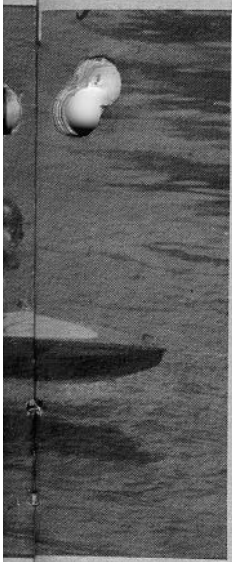
Two-inch square strips nailed parallel and at the desired water level on either end of the tank can be used to support anti-splash planks to create a cover at water level and offset splashing loss.

Never tank-run an engine with a standard racing or service propeller, nor without adequate preparation for water cooling. For any of the Class A, B or C racing engines, disconnect water leads at the lower end near the bottom of the drive shaft housing and connect a garden hose, clamping it securely with a hose clamp. Since a standard design propeller will merely create an air pocket in the tank and permit the prop to cavitate, a test wheel must be used. Such wheels are obtainable from the engine manufacturer at about $15 and will last indefinitely.

A new engine setup should be broken in on a rich fuel mixture. If you buy a standard prepared racing fuel add a pint of castor oil to each five gallon container to be sure of plenty of lubrication. At the time of starting the engine be prepared to open hose flow for cooling immediately after the engine starts. However, start the engine without the flow of water as otherwise it may prove difficult to fire the cold power head. Run the engine in for at least one full hour at slow speed, 2,500 to 3,500 r.p.m., before opening it up. During the break-in period, check the cylinders and heads by hand periodically to be sure the engine is running cool.

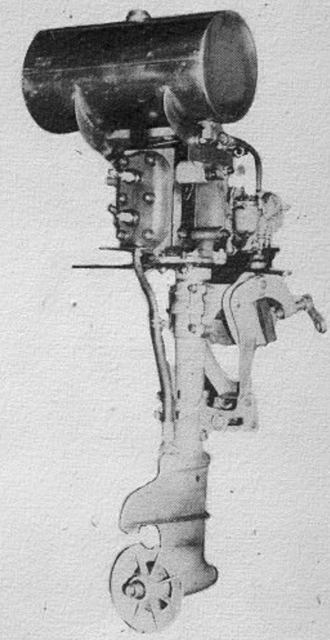
Of great value in tank testing is a tachometer which is of considerably less help in underway tests. Relative merits of varying fuel formulas can only be accurately checked in a test tank with a tachometer. The tachometer pictured in tank tests here is made by Jones Motrola of Stamford, Conn. It has a range of 50 to 50,000 r.p.m. and costs $77.50. Actually range up to 7,000 is all that is needed and accurate ones can be bought for less than $40.

Remember, the tank test is relative and a tachometer is the only gauge used for such testing. Once the engine is well run in you may open it up for brief periods to check ignition



OUTBOARD TRY-OUTS

ENGINE RUN-IN IN TEST TANK IS IMPERATIVE TO AVOID POSSIBLE "STICK" DURING COMPETITION — PRACTICE RUNS PROVIDE CLUES TO BEST PERFORMANCE . . . . .



A specially designed wheel must be used in place of usual two-blade racing propeller for tank testing.

timing and fuels. After you have checked a couple of engine setups, you will soon recognize when you have a hot one or that is just mediocre. The final 50 and 100 r.p.m. differences in engines are the added extras in speed that give one engine an edge over another. Keep records of tank tests.

Once the engine is tank-run-in you are ready for boat tests. Important! Plenty important. One top eastern driver had been playing with different powerhead setups all winter. Each test was a disappointment with his water speedometer reading consistently two to four miles slower than his engine clocked the year before. Finally after two different sets of pistons and a grind, an overall investment of nearly $50, plenty of wasted labor and worry that his hop-up touch was slipping, he decided to check the bottom of his boat. That's when he discovered a planing surface hook at the stern that was costing him nearly 4 m.p.h.

Before wetting your boat, give it a thorough check to be certain it hasn't warped or taken a set since it was last used. Establish a basic engine angle and then begin tests.

A water speedometer and a stop watch are musts. No driver, regardless of his experience, can guess the slight change in his boat speed that minor variations in engine angle, transom height and different propellers will offer.

The marine speedometer consists of a Pitot tube, a small streamlined device with a small forward opening that scoops water in and forces it under pressure through a flexible tube to a pressure gauge calibrated in m.p.h. Such equipment complete is available for about $15 and up, dependent upon speed range. Buy the type best suited for your own racing outfit's peak speed. For the Evinrude Midget racer a 5-45 m.p.h. speedometer is suitable. For the A driver, a minimum peak of 50 m.p.h. is needed; B, C and F drivers will be better off with one with a speed range of 25-70 m.p.h.

Don't worry too much about the calibrated accuracy of the speedometer as for testing purposes you are interested only in determining what combination of engine settings, propellers, transom heights and engine angles give you the top reading. An A driver of my acquaintance does a good job of testing with a steam gauge he has rigged to serve as a speedometer. He quickly learned whether one pitch and diameter prop gave him more pressure, i.e. greater speed over the water, than another and that is his real interest. The only accurate peak speed measurement is the average of a two direction run over a measured mile.

Now for actual boat checking. Keep an accurate record in a note book. For each day's test, make note of wind velocity, condition of the water's surface, type of fuel being used, needle valve setting. Establish one needle setting and keep this standard for the entire test period and use one fuel formula only.

Two buoys on test location will be of added value and should be anchored approximately a hundred yards apart. In your note book list the following headings: propeller designer (i.e. Michigan, Stannus, Johnson or whatever it may be), pitch, diameter, engine height on transom (this to be varied by using a supply of ⅛" and ¼" wood shims), engine angle (distance in inches of inner edge of shaft housing in inches), peak speed, number of seconds from 25 m.p.h. to peak speed, and acceleration run between buoys.

Remember that although one propeller may give you higher peak speed, another may give greater acceleration.

Each boat, each motor and each driver combination will present a different set of factors. You should know all of these factors for your own outfit. With the speedometer, and using the speedometer in conjunction with a stop watch, you can learn in what location in the cockpit you attain greatest acceleration and in what location you can reach maximum speed. Dependent on these findings will be your own driving style.

In checking props, check all wheels, one after the other with one transom and angle setting. Then repeat the process with the same angle and a different transom height. After checking all transom heights you consider reasonable then go through the same process with variations of engine angle. You will wind up with at least two dozen combinations all

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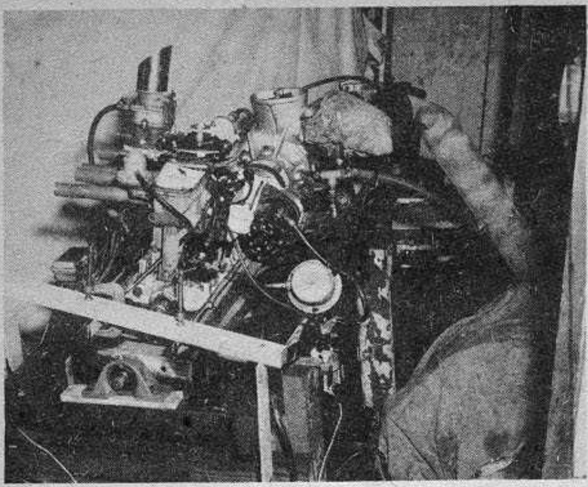
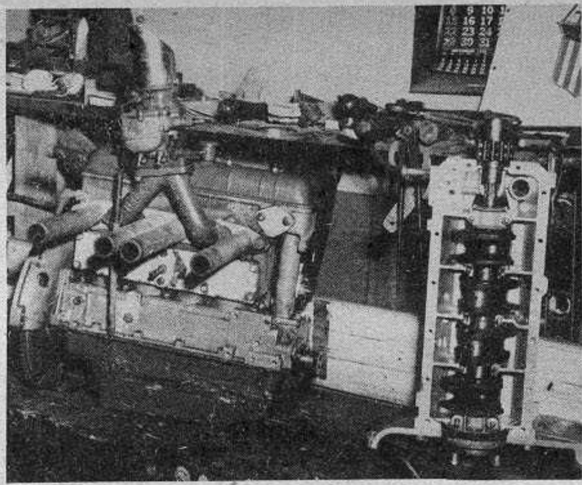
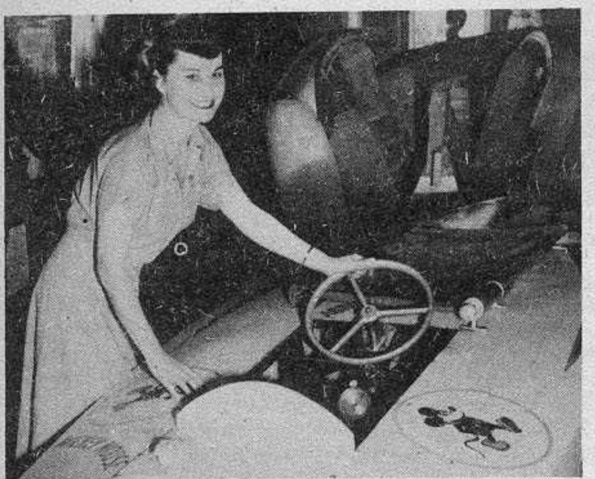




Scull's unique home-designed dynamometer for tests. Parts from Navy 500-type firefighting pump at flywheel create working load.

48 cu.in. crankcase chain coupling in position on crankshaft. Fuel pump has been removed from engine and blocked off as shown.



Ruby Scull's 48 c.i. runabout Mickey Mouse boasts a driver's seat. The majority of those who race in the 48's ride on their knees.

(Above) Speedboating's standout woman driver for 1950 was Mrs. Ruby Scull, world's record holder for one-mile speed runs.

(Below) Ruby Scull beat Bob McAllister to finish line in Florida, Feb. 1950, in her 48 c.i. runabout, Mickey Mouse. Just as we go to press with *Boat Sport*, word comes that on Feb. 18th she set new one mile world's record at Biscayne Bay Regatta, Miami Beach, for 48 runabouts at sizzling 59.571 m.p.h.

48's—THAT SCINTILLATE!

ECONOMY-SIZED, CROSLEY POWERED HYDROS AND RUNABOUTS PACK THRILLS APLENTY WHEN PROPERLY SOUPED

C. Mulford Scull, veteran outboard hydro driver and perennial winner, in his prop-riding 48 cu. in. hydro. After 16 years of front rank driving, he retired from outboards in 1939. In 1948 he returned in speedy inboard hydro competition.

LEAST expensive to set up and cheapest to maintain of the inboard racing boats are the 48s, runabouts and hydroplanes. These two post-war classes have made rapid strides in contestant popularity and are providing some of the most exciting speedboating competition.

Currently the Crosley engine has the nod from the bulk of the 48 cubic inch fraternity but some experimentation is being done with motorcycle engine conversions. Both the runabouts and hydroplanes must be a minimum of nine feet overall length with a minimum beam restriction for the runabouts of four feet (no beam limit on hydros).

The 48s were established with the idea of promoting a class of inboard runabouts and hydros of low initial, operational and maintenance cost. The class has caught-on as is evidenced by the APBA registry of more than 100 of these tiny high-speed water skippers in 1951 and an estimated number nearly double that this coming season.

The 48 cubic inchers definitely are not boats for the rocking chair skippers. They're action packed and inch for inch, in comparsion to the larger inboard racing classes, the 48s load plenty of punch. A look at the record proves this. Pete Pierce, San Gabriel, Cal., in his Tinker Toy, a Crosley-powered 48 hydro, made a two direction run over a measured mile course at Salton Sea at an average of 79.330 m.p.h. The runabouts with their monoplane design, more wetted surface and greater drag are naturally somewhat slower but mile-record-holder Ruby Scull of Ventnor, N. J., clocked 53.258 in her boat Mickey Mouse and that's scarcely an anchor-dragging speed.

The Crosleys wrapped in the tiny plywood packages are exceptionally efficient. The 91 cu. in. inboard hydro record for five miles in competition is 53.989 m.p.h. But the 48 cu. in. record tops the 91s with 61.771 m.p.h. mark established by Lou Sonny Meyer, Jr., in his Hallett-built hull. Not bad for an outfit pushed by hardly more than half the displacement of the 91.

Bob McAllister in his Yankee Boy, a Scull-built hull, Crosley powered, averaged a neat 50.920 m.p.h. at Red Bank, N. J., August, 1951 over a five-mile course with competition as thick as flies.

At present the 48 cu. in. class places restrictions on modifications of the engines so that no great amount of reworking or expense is required to alter a stock Crosley engine to a fine competition marine product.

Currently the rules state flatly "the cost of the power plant complete as installed including all extras and permissible modifications shall not exceed $350."

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SPEEDBOATING ROUNDUP

(*Continued from Page* 7)

Brute horsepower vs. weight was the success formula for Miss America's speed.

Contrast Miss America X to Paul Sawyer's 266 cubic inch prop-riding Alter Ego with which Sawyer established a new five-mile competition mark of 87.890 m.p.h. and recently at Salton Sea., Calif., drove to a new one-mile record for the class at an average of 120.085 m.p.h. Sawyer's boat measures only 16½ feet by contrast to Gar Wood's 38 foot long monster. A power comparison is even more striking as Sawyer's shingle was pushed by a 230 h.p. engine, yet peak speed of the two craft varied by less than 5 m.p.h. (Wood's 1932 record speed was 124.915 m.p.h.)

Clay Smith, one of the country's outstanding speed mechanics, is credited with the work on Sawyer's motor, but Rich Hallett, the hull designer has created a boat that made Smith's engine finesse show to its greatest advantage.

The bottom of inboard racing hull designs, knowledge of shaft attack angles, the application of the Hi Johnson type propeller, have all been developed well, but streamlining is still largely neglected in American-styled speedboats. Most boat owners are satisfied with a sleek auto-race car type superstructure which may be efficient in the 60 m.p.h. zone but still does not represent good superstructure design for 100 m.p.h. plus zones.

During 1952 it is reasonable to expect that the 100 m.p.h. barrier will be cracked by 135 c.i. hydros. The present mark is held by Chuck Powell of Monterey Park, Calif., at 97.494 m.p.h. in the boat Keeno, owned by John Kirby.

The tiny 48s can be expected to top 80 during the coming season. Lou Sonny Meyer, Jr.'s former record-holding Lou Kay has been unseated from the throne and replaced by Tinker Toy with a mark of 79.330 and helmed by Pete Pierce of San Gabriel, Calif. Lou will be hot after the record again and Pete and the rest of the Crosley stalwarts will try to keep the 48 mark for themselves. These smallest of the inboard hydroplanes have developed into a terrific competition class and already have astounded the fans by bumping up their records from under 50 per to nearly 80 in less than three years of recognition as a competitive class.

By the close of 1951 a flock of new records moved onto the boards. Mully Scull's 48 c.i. hydro competition mark of 58.121 m.p.h. lasted only slightly longer than his one-mile straightaway record of 72.727 m.p.h. for the class. Pete Pierce, as already stated, grabbed the straightaway title and Lou Meyer, Jr. scrambled back into the record books with a scorching 61.771 in five mile competition.

The high bouncing, wild riding Cracker Box class was taken over by Ed Brown, another Californian with a 72.054 mark for the mile trap. Paul Terheggen, Lynwood, Calif., clocked a 74.572 m.p.h. speed for the mile in his Class E racing runabout but had his crown copped by a mark of 75.558 m.p.h. established by Sam Griffith, Miami, at his hometown Orange Bowl Regatta on the last day of 1951.

The new stock outboards have also given the 1952 competitors something to shoot for. Another newcomer to the record ranks, one-mile trial holder for stock outboards in Class AU, J. H. Moesley, Fort Lauderdale, Fla., racked up a plenty fast 46.916 m.p.h. and Elgin Gates of Seattle, Washington, who has long been prominient in outboarding circles, set a stock outboard mile record for BU at 47.462 m.p.h. early in July of last year. Two days before the New Year at Miami Beach, Florida, Jim Coulborn of Burlington, N. J., bounced around the Bakers Haulover course at an average speed of 41.171 m.p.h. to set a new competition record for a BU.

48's—THAT SCINTILLATE

(*Continued from Page* 27)

In actual practice it is highly dubious if all competitors comply with this rule any more than it was possible for outboarders to keep under their ceiling prices when as late as 1949 the APBA rules called for a maximum tag of $300 for a Class A motor when beaten-up dogs sold for $350 and a going iron was bringing as high as $750.

Ruby Scull, the mile runabout titleholder, and her husband, C. Mulford Scull, have been very cooperative in offering advice to the newcomer to the class. Ruby established three new mile-record marks for the class in 1950. She won seven first places and 11 second spots in 28 open racing events as well as winning the 1950 women's 48 Runabout Nationals. By turning in this performance in her first year in speedboat competition, she was among the exclusive group of 15 drivers of all classes elected to the 1950 Marine Hall of Fame sponsored annually by Gulf Oil Corp.

Mul Scull is a nationally recognized speedboating veteran. From 1923 to 1931 Scull was unbeaten in Class C outboard hydro competition. During his long career in boating Scull won more than 300 trophies including a two-time capture of the Lipton Trophy. Of all his victories Mul thinks highest of the Lorimer Cup he copped in 1929 at Merit Lake, Cal. That year 28 other Easterners joined Mul in the westward trek to try their skill against the best in the West.

"There was quite a feeling of antagonism between the drivers from the two sections of the country in those days," Mul recalls. "In fact, in order to be ready for a free-for-all tangle after the races on the final day of the regatta the Easterners wore black arm bands on their sleeves so that in the expected fracas we wouldn't accidentally slug some friend."

Scull believes that he's raced on practically every river, lake and salt water course in the country at some time or another. In 1939, his last outboard race sent him to the hospital for a long stretch. He decided to retire from racing, but in 1948 the bug hit him again and he returned in a 135 cu. in. hydro. After several fair seasons of competiion in 135, Mul has decided to concentrate on a single class in the family. So in 1952 he and his titleholding wife are behind the wheels of 48s.

Mul prefers the hydros and his Shooting Star follows the trend toward prop riders. Ruby is sticking to runabouts and in Mickey Mouse she is always a good bet for a front rank finish at any regatta.

Scull has proved his ability to set up a Crosley so it will move plenty quick. He built the hull and did the original engine work not only on his wife's one-mile record holder but also on Bob McAllister's Yankee Boy, the five-mile competition titleholder and 1950-1951 National 48 Runabout Champion. In fact at one 1950 regatta Scull hulls and engines were in the first five money spots in two straight heats.

In August of 1951, Mul Scull predicted prior to the start of the big events at Red Bank, N. J., that he would break the world's competition record. In the first heat of 48 cu. in. hydros Mul finished a rather poor third and his pre-race statement might, to those who didn't know Mul's background in racing, have sounded like idle bragging.

But in the next heat, with *Shooting Star* properly tuned, Mul skipped over the roughed up Navesink River to a new competition record of 58.121 m.p.h.

In 1951 the 48s were moving plenty fast and Mul's record remained in the books just short of three months for on November 11, 1951, Lou Meyer, Jr. (son of the former big-car racing star of Indianapolis fame) drove his *Lou Kay* to the present 61.771 m.p.h. average in competition at Salton Sea, California.

Scull took his dethroning as a matter of course but during the winter you can bet your favorite prop Mul has been working his *Shooting Star* back into titleholding form.

Mul explains that although the class is for engines of maximum 48 cu. in. displacement the stock Crosley is only 44 cu. in. An exception is the Peek Wildcat, an engine basically Crosley with an APBA accepted crank that offers close to the 48 cu. in. limit.

The stripped engine, i.e., the Crosley, less carburetor, manifolds, starter, battery, costs approximately $225. Practically every type carburetor has been tried on the 48s for marine use. Scull's

BUILDING UP A "CLASS" RACING ENGINE—PT. I

(*Continued from Page* 11)

This means you can expect to salvage a minimum of $191 worth of parts from a Handybilly. To complete your entire engine you can expect to spend about $250 for additional parts. If you can pick up a Handybilly for $50 or less, the cost of your Class A engine parts will run to $300 or under.

The starting point is the crankcase. Measure the inside diameter of the case at the center bronze seal. It should be 3.0625", plus or minus, .0005". Next, check the crankshaft diameter at the largest diameter section, i.e. the rotor, which should be 3.058", with a minus tolerance only of .0005".

Should your case be a used one and you find the clearance between crank and crankcase seal is over .006", your first alteration is called for.

To cut down this clearance to a desirable .003", or less, (to get good case compression) you must build up the center seal. Check crank clearance by inserting crank, putting on crankcase cap bearing assembly and inserting a feeler gauge between rotor and seal.

To build up the seal use ordinary 50-50 solder and flow in .005" to .010" thick covering entire bronze seal surface. Next, line bore the new seal with final shaft seal clearance of .003" maximum in mind. Remember this gives only a 0015" clearance when engine is operating.

A screw-cutting type, modeler's bench lathe, is, I'd say, quite adequate for the job. A piece of bronze 1.375" diameter shafting 12" long will serve as the boring bar. This is a standard diameter shaft which can be obtained from any marine supply house. Drill boring bar at approximate location and be doubly sure you set in cutting tool at proper depth, i.e. extend from bar 1.683". Then cut out seal. The use of high grade babbit instead of 50-50 solder is not necessary as the center seal is not designed as a bearing. If, when the case is assembled, the crank touches the center seal, the case just isn't properly set up.

Next, in the bottom of the case you will find a steel bearing race of 1.378" diameter. In the standard Handybilly set up from top of the steel race down, there is a roller bearing, then a bronze seal and another set of ¼" rollers. Standard practice is to replace the top rollers with an LS-9 ball bearing. This ball bearing has the proper inside diameter to take the .8745" shaft which should not vary over .0005. Another small machining job is required here to machine out a seat in bottom of the case for the LS-9 bearing.

After measuring the shaft thickness at the spot where lower rollers are located, if shaft is less than the factory .8745", oversize rollers are called for and can be obtained from outboard *racing parts* suppliers in diameters from the standard .250" up to .0050" oversize.

To figure what you need here, remember you want to arrive at an overall 1.3745" dimension. If shaft, instead of .8745" is worn to .8725", subtract the .8725" from 1.3745" and you arrive at .5020". Remember that any oversize set of rollers will fill up twice its own oversize dimension, so divide the .5020" in half and you get .2510" which is the size roller replacement you will require. A shaft requiring up to .2550" oversize or worn .010" is still useable with oversize bearings.

The cap bearings are replaced in the same manner with an LS-9 ball-bearing, replacing the lower cap roller and oversize rollers inserted for originals at top of cap, if necessary.

On the Handybilly case (see illustration) the intake throat on which the Tillotson carburetor installation will fit must be altered. Several methods can be used in building up an adaptor but the simplest is to use a section of brass pipe or aluminum tubing 15/16" outside diameter by 1¼" long and ⅛" thickness. Machine billy throat ½" into present throat for snug press fit. Cut away section of tube insert on inside that will obstruct fuel intake passage to right side of carburetor, drill ⅛" holes and tap threads or insert self-threading screws. Then with a handy grinder and a file, taper outer end of new throat inner surface so when carburetor is mounted there is no obstruction to flow of fuel.

Finally, after crank has been set up in case and cap tightened down, check end play of crank. End play of .005" is fine.

If shaft rotates freely in case, then you are ready to finish up the crankshaft. If the shaft, when rotated, drags against the center seal, then you must check the crank for alignment.

If the shaft, using three or more check points on either shaft pins (sections extending beyond the rotor) is out of line .0015" or more, it must be straightened as this will give a .003" misalignment in center seal. Although x-raying or magnafluxing of the shaft is advisable, a cheap home substitute method that will *usually* detect a fractured shaft is to attach a section of wire to threads at top of shaft, extend by hand so shaft hangs free except for the wire, and tap with a piece of metal. If the shaft doesn't ring with a tuning fork clarity then by all means have it x-rayed for fractures.

Assuming you have obtained a new, unaltered shaft, or a Handybilly shaft, you still have work to do. First, the section of the shaft that contains the two ports is your internal rotary valve. Those two ports carry the flow of fuel to the cylinders. Original factory machining is not hand finished and the ports are heart shaped because two cuts were taken without cleaning out the center of the ports.

Using the maximum width and maximum depth of the heart shaped ports as your overall limit guides, the ports should be cleaned up to permit a maximum and easy flow of gasses. Don't open up the ports beyond the maximum limits indicated above as you will gain nothing thereby and will run the risk of changing your port timing . . . and believe me there is nothing but grief waiting for you if you alter the port timing.

Now check the bottom pin. If it fits in the case so it doesn't extend beyond the bottom of the case and has been splined, i.e. has hole with a series of keyways cut in it, you are finished. If it is a Handybilly crank which has a longer bottom pin with a square end, you still have a little work. The simplest thing to do is send the crank to a specialist who is set up to alter, cut down and spline "billy" shafts. The job costs $10 and is worth it.

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BUILDING UP A "CLASS A" RACING ENGINE—PT. II

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and soap or a detergent powder makes a suitable cleaning agent.

There are dozens of commercially blended racing fuels on the market. These range in price from about $6 to $9.50 for a five gallon container. I prefer to mix my own fuel for two reasons: economy and consistency of blend. I have used EXOL with excellent results. However, another commercial blend caused excessive gumming. Another varied considerably in quality and quantity of lubricant from one batch to another and may have caused a crank bearing failure.

If you prefer to mix your own fuel, here is a simple formula that you can blend for under $3.50 per five gallons and yet incorporate top grade ingredients: 4 gallons methanol, 2 quarts benzol, 1½ quarts castor oil. Good grade castor in five gallon quantities costs less than $2.75 per gallon. Benzol retails at your local paint dealers for about $1.10 a gallon and methanol in 50 gallon lots will cost approximately 50 cents a gallon.

Shake all fuel mixtures (home or commercial blends) well just before using as the lubricant tends to separate.

What of additives? Sure, I know you've probably heard that the drivers use everything from camphor balls to ether to give them added hop. Actually they've tried everything in the book with concentration on such ingredients as nitro-benzole and nitro-methane. A word of caution! Stick to a good commercial fuel blend, or mix your own to a proved formula, and save yourself plenty of grief.

The guys who mix their own and get fancy with their formulas learn the hard way only after plenty of burned or stuck pistons and scored barrels. And they are also the boys who have really screaming outfits to begin with and are searching for that extra quarter of a mile an hour or less. Before you fool with additives to your fuel, get the rest of your engine up to snuff. Perfect balance and alignment will give you more added power than a medicine dropper full of some explosive that may give extra rpm's or it may blow the head right off the block.

Next item to procure is the cylinder block. The handybilly block is of the non-removable head type and is not suitable for racing purposes. In selecting a block you have two alternatives: to buy a new untried casting for $40 to $50 from a racing parts supplier or to try to locate a new or second hand original Johnson block. Your chance of finding a new, unused Johnson block is practically nil. Second hand proved blocks sell for anywhere from $20 to $150 dependent upon condition. A seasoned second hand block with a history of good performance is a better buy than a new untried block. If you track down a second hand block I suggest that you buy it subject to refund should it fail to pass a magnaflux test. The cost of magnafluxing a Class A block on current quotation of a specialist in this work is $5.

Inside diameter specs on the blocks call for a bore of 2⅛" and present rules permit as much as .020" oversize. Measure the bore for diameter and wear at the ports which if present will cause excessive ring chatter or breakage. Next check the intake ports which should measure 2-17/32" plus or minus .020" from the bottom face of block to top of the ports. If you plan to enlarge these ports (on a new block they will be approximately 13/32" high) you may increase them safely to 16/32", but be sure that any metal removed is taken away toward the crankcase end of the block so as not to change the port timing.

The next step is to inspect the cylinder bores for alignment. If they are within the .020" oversize tolerance and check within .0005" of being straight they are worth a test without grinding. Don't bother to have a new or untried used block chromed until after you give it an adequate test.

The answer to proper performance is a set of blocks that are precision ground and hold their shape while running at high rpm. Should you find that in testing the blocks under running condition that they walk, i.e. go out of shape when your engine starts to climb to peak rpm, and lose power, then your only alternative to try to salvage the block is to have it heat processed (neutralized). Neutralizing consists of bringing the blocks up to 800° Fahrenheit over a three hour period. Then the blocks are placed in pre-heated lime of a like temperature and permitted to cool gradually to 68° Fahrenheit over a twenty-four hour or longer period. Any reputable grinding and chroming specialist will do this job for about $5.

After heat processing a grind is necessary. Varying type grinding wheels are used. They range from V-1 to V-20. V-20 is the coarsest wheel and I recommend this for unchromed blocks. If the blocks, after grinding to an expected tolerance of .0002" are larger than the .020" oversize allowance, then you must have them chrome plated to bring them back within legal limits. Chroming is done for two purposes: to add thickness to cylinder walls to return them to legal dimensions and to offer a harder surface than the cast iron. For chromed blocks, a V-5 grind is recommended.

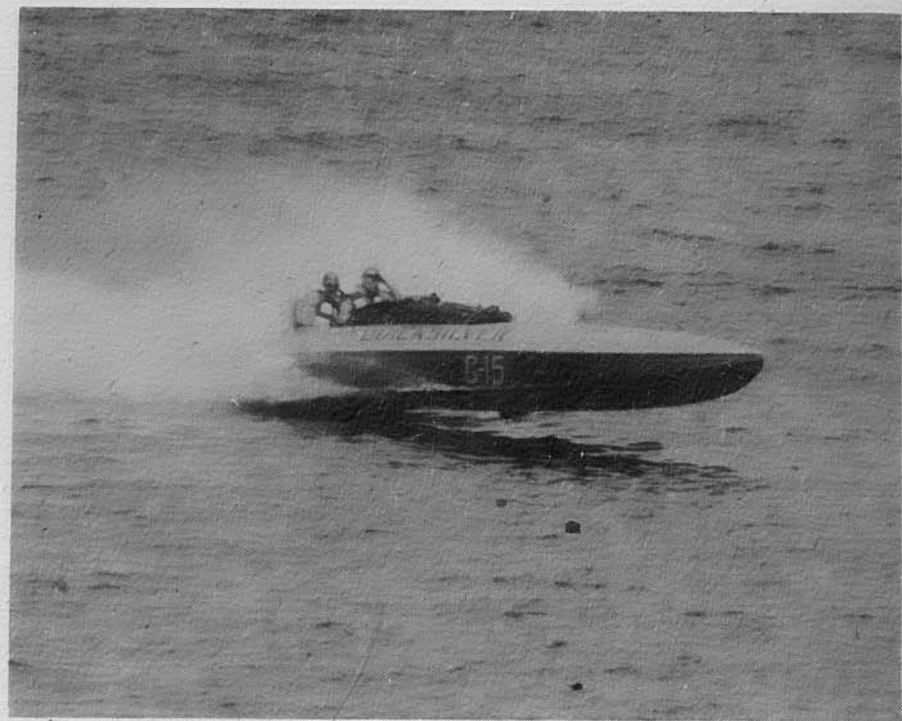
Remember that chroming blocks does not make them faster, but a chromed block having a harder surface resists ring wear and retains its shape longer.

Unchromed blocks should not show excessive wear for about a half dozen heats of racing. A skim grind for about $3.50 a hole will put them back in first class condition. The real advantage of chroming before blocks have worn to about .019" oversize is that each skim grind gives the piston set-up a sloppier fit. A piston setup represents a minimum of $10 assuming you do the piston turning, to as much as $18 to $25 if you have a specialist do the job.

Piston clearance at the skirt should be .002" to .0035"—the latter is recommended. After a couple of grinds it is obvious that skimming off .0015" to .0025" on a grind will give your formerly well fit pistons a sloppy fit.

Neither boring nor honing is satisfactory for outboard racing purposes. No hone exists that can straighten a crooked cylinder. A hone has two applications for outboard racing cylinders. It can be used, by a specialist, to detect and then remove high spots from a set of properly ground cylinders that have been subject to slight wear, but it should be used to eliminate the high spots only.

(*See Over*)



Tragedy struck during the final heat of the Gold Cup classic when Quicksilver, a plywood constructed Rolls-Royce powered craft entered its third lap at an estimated straightaway speed of 105 m.p.h. As she entered the south turn her nose tripped and in a huge plume of spray the hull disintegrated carrying her driver Orth Mathiot and riding mechanic Thompson Whittaker to their speedy deaths.

IN THE NEXT ISSUE

GAR WOOD—THE WHITE FOX OF ALGONAC

A PICTORIAL REPORT ON THE GRAPE FRUIT CIRCUIT

WHAT KIND OF FUELS ARE THE FAST BOYS USING?

A SPECTATOR SOUNDS OFF

CAN DETROIT BRING THE GOLD CUP EAST AGAIN?

AND MANY OTHER FEATURES

BUILDING UP A "CLASS A" RACING ENGINE—PT. II

(Continued from Preceding Page)

Thus it is first used as a gauge—shiny spots will identify the high points—and secondly, revolved loosely for no longer than a minute, to remove them.

Boring is unsatisfactory as boring is done with a cutting tool and the lack of uniform hardness of the cast iron lets the cutting tool ride over hard spots and undercut softer areas. Drift, belling effect at either end and signs of gear chatter reflected to cutting tool and then on the cylinder wall, are all tell-tale marks of a bore job—and even a mediocre grind is more satisfactory.

Two final steps remain in preparing the block. Check faces of block in order to be sure that no warping is evident. Even new blocks may be warped. Check faces, don't assume they are straight. This may be done by coating block faces with Prussian Blue and placing face down on a piece of plate glass on which valve grinding compound, thinned with gasoline, has been spread. Work cylinder face in figure eight fashion for a few minutes and inspect. If spots of Prussian Blue remain untouched the face is warped and additional lapping will be required. A properly lapped surface is your best precaution against blown gaskets. Properly trued faces also help offset the danger of cracking base flanges if nuts are drawn up too tight or if engine is flipped.

Finally the intake passages in the block must be opened, smoothed and polished. Tools necessary for the job are a handy grinder, small file, emery and crocus cloth.

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BUILDING UP A "CLASS A" RACING ENGINE—PT. III

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If you are certain the crowns of your pistons are level and still you aren't getting an even impression in the heads you must alter the contouring of the heads with a handy grinder. Having achieved proper balance, which will be a time consuming job running into several evenings of spare time work, then clean heads of clay and polish the inside of the head, first with a fine valve grinding compound and then with metal polish.

The importance of balancing the volume in the ring chamber lies in heat distribution and its effect on piston sticking. A well-balanced firing chamber will distribute heat evenly. Poor balance will cause one side to heat more than the other. The uneven heat distribution will in turn be reflected to the piston and cause distortion and a greater potentiality of sticking. If you are to work toward the least compression loss and plan to set your pistons with as little side clearance as possible, the above operation is important—but naturally is less important the sloppier the fit of your pistons.

Once the contouring of each head is equalized, the final job is to set the compression ratio. Remember that just because one successful driver used 13½ c.c.'s as his T.D.C. volume doesn't mean it will work for you unless you also know whether his bore is standard, .010" over standard or nearly double that figure.

An approximate 10-1 compression ratio is a good starting operating point for your first engine set up. Higher ratios will bring added starting trouble and a greater possibility of burned pistons.

With gasket in place (copper lined with asbestos fill—a standard $1 item from racing parts suppliers) tighten head and check again the volume at T.D.C. Assume your working volume was 120 c.c.'s. If your volume from T.D.C. is 12 cc's on both barrels, the job is done and you have a 10-1 compression ratio. Seldom, however, will this occur.

Almost invariably the top and bottom cylinders will have different volumes. Suppose for example the top volume is 11 c.c.'s and the bottom 13.5 c.c.'s. Divide the T.D.C. volume into the working volume in each instance and you note you would be operating on 10.9-1 ratio on top and 8.9-1 on the bottom. It is obvious that it would be impossible to have a fuel mixture and spark setting proper for both cylinders with such unequal compression ratios.

The first job here would be to equalize the volumes by removing metal from the top of the piston of the top cylinder until both cylinders' volumes are equal. After careful work, both cylinders would be brought to 13.5 c.c.'s. At this stage the chambers are balanced and volumes are balanced but we still haven't obtained the 10.1 ratio we started out for but rather an 8.9-1.

You have several alternatives. Since the volume is too great, you can lap metal from the head or from the top of the block. However, it is simpler to vary the gasket thickness.

In addition to the standard, approx. .080" thick copper gasket, there is also a considerably thinner, approx. .040" double-faced standard asbestos gasket with a copper center liner. One racing supplier, Johnny Maddox, specializes in solid copper die-stamped sheet gaskets .018" thick. These are under $1 each and it is a good idea to stock up with a half dozen or so. By using multiples of these you can arrive very close to your desired compression ratio.

With volume and compression ratio established, the final job on rod and piston assembly set up is balance.

I don't recommend removal of metal from rods to lighten them as such removal merely lowers case compression. However, polishing the rods, i.e. removal of any slight nicks, may lengthen their life.

Important, however, is weight balance of the two sets of rod and piston components. One set of rods, piston, rings and wrist pins should weigh exactly the same as the other.

Weigh each set separately on a pharmacist's scale. Should they not be identical which they probably won't be, weigh pistons, pins and rods separately and intermix to get best possible balance. If the interchanging of parts won't do the trick, then remove small amounts of metal from the inside of the piston skirt of the heavier component set.

One of the simplest jobs and one that may have stumped you, is rod assembly. How do I get 29 needle bearings in place? There's a little trick to it that makes it easy.

Place your case on its side so that the block studs face upward. With your finger lay a coating of vaseline or heavy grease over the inner surface of the rod, throw-end cap. Line up 15 needle bearings in the cap. They'll stick nicely to the vaseline. Then with a spring type long nosed pliers (a 35 cent item that will be a handy addition to your tools) move cap into position under one crank throw. Pass a section of solder wire under cap and bend solder to hold cap into place loosely. Put vaseline and lay in 14 more needles on rod and place gently on top of throw. Tighten in two Allen-head screws and the job is done.

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BUILDING UP A "CLASS A" RACING ENGINE—PT. IV

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insulator extends beyond the end of the threads.

Somewhere within the Champion range designated by R2S, R2, R11S and R11 you will find your final selection, or plugs in the same relative range from cool to warmer in Blue Crown, Deance or A.C. Champions are almost universally used by the outboarders.

For safety's sake, start with the coldest plugs—R2S for initial testing. If you can start your engine on them, fine. Give the engine a slow run-in at half speed for about a half mile and then check the plugs. Chances are that, with a new engine set-up, you will have to try R2 and R11S until you have worn in the rings and walls enough to stop excessive blowby.

In any running, the proper plugs are those that show a light chocolate brown coloration on the porcelain and the electrodes. If there is a white ashy deposit, the plugs are definitely too hot. Pull them before you burn a piston. Should the plugs appear black, wet and oily, switch to a warmer plug to avoid fouling.

MAGNETO: The greatest offender in an improperly set up or cared for racing engine is faulty ignition. The class A magneto has two coils, two condensers and two sets of points, activated by a cam located on the flywheel hub. Before timing the ignition have the component parts checked. Since a check of the magneto will be a routine before and after each racing event, a simple home-built test outfit should prove handy. The equipment needed is a 6-volt hot-shot battery, a knife switch, a 5-ampere ammeter, three spring clips, a standard Ford vibrator coil and three darning needles.

To test, first place strips of paper between the breaker points. Then clip a wire to the primary lead of one coil and run it to one post of the hot-shot battery. Connect the other post of the battery to one terminal of the knife switch. The other switch terminal connects to one post of the ammeter. Connect the other post of the ammeter to the vibrator coil. Finally, clip a wire to the armature plate and run it to the other lead of the vibrator.

Now, insert one needle through a piece of bakelite or hard rubber, and ground it to the armature plate. Connect the high tension lead from the coil to be checked to another needle mounted with a ¼" gap between it and the needle grounded to plate. Then, close the knife switch and adjust vibrator coil until a reading of 1½ amps. is obtained. The resultant spark should penetrate a calling card inserted between the needles.

Failure of the spark to penetrate the paper will indicate a broken-down coil or faulty condenser. Since condensers are only a $1.50 item, you should keep a couple of spares on hand. Replace the condenser with a new one. If the spark still fails, by simple elimination, the coil must be bad.

When replacing a faulty coil the interlocking heel plates seldom line up perfectly. Prior to removing a faulty coil, it is advisable to check the measurement from the outer side of the right-hand heel plates of one coil to the right-hand heel of the other coil, and repeat the same measurements with the left hand coil heels.

Points are of the utmost importance. Pitted points filed down are never wholly satisfactory, as the filing or sanding cuts through the outer hard-shell metal and burning and pitting will occur after very little running. If you are seeking perfection—and only perfection is going to keep you out in front—then frequent replacement of points is a must. Check, for example, the difference in tension between the springs of a new unused set of points and old worn ones. Remember that the point springs flex five thousand or more times a minute. Without enough tension, points will not close properly at high speed and faulty ignition will result.

Timing on the alternate firing KR is exceedingly important and it is a phase of ignition frequently overlooked by nine out of ten drivers. Breaker points on the A engine must open exactly 180° apart, but there is more to timing than merely setting points so they will start to open precisely 180° apart.

On every Johnson factory-built engine, and on billy pump flywheels and magneto plates, there are scribe marks. First inspect the flywheel. On the underlip of the sidewall shell, note the small filed indentation. On the ridge on the underside of the magneto plate located near each of the high tension leads, you also will see scribe marks. With the spark lever set at full operating advance, which is a location approximately directly above the right-hand front stud of the crankcase head, one set of points should just be starting to break when the flywheel scribe and one of the magneto plate scribe marks line up. The construction of the magneto on the KR is such that the current in one coil reaches its greatest intensity at this position.

Three Cracker Box class inboards in close competition at the Long Beach, Cal. Marine Stadium. 4P is Ed Brown's 72.054 m.p.h. record holder Bouncy Barby.

Should the points start to open before or after the marks index, the spark will be weaker, as it will have occurred before or after the current in the coil has reached its peak. Failure to use these scribe marks in timing will result in a spark no more efficient than that from a weak coil.

If the points are not about to break at the spot where the marks index then, by means of the adjusting screw, the location of the points must be shifted. Set the point gap at .017" to .018" clearance. Then, revolve the flywheel 180° and check whether the marks index as the opposite set of points are just starting to break. This basic timing establishes a make and break 180° apart at the time when the coils have reached their peaks.

However, in properly timing the A engine, one other factor must be considered. This is the location of the pistons at the time of ignition. For a compression chamber balanced at 13 cubic centimeters, which gives a standard block a 9.1-1 compression ratio, when the marks index and ignition is timed for this indexing point, the piston on compression should be ⅜" from t.d.c.

To determine this point, turn the flywheel until one piston is at t.d.c. (top dead center). Measure through plug hole with a depth gauge. Note the measurement, and advance the gauge ⅜". Rotate the flywheel again until the piston reaches this ⅜" from t.d.c. position. With each ½ cc. less volume in the compression chamber, add 1/16" to the above depth gauge figure and subtract 1/16" for each ½ cc. greater volume.

With a first class magneto, properly timed, it should be possible for you, during tests of your engine, to find the exact full-advance location for the spark at any given race location, then tighten the magneto to a permanent set for that day.

— THE END—

HURRY UP HULLS

(*Continued from Page 23*)

brock heads and an Iskenderian cam.

Bozarth estimated the cost of hull materials under $200, but as he did not have available spare time, he had the boat shop-built to Champion specifications for $600.

During his first year in competition Bozarth raced in about a dozen eastern and mid-western regattas. He was able to peak at close to 80 m.p.h. when he finally ironed out the bugs and in competitive fields of from 10 to 20 entries, he finished in the first quarter of the field at most events—winning one heat at Cape May, N. J., as his best effort.

After a single season of competition, Bozarth, like most speed-boating addicts, wants to better his performance. Consultation with Arthur Seabrook, who planned a number of Edison Hedges' record breakers, caused Bozarth to decide to have a new hull built. Although the new design, pictured here in partially completed form, is scarely recognizable as such, it is in fact a modified version of his original Champion.

By using mahogany throughout, Bozarth expects the new hull to weigh 300 pounds—a saving in weight of at least 100 pounds over his original hull and at no sacrifice in strength. Side and bottom planking of the new hull are of quarter-inch mahogany plywood (now selling at about 45 cents per square foot) with decking of eighth-inch aircraft plywood (85 cents). Frames, battens and engine rails are of mahogany. Only the rub strake rail is of oak.

The overall length is 13 feet 6 inches

(*See Over*)

HURRY UP HULLS

(*Continued from Preceding Page*)

(minimum allowed) with 84-inch beam. The altered design carries the sponsons forward so that the bow is an unbroken semi-circle. The mid-section has shape, i.e., roundness, rather than the straight Champion original lines and there is less free-board toward the stern.

The rudder will be outboard mounted, Debold type, with two model fins screwed to the inner sides of the sponsons. The water scoop will be located on the trailing edge of one fin and the seven-eights diameter monel shaft will have a very mild 10 degree angle of attack so that the new hull should be a prop rider in California-design fashion.

With a 12-pound aluminum fly-wheel and a "Hi" Johnson prop, Bozarth expects the new boat to hit better than 90 m.p.h. and he considers his engine will, at peak r.p.m., pull close to 120 hp.

As the 135 described here is typical of those boats competing in the class, it is possible, by doing the work yourself to build up a boat and motor similar to Bozarth's for as little as $700.00.

At New Martinsville, W. Va. on September 30, 1951, Ardson Bozarth proved his new 135 cu. in. had plenty of stuff by finishing a second and third against nine plenty hot 135 cu. in. starters to take a second in total points. In 1952 with competition bugs ironed out Bozarth should be looked for to offer the fast boys in the 135 Class tough going in the front running spots.

78,000 SPECTATORS CAN'T BE WRONG

(*Continued from Page* 19)

After the race, winning boats and motors in each of the six classes are swiftly torn down and carefully inspected by certified A.P.B.A. inspectors. Prizes, amounting to $5000 in merchandisé, are distributed before the winners leave Neenah. Milwaukee Sentinel trophies for the first, second, and third place winners in each class, plus Dunphy Medallions signifying membership in the Marathon 92 Mile Club, are distributed to each driver finishing the course. The medallions are presented by the Dunphy Boat Corporation of Oshkosh, Wisconsin.

Race officials look for a banner year when the 1952 Marathon rolls around, Sunday, July 29th. Entry blanks, rules and regulations, and general race information are available by writing to Mr. Thomas E. Johnson, Outboard Marathon Editor, Milwaukee Sentinel, Milwaukee 1, Wisconsin.

The Sentinel-Winnebagoland Marathon is a 92 mile run for stock utility outboard boats and motors only. We recommend a good rig, for as more than 78,000 spectators in 1951 can attest, this is truly one of the roughest of the country's rough-water Outboard Marathons.

INBOARD RUNABOUTS

(*Continued from Page* 20)

4′ 7″. Class C length minimum is 15′ 5″ with 4′ 8″ minimum beam. The minimum for Class D is 15′ 7″ with a 4′ 9″ minimum beam. Class E minimums are 16′ 8″ and 4′ 11″. No overall weight restrictions are imposed. All racing runabouts must be built with at least one watertight compartment.

"If your first runabout is just a starter for experience and you don't mind getting wet down when the rest of the field screams by, then basic design of the hull isn't too important. But if you want to run with the fast boys, check into the background of the used racing hull and the reputation of other boats of the same design," Pop Glazier suggests.

"There are a lot of good racing runabouts and the list of their builders and designers is too numerous to tabulate. Most builders have made good and bad models. All of them study competition performance of their designs and constantly strive for improvements. If the boat you are considering was a record holder 10 years ago its design may be archaic today."

These are some of the things Pop Glazier considers important. Inspect the bottom and look for breaks in the planking. You'll usually find them about four feet back from the bow if the breaks are from strain. Pop says in racing the worst beating is taken by the leading third of the boat's overall length.

Planking can be replaced without too much difficulty if the bottom originally was secured to chines and keel by an elastic seam compound. This compound will stay soft and will permit a certain amount of movement and yet will take up its own space again.

The bottom planking in any class runabout over 48 c.i. should be a minimum of ⅜″ thick, Pop maintains. He recommends birch plywood which although slightly heavier than mahogany ply has greater strength.

Several methods are used for planking to the keel. Pop prefers to rabbet the keel to the depth of the planking and for several inches of its width so that planking is cut into and secured to the keel.

When asked about the proper woods to use Pop swears by white oak for frames although he considers mahogany equally satisfactory. He cautions against the use of maple, because while it screws well, it tends to split.

Frames on Classes B through E should be spaced no more than a foot apart for sufficient strength for the beating encountered in racing. The construction of engine stringers which serve the dual purpose of fore-and-aft stiffeners and engines supports is vitally important.

"Engine stringers should be fastened to the frames with wood knees (plywood laminated for strength), and bolted, not screwed. These should be glued with a good quality phenolic resin marine glue. In fact every bit of wood, other than planks to keel and chines, should be glued."

Metal stringers or metal lamination of stringers or metal knees are not a good design practice to follow since they cannot be glued properly and are certain to shift when the boat is in motion. Eventually the bolts will sheer off from the metal to metal friction. Top grade, straight grained Sitka Spruce is Pop's choice for stringers with birch or mahogany plywood lamination.

"Watch out for engine stringers that have been bolted from top on down through the frames to the bottom," says Pop. "Remember that the strength of the frames and stringers themselves are cut in half when a bolt passes through them vertically. Thus if your stringers are three inches thick, for example, and they are bolted down through the frames it means the strength of the stringers is only that of one-and-a-half inches less half the diameter of the bolt."

Finally, Pop suggests checking the frames to be sure they haven't worked loose or cracked. If the screws are loose then check for rotted wood that may have caused the screws to pull free. Be sure that the floors (frame strengteners) have been glued and are secure or frame breakage at the keel line will result.

OUTBOARD TRY-OUTS

(*Continued from Page* 25)

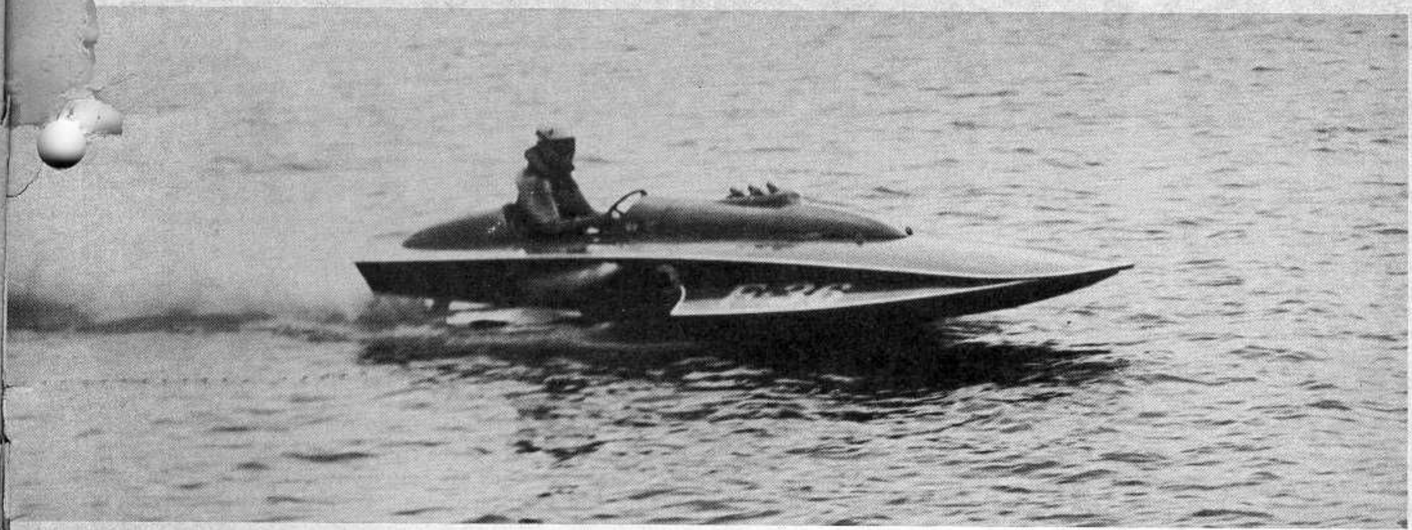
carefully recorded. Your next check is to go through the same routine under varying water conditions.

When you reach a race site by studying the length of course, angle of turns, plus water surface conditions, your note book will contain the answer as to which prop, what transom height, what engine angle to use under the existing set of conditions.

Since the Pitot tube of the speedometer can create a certain amount of drag, I recommend taking the tube off the boat's transom during the race itself and using it only in warm-up periods.

Also, the rooster tail, created by the Pitot tube's movement through the water, may tend to wet down your plugs and cause shorting out of plugs in competition.

The water speedometer is a precision instrument and should be treated as such. Don't treat it roughly. And remove the entire speedometer unit including the flexible cable for winter storage as it may well contain a residue of water and freezing could render the entire equipment useless.



Robert C. Rowland (below) of South Norfolk, Va., Gulf Oil Gold Cup winner in 1951, is given a congratulatory kiss by Mrs. Ruby Scull of Ventnor, N. J., the outstanding woman driver of 1950 and 1951. Bob Rowland is the owner-driver of the 226 c.i. hydro, "You All." He competed in 29 heats during 1951, finishing first in 23, second in 2 and one D.N.F. He was the only driver to defeat Sid Street, 1950-51 National Champion for the class, in 2 heats. Bob is 34 years old. He started racing outboards in 1935 and continued to 1948 when he switched to inboards. He's won the Virginia Gold Cup, Red Bank Gold Cup, Maryland Gold Cup and Maryland Sweepstakes, Calvert Silver Trophy at Louisville, World Trophy at New Martinsville, Tidewater Sweepstakes at Norfolk, the Dan Murphy Trophy, the Gordon Munce Trophy, the John Charles Thomas Trophy at Washington, as well as the Gulf Oil Gold Cup.

Ruby Scull is the world's record holder for 1-mile speed runs in 48 runabout class with an official 53.258 m.p.h. Driving her boat, "Mickey Mouse," at whirlwind speed, she was the race winner last year at the Red Bank, Miles River and New Martinsville regattas.

The picture of Bob Rowland at the wheel of his hydro, "You All," (See top of page) was sent to us at our urgent request by Bob, himself, for which our heartfelt thanks at being able to include this action shot in the first issue of *Boat Sport.*