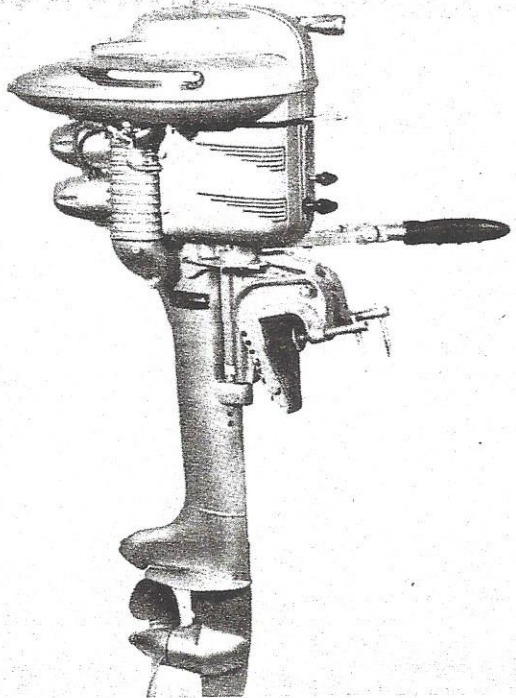


# The Long Happy Life of THE PHENOMENAL OUTBOARD MOTOR

## Conclusion: Postwar Years — and What Next?

by Charles D. Strang



THE end of World War II found the boating populace prosperous, anxious to again enjoy relaxation afloat—and eager to buy boats and engines. Outboard motors were in short supply. Rushing to meet this demand, outboard builders hurriedly cleaned up lingering wartime commitments, then plunged into outboard production. Most of the early postwar outboards were nothing more than duplicates of pre-war models, some of which were essentially unchanged since their introduction in the '30's. Still, the industry sold over 350,000 units in 1946 and a staggering 625,000 motors in 1947, or about 3½ times the sales of the best pre-war year.

filled, sales fell a bit each year to a postwar low in 1951 of 290,000 motors. Then, instead of leveling off, sales soared again and surged to 630,000 engines by 1956. A new phenomenon was occurring: the true postwar outboard boom.

### New Users—New Uses

The prewar and the early postwar outboarder was either an ardent fisherman or an outboard addict intrigued by outboard motors first and by boating second. The true postwar boom was built around a new breed of outboarder, the man—or woman—who viewed the outboard as an extension of the automobile. It had to do more than get out to the fishing grounds. It had to be completely re-

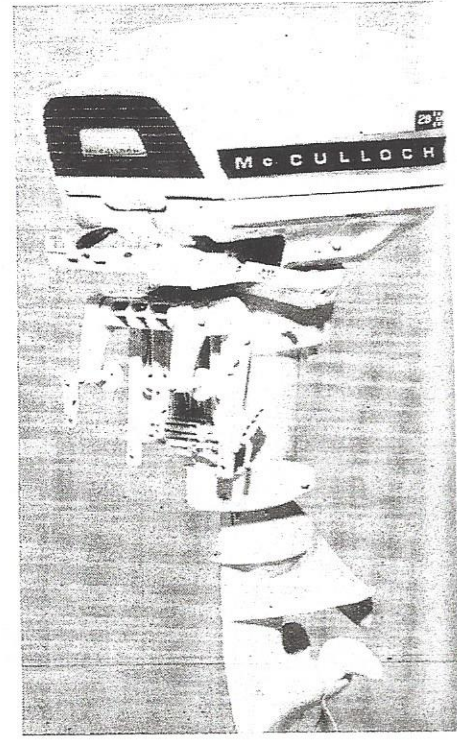
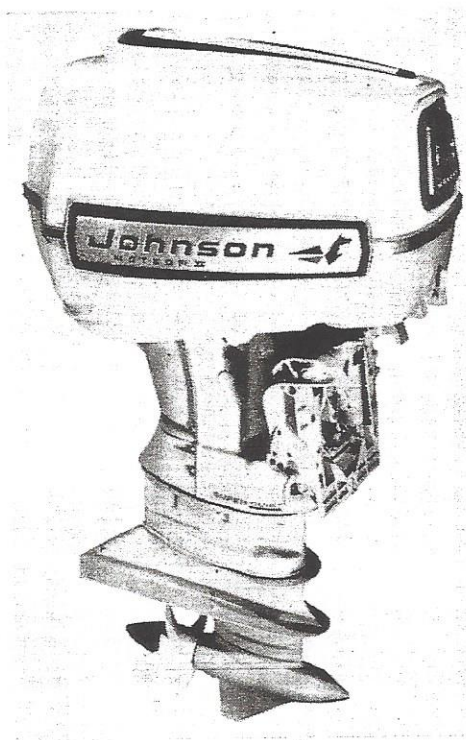
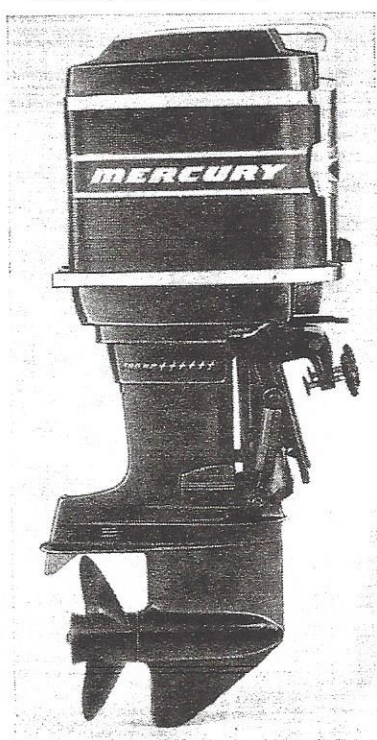
As the war-caused void was slowly

Mercury's 1946 6-hp Rocket Twin.

Mercury's 1965 100-hp model.

Johnson's 1965 90-hp Golden Meteor II.

McCulloch's 28-hp model for 1965.





liable. Tinkering was taboo. Now the outboard had to tow several skiers at one time; it had to supply fast transportation for entire families in large boats on mass cruises; it had to push large cruisers, even houseboats—and provide back-to-back hours of plain joyriding as an escape from clogged highways.

Car, trailer, boat and outboard motor became a recipe for millions of people who had never dreamed of taking to the water and who in no way identified themselves with the classical yachtsman. Old motor standards of performance, reliability, smoothness, quiet, ease of operation and even appearance were no longer adequate. More was needed—and it was quick in coming. Development proceeded at a torrid pace, equalling or exceeding that of the hectic 1920's.

### Newcomers and New Techniques

Spurred by seemingly easy pickings, fledglings flocked into outboard manufacturing. Martin, Chris-Craft, Flambeau, LeJay, Silver Creek, Fa-geol, Clinton, Comanco, Bundy, Eska, Schnacke, Cary, ATCO, Cal-Jet, Propulsion Research, American Marc, Bremer, Oliver, Perkins, American Chain and Cable, Homelite and West Bend were all postwar entrants. More familiar were such prewar brands as Johnson, Evinrude, Mercury, Scott, Atwater, Champion and Muncie.

The boom was hardly underway when extensive changes began to ap-

pear both in manufacturing technique and engine design. High pressure die-casting replaced the slower more expensive sand casting of aluminum alloys. Aluminum forgings and extrusions appeared in highly stressed parts. Shell castings replaced some steel forgings. New protective treatments for aluminum added salt water life.

Bronze bushings were replaced by ball and roller bearings at critical points. Atop the engine since 1909, the gas tank was separated from the engine and now delivered its fuel to the carburetor via a hose—a safer, cleaner arrangement.

The exposed powerplant was made extinct as stylists had a field day with fully enveloping cowling. The rewind starter—introduced by Caille in 1916 but dropped soon after—became standard equipment, greatly helping the stylist in that the flywheel could now be concealed.

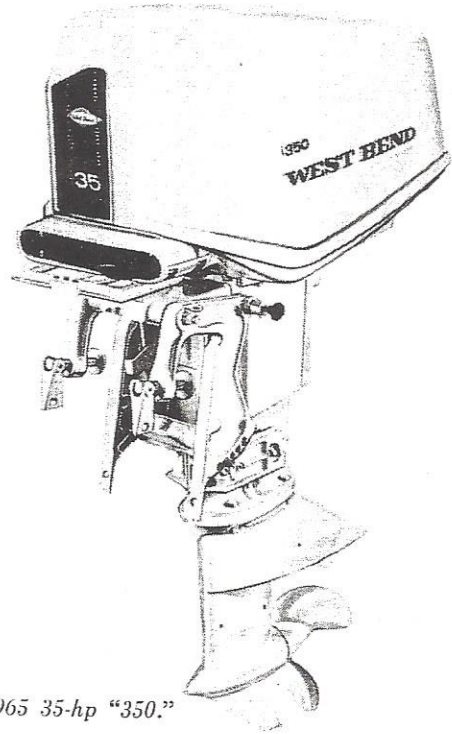
Particularly sweeping was the change to reed-type intake valves. A paper-thin strip of steel which served to admit air and fuel into the engine, the reed valve first appeared on outboards in the Evinrude Sportsman of 1935, then fell into disuse. The full postwar Mercury line featured reed valves, as did the Scott-Atwaters, and the idea soon became universal. The less versatile rotary valve disappeared.

### First Four In-Line

Alternate-firing, introduced on

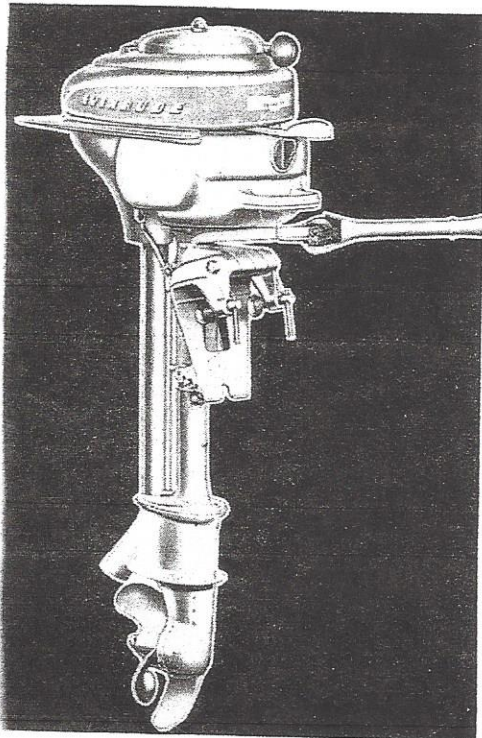
small twins by Johnson in 1930, spread to larger twins in the boom years. Low starting effort and smooth running were earmarks of alternate-firing outboards. The first four-cylinder engine to use this principle was the 1949 Mercury Thunderbolt. Unlike conventional fours which had two cylinders to starboard of the crankshaft and two more to port, the Thunderbolt had its four cylinders aft of the crankshaft, all in a vertical row.

Instead of the two large power impulses  
(Continued overleaf)

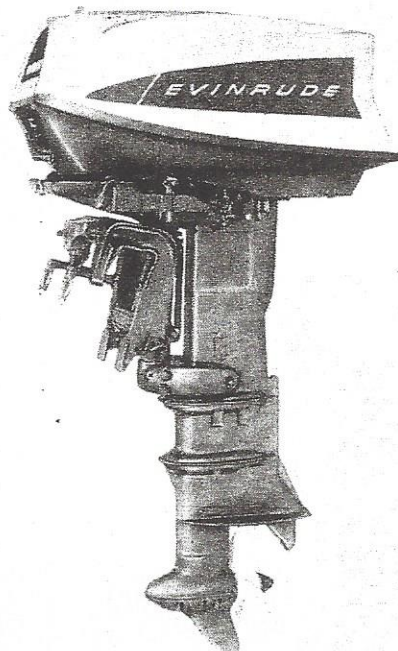


West Bend Chrysler's 1965 35-hp "350."

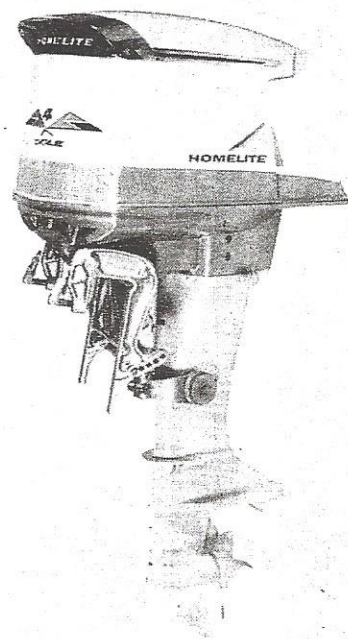
Evinrude's 1945 5.4-hp Zephyr.



Evinrude's 33-hp Ski Twin for 1965.



Homelite's 1965 4-cycle 55-hp motor.





which older fours delivered with each revolution of the crankshaft, the new motor provided four small impulses and permitted use of lighter construction for a given power output. The new Mercury was rated 25 horsepower at 5500 rpm.

By 1951 the opposed cylinder outboard was obsolete. Evinrude stopped production of the Big Four, a giant 50-hp quad derived from the wartime assault-boat engines. Johnson dropped its famed PO model, an opposed twin of 22 hp and a direct descendant of the 1929 Sea Horse 24.

New top model in both lines was a modern alternate-firing twin of unheard of size for the type, 35.7 cubic inches of displacement and 25 hp at 4000 rpm. The engine was extremely successful and led the way to even larger twins.

### **From the Past, Something "New"**

The new outboarder was not content to yank the starting rope in order to zip off in a welter of foam. Nor would he whip out a paddle to move his boat astern. His car had a neutral gear which let him start the engine before moving off, and he could power his car back at will. To attract the new "mass market," the outboard had to be equally flexible.

Oddly, the very earliest outboards had reversing means—reversible propellers, swiveling lower units, engines which could be started in either direction of rotation, but these features disappeared in the 1930's, except for a few small twins which could be steered through 360 degrees.

Gearshift outboards appeared in 1949, Scott-Atwater and Johnson arriving with them simultaneously. Both used an old concept—so old that existing patents had already expired—which used a reverse gear in the lower unit and a sliding clutch to select forward, neutral or reverse operation. It worked, it was timely, it "revolutionized" outboarding. Other makers followed suit immediately.

### **Remote Operation**

The gearshift and higher horsepower led to driving from the forward seat rather than from the traditional spot at the transom. Visibility was better, the owner could join his guests—and handling the boat was more like driving a car.

The engine makers quickly provided remote controls. Neat boxes

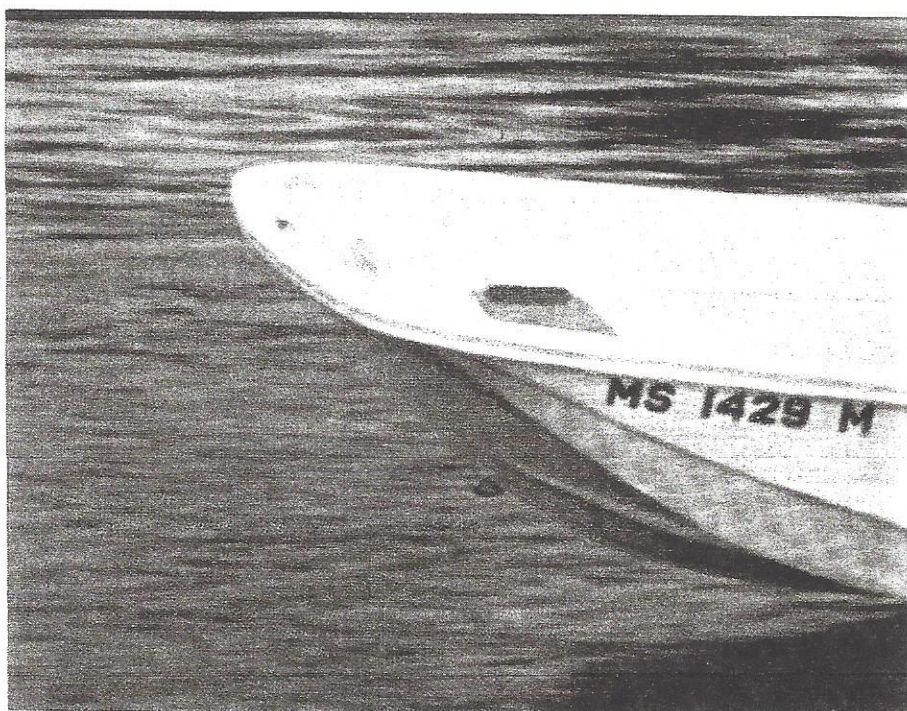
containing levers for shifting gears and actuating the throttle; these could be mounted anywhere in the boat and linked to the engine by flexible push-pull cables.

The Morse Instrument Company soon pioneered the single-lever remote control for outboards (it had done the same for inboards in 1945). The gearshift and throttle levers were combined into one and the driver had only to push it forward from the neutral position to engage forward gear, and farther forward to open the throttle. Reverse action was similar. Required skill by the driver was further reduced, more people could run a boat—and variations on the

1954 and soon vanished from all makes of medium and large outboards. Remote control had arrived.

### **Electric Starting Revived**

The new outboarder could operate his engine from anywhere in the boat—but he had to clamber aft to yank a rope to start the engine. Obviously an electric starter would let him do the whole job without leaving his seat—and would encourage boating by women who lacked the muscle to crank a big outboard. Obvious, yes—but it took a small Texas accessory maker, Lausen Specialty Company, to drive the point home to the majors. Lausen marketed a starter



idea were soon common, as were other reversing systems which lent themselves to single lever operation.

The boat had to be steered too, and accessory firms provided a wide choice of steering wheels, ropes and pulleys. In the late 1950's Marmac Products, of Detroit, offered a system using a large push-pull cable instead of ropes to simplify installation and maintenance. Kiekhaefer Corporation tailored a similar device to its Mercury outboards to provide a fully integrated steering and control system.

The tiller, or steering handle, was a part of every outboard motor since the very first. It was conspicuously absent on the Mercury Mark 50 in

kit for the popular engines in 1953, with noteworthy acceptance.

Johnson and Evinrude big twins for 1954 featured automobile-type, 6-volt, electric starters rather than the flywheel type they had used in the 1930's. On its largest 1954 model, Mercury offered a 12-volt starter and a flywheel alternator—a form of electrical generator—to keep the battery charged and provide wattage for accessories. Simplicity and freedom from corrosion made the alternator ideal for outboard use and it soon became optional equipment on all major brands.

The simple "kicker" of 1910 was rapidly becoming a sophisticated ma-



chine with all the features and styling of an automobile.

### Horsepower Race?

Family boating brought with it a steady increase in outboard motor power, a process which has been compared to the "horsepower race" in the automobile world. Unlike the automobile, however, the growth of outboard power was related to utility rather than speed.

The new ease of operation boosted family boating. Family boating meant bigger boats. Bigger boats meant more powerful motors to plane heavy passenger loads.

Horsepower went up. In 1951 the

vor of a reversible electric starter, timer and water pump to let the engine run in one direction for forward and in the other for reverse. An electrically operated remote control provided single lever operation.

For 1958 Mercury upped the 6-cylinder model to 70 hp. Scott-Atwater brought out an interesting 3-cylinder, in-line engine of 60 hp.

### V-Four

Four cylinder outboards were old hat to the Outboard Marine people but their 1958 Evinrude and Johnson versions were a dramatic departure from the old opposed quads. Displacing 70.7 cubic inches and developing

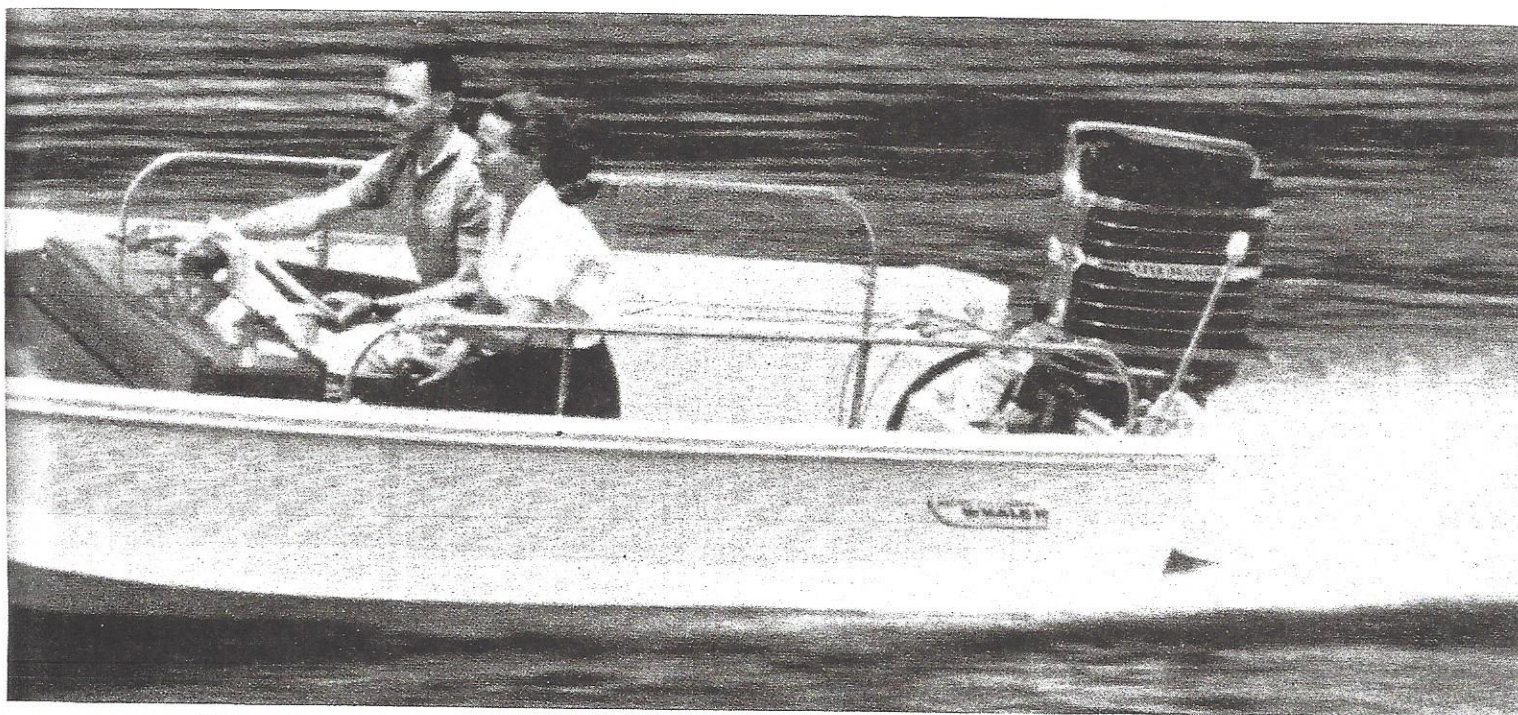
Seemingly determined to stay ahead in the horsepower drive, Kiekhaefer Corporation designed a new 6-cylinder model of 90 cubic inches displacement for 1962 and marketed the world's first 100 hp outboard.

Evinrude and Johnson brought their V-4 engines up to 90 hp for 1964 while Scott and West Bend held to 75 and 80 respectively.

By 1964 the average horsepower of the year's production had risen to 30.3—or a 340% increase over 1951.

### Quiet Please

*Motor Boating* for December of 1928 carried an account of noise level tests conducted at Madison, Wisconsin,



Modern Mercury outboard with electric starter and remote controls speeds this 16½-foot Boston Whaler.

largest outboards were of 25 hp and the average was 8.9 hp. Mercury brought out a 40-hp four, the Mark 50, in 1954. Two years later, 1956, Evinrude and Johnson were at 30 hp, Scott-Atwater had 33 hp, Oliver 35 and Mercury 40.

Seeing a market for still larger engines, Kiekhaefer took a daring step in 1957 and produced the first 6-cylinder outboard motor, the 60-hp Mercury Mark 75.

Aside from the 6-cylinder, alternate-firing design and the 50% jump in top power, the engine was interesting for its return to battery ignition after decades of magnetos. It eschewed conventional gearshift in fa-

50 hp, the 4 cylinders were arranged in a V configuration to yield a low, wide form as compared to the in-line fours. The new engines fired alternately to give four power impulses per revolution for smoothness.

By 1960 the V-fours had been enlarged to 89.5 cubic inches and were producing 75 hp at 4500 rpm.

Mercury's large 6 was up to 76 cubic inches and 80 horsepower for 1960 and 1961. Outboard Marine held to 75 in 1961 while Scott, now a division of McCulloch Corporation, raised its 60-inch, 3-cylinder leader to 75 horses. West Bend joined in with a big four in-line of 84.36 cubic inches and 80 hp.

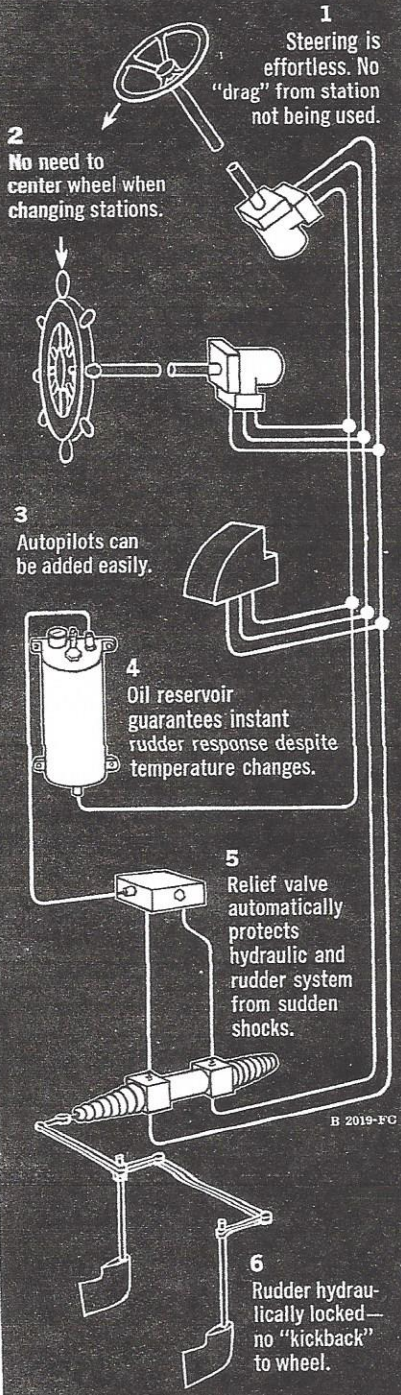
sin, to defend the outboard motor against its detractors. The noise problem was magnified with the coming of family boating—who wanted to shout over the sound of a roaring outboard?

Johnson, in 1954, produced a 5½-hp model that was significantly quieter than any outboard of its size. Using principles well known to aircraft designers, the Johnson men placed springs between engine and boat to let the engine jiggle and vibrate without transmitting much of the vibration—and hence noise—into the boat. Without the boat acting as a broadcasting device, the whole sound level (Continued on page 104)





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## OUTBOARD FROM PAGE 47

decreased markedly. The idea led the way for the entire industry.

Scott-Atwater followed with spring mounting in 1955 while Evinrude, Johnson and Mercury went further to use rubber springs that year. Rubber was a far better vibration isolator and became standard for the purpose.

In 1957 Mercury blasted the exhaust out through the center of the propeller hub, further beneath the water than the normal outboard underwater exhaust.

West Bend reduced noise emission from the powerhead by mounting the cowling separately from the powerhead, supporting it from the swivel pin on which the engine turned for steering.

In 1960 Johnson and Evinrude carried this idea to its ultimate with motors in which the cowling covered not only the powerhead but extended down to water level. The cowling thus became a structural member and sound container, the vibrating engine being carried by the cowling but isolated from it by rubber springs to achieve a great noise reduction.

Kiekhaefer Corporation tackled the problem differently and, for 1965, made engines with cowling attached to the engine only by soft rubber springs to reduce noise emission. Noise radiation from the lower part of the engine—the driveshaft housing—was effectively damped (no pun intended) by letting the housing fill with water when the engine was running, so erecting a wall of water between the internal exhaust pipe and the exterior of the engine. Again, noise was greatly diminished.

Numerous other features appeared during these years. Johnson and Evinrude provided automatic chokes for easy starting procedure. Scott-Atwater outboards contained an extra water pump for use in bailing the boat. Concerned about stresses involved in striking underwater obstructions with large outboards, Mercury introduced hydraulic shock absorbers as a safety measure, to ease engine tilting upon impact. The same company introduced fixed jet carburetion, eliminating the age old needle valve and their problems of adjustment. So it went, one manufacturer topping another and vice versa—benefiting the outboarder.

In 1956 an Italian outboarder, Massimo Leto di Priolo, became the first man to exceed 100 mph in an outboard motorboat, using a 60-cubic-inch, supercharged, hand-built racing en-



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gine to reach 100.3 miles per hour.

Hu Entrop of Seattle, became the first American to top 100 when, in June of 1958, he reached 107.8 mph with a production made, 60-cubic-inch Mercury Mark 75H on a boat of his own design and construction. Sometime later, in 1960, Entrop used a 90-cubic-inch Evinrude to reach 122.9 mph with a similar hull.

And in all forms of racing activity, records were posted with astonishing regularity.

### The Industry Today

By 1965 the outboard business was markedly different from the business of 1950. Its engineering had become infinitely more complex, its tooling huge and costly. Swift changes and large expenditures were standard operating procedure.

Homelite, a division of Textron, Inc., plunged into the outboard business in the 1960's with a four cycle, 55-hp model—the only stock four-cycle available. Hottest advantage of the four cycle is that the gasoline for the motor does not have to be mixed with oil; the motor has a separate oil crankcase not unlike conventional inboard engines.

Only the strong had survived the 15 years prior to 1965. Champion, Martin, Oliver, Bundy, Chris-Craft, Fageol, Flambeau—all are names which slipped from the outboard scene. A few specialty makers hung on by limiting their activity to items outside the interest of the majors—electric trolling motors, tiny outboards, jet outboards and four-cycle motors.

Surviving and strong are Johnson, Evinrude and Mercury. Johnson and Evinrude are divisions of Outboard Marine Corporation, world's largest builder of outboards under the experienced guidance of Ralph Evinrude, son of the man who founded the company in 1909, Ole Evinrude.

Carl Kiekhaefer, founder and president of the company that bears his name, saw his Mercury line drive to a very strong second position in less than 25 years. A subsidiary of Brunswick Corporation since 1961, the Kiekhaefer Corporation continues to grow under the watchful eye of the hard-driving founder.

A third survivor, Scott-Atwater, became part of McCulloch Corporation, a major builder of chain saws, in 1958.

Interesting indeed is the fourth survivor. Founded in 1935 by an automobile maker, Kissel Industries, the Waterwitch outboard assets were purchased in 1945 by the West Bend Aluminum Company, big Wisconsin

utensil maker. The circle was completed in 1965 when the West Bend engine division was acquired by another auto manufacturer, Chrysler. Entrance of the automotive giant, with its vast resources, into this field has caused much speculation.

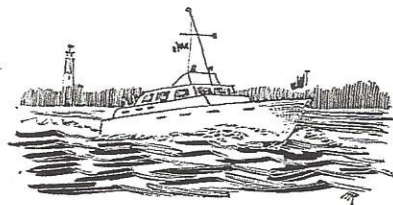
### Whither Away?

Now the outboard motor has come far since the turn of the century. Six and one-half million motors were in use during 1964. Another 400,000 were sold last year, with an average output of over 30 hp. The modern outboard is remarkably easy to use, is quiet, has ample performance. The 3-hp engine is still popular, the once exotic 100-hp figure is now commonplace.

What next? Will the gas turbine find a place in outboarding? Or the four-cycle piston engine? Or a rotary engine, such as the Wankel? Or will new developments make the two-cycle engine unassailable? Will the once popular variable pitch propeller return? Will the top horsepower level increase, hold steady, or decrease in the face of competition from the new stern drives?

Only time and the manufacturers' research programs will provide the answers, so complex are the many variables. Similar problems were probed in the original version of "The Phenomenal Outboard," which appeared in *Motor Boating* nearly 50 years ago. Its conclusion—the only safe one—holds good today:

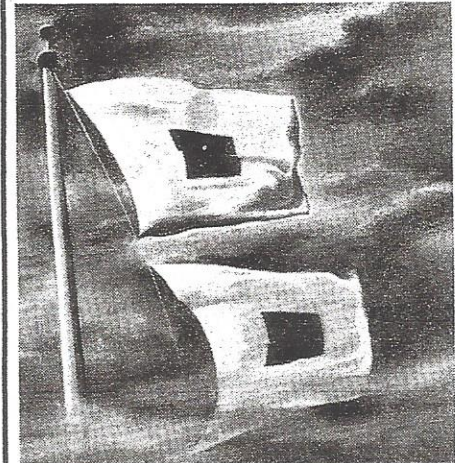
"We are unaware of where it will all end—but we do know that with the large variety of detachable motors on the market there is no longer an excuse for rowing!"



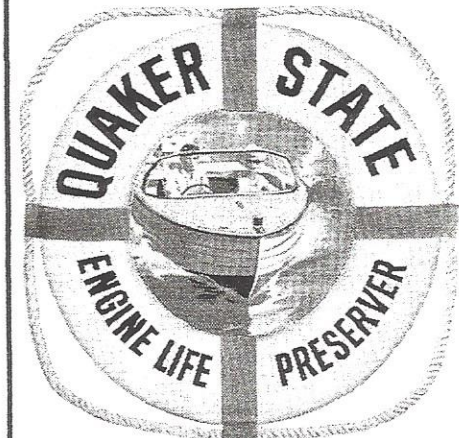
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