

JUNE 1970 50 CENTS

# Popular Science

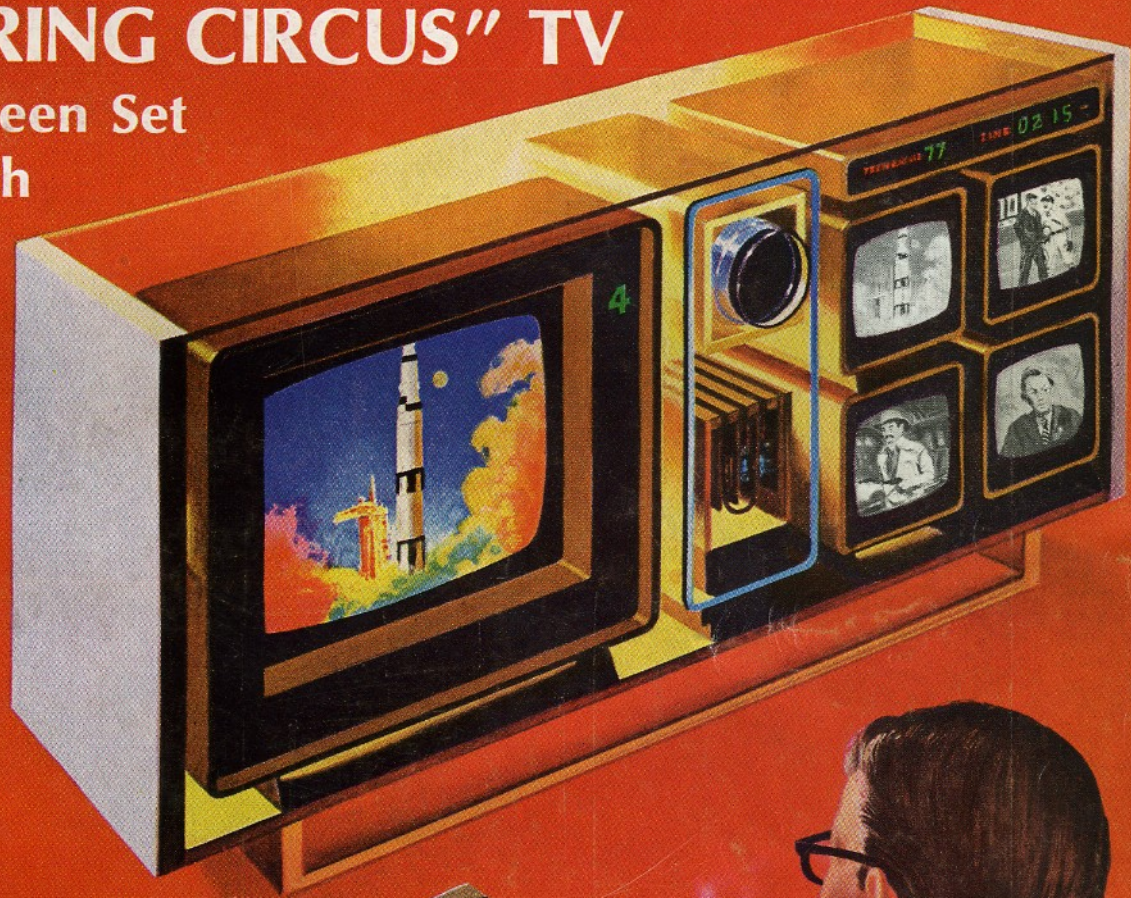
# The '71 CARS

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You can mow your lawn at night and avoid the heat of the sun. Electric power provides light, and whisper-quiet operation.

**Snow clearing is a snap** with the Elec-Trak. There are no starting problems, even in winter. Extra-slow speed and a separate motor for the blower assure removal of the heaviest snow.



**No hot manifolds and exhaust** mean cool operation in the heat of summer. This tiller raises and lowers with Elec-Trak's lift. Like the mower and snow blower, it can be fitted to mower in seconds.



# Fantastic ELEC-TRAK

## Runs on Batteries, Powers Your Electric Tools, Too

**PS tests the garden tractor that's going to shape up the power-equipment market**

By E. F. LINDSLEY

*PS Outdoor Power Equipment Editor*

If you're wondering what it will be like to drive an electric car some day, you can get a preview right now by trying General Electric's brand-new electric tractor. And if you've also been wondering when someone was finally going to do something about the air and noise pollution that surround suburban lawn chores, here's your chance to be that someone.

Make no mistake—this is an all-electric tractor that's on the market now! Not a pilot model, not a low-production, market-testing prototype, the Elec-Trak is in the lawn- and garden-tractor market with all four wheels solidly on the ground and with five years of test models behind it to insure bugfree performance.

Even better, the price is right—just about in the middle of the 10-, 12-, and 14-hp price range, depending on the size you buy. You pay no premium for electric power. Here's what you get:

- Full power to equal gasoline.
- Torque better than gasoline.
- Separate motor power on mower, snowthrower, and tiller.
- No starting problems.
- No fuel problems or hazardous gasoline handling.
- No tune-ups, spark plugs, or hot manifolds.
- No noise, fumes, belts, or chains.
- A rolling power source for other yard tools.

What's the catch? If there is one, I didn't find it in test-driving the Elec-Trak. You'll be able to drive one yourself shortly, but hop aboard with me now. I'll take you on a test run so you can see how it goes.

**Speed: seven mph.** GE says the tractor is designed to fit the human body. You'll find that the seat, leg room, control placement, brake, steering, and visibility seem natural all around. Reach left and thump home the main circuit breaker to make all circuits "go." Turn the safety key that keeps the kids from unauthorized use, and choose your gear.

Low-low is very low indeed. High (D-2, it's marked) will take you over hill and dale at seven mph—faster than needed for most work. As you drive you'll find that even in D-2 you can throttle back to a crawl and still have loads of torque. This torque has a profound effect on tractor operation—more on that later.

For the time being, go ahead, dump the throttle wide open—there's no clutch to fool with. You'll hear a quiet hum as the tractor moves ahead. For a moment, you'll be surprised; this isn't quite the surging power you expected. But within a second you'll hear a low click and the speed will

increase. A quick series of these clicks and acceleration periods, and you're under way at full speed.

GE calls this "programed starting." Why have it? For safety. Talking to Bruce Laumeister, who has headed GE's long-range electric-car development project and is father of the Elec-Trak, I gathered that early tractor models were bombs on takeoff. It figures. Electric motors have maximum torque at stall. Unlike a gasoline engine, an electric can light out from scratch with lots of scramble. Starting up a hill, too sudden acceleration could flip a tractor onto its back. Programed starting prevents that.

### The Elec-Trak's little helpers



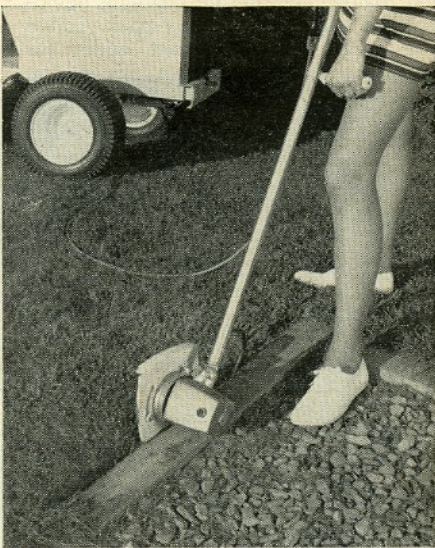
**Electric drill**, designed specially to run off Elec-Trak's 36-volt powerpack, lets you make repairs anywhere in your yard.



**Electric hedge clipper**, like other tools made for use with the tractor, impressed the author with its power and performance.

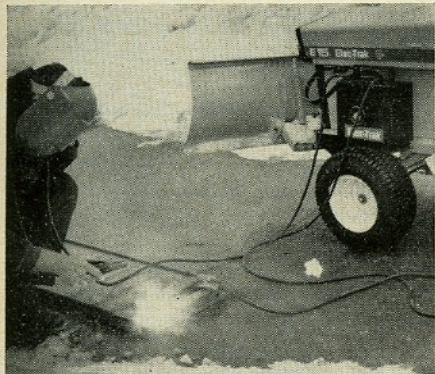


**Garden fogger** runs off the tractor's 36-volt pack, too. The low-voltage power system is well below the shock-hazard level.

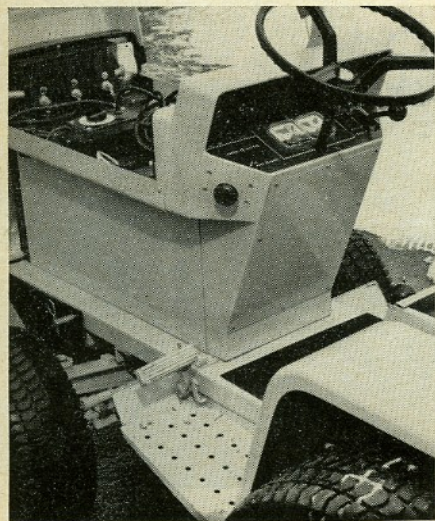


**Electric edger** makes yard care easy. Standard 115-volt tools can be used, too; you run them off an optional inverter.

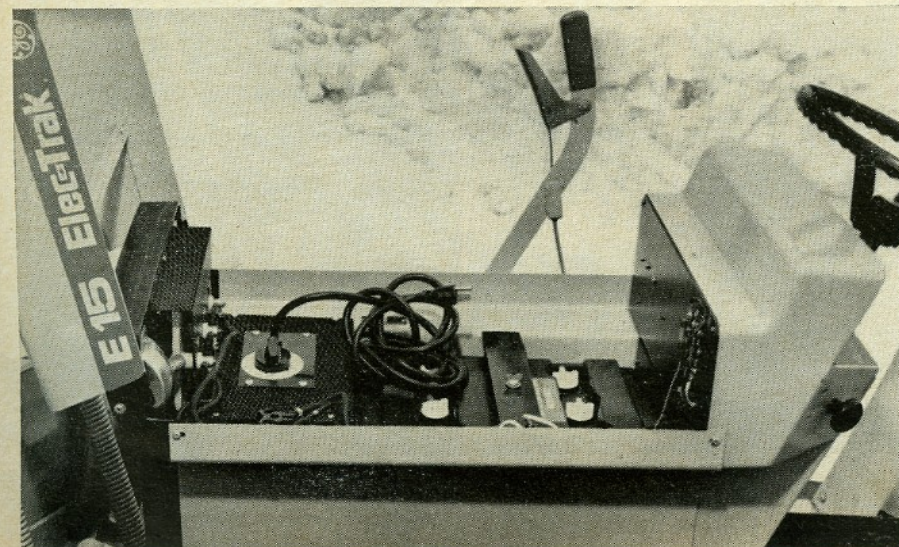
The "fuel" gauge. Once you get the feel of the Elec-Trak, take a look at the instrument panel. You'll see a "fuel level" gauge, which in reality indicates the level of the battery charge. A second gauge shows how much power you're pulling. Maybe



Potent DC welder operates so smoothly from the Elec-Trak's powerpack that even amateurs will be able to lay clean beads.



Solid-state controls are housed beneath the instrument panel (above). Lifted front hood (below) reveals the charging equipment and part of the battery pack. Coiled cable plugs into household outlet for charging when the tractor is not in use.



in the wrong gear and the right circumstances you could force the needle into the red. I never did and I tried hard to make the machine sweat.

Flick the switch just to the left of the gauges. A built-in electric lift will raise the front-mounted mower, or snowthrower or dozer blade. The lift is standard on all models. My only real criticism of the tractor is the size of this switch. Cutting grass on a warm day, the size is fine; but trying to jockey a snowthrower with your hands in mittens is an all-thumbs fumbling session.

Now flick the implement power lever. You'll hear another steady hum—unless the wind is blowing or the birds are chirping loudly; the mower is really that quiet. Of course, you can hear the blades on the 42-inch mower, but it's a low fluttering noise. Your neighbor will never know you're cutting grass.

When you're satisfied that the Elec-Trak really works, and you've become accustomed to the silence, try some hills and rough going. The tractor has amazing traction and handling. About that torque I mentioned before: Hills and heavy loads won't slow the Elec-Trak down. Confidential GE films (which you'll never see) show Elec-Traks pulling conventional tractors of equivalent power backwards, with their wheels spinning. And this with three extra men standing on the conventional tractor for extra traction.

Safety is built in. The Elec-Trak has some more surprises in the field of safety. The safety interlocks on the tractor are a silent testimony to the engineer's efforts to outguess even the most careless user.

Flip off the mower switch. The motors and blades stop almost instantly. Three seconds is the maximum coast time, even for mower cutters swinging free in the air. Over grass, they stop almost instantly.

Bounce up off the seat. The tractor and mower will stop dead. Picture yourself momentarily bounced overboard. The tractor would stop. If, while trying to scramble back into the seat, you closed the weight-sensing switch underneath it, the tractor would not move; a seat-only circuit breaker offers too much chance of running over the feet or legs of someone trying to regain the seat from an awkward falling position.

So, to get moving again, you must once more be seated properly, deliberately turn off the switch, close the throttle, and reset the controls. In short, the tractor makes you tell it specifically what you want it to do. Cross it up in an unsafe manner and it's programmed to stop like a wise old horse.

Unplug it and go. If the Elec-Trak could do nothing but cut grass, plow snow, and till soil, it would still be welcome news. After all, nobody enjoys fooling with gasoline, oil, belts, and starting problems. The closer a piece of equipment comes to a refrigerator in the "convenience of owner neglect," the better. That's another Elec-Trak strongpoint. Plug it in when not in use—it takes care of its own fuel needs. Unplug it and you're ready to go. Half-charge takes three hours; full-charge, five to six. You'll have to dribble a smidgen of tap water into the batteries about once a month during the summer. In winter, plug it in and forget it till you need it. Cold outside storage? The batteries love it. When you want to move snow, you'll have no starting problems.

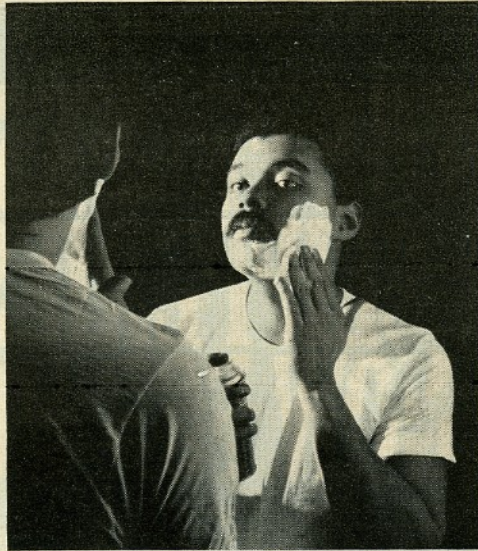
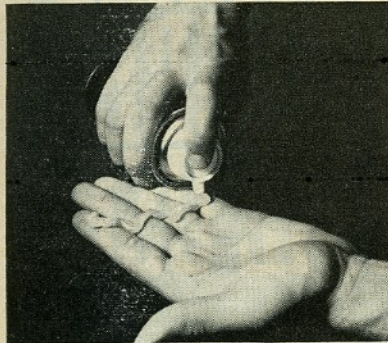
Add to that the fact that the Elec-Trak is a willing, portable source of plug-in power anywhere you drive it. Edging, clipping, tilling, hedge trimming, drilling, grinding, or spraying—all are available in a complete line of hand tools wired to run on the tractor's supersafe 36-volt system. There's also a powerful arc welder, priced at under \$100.

Another convenience that shouldn't be overlooked is the mounting of the front mower deck. This, and other implements, hang on what GE calls a "stab" mounting. You simply stab the mounts into frame channels at the front or rear of the machine. Obviously it's a lot easier to push in an electric plug than to rig belts, chains, or drive shafts.

You'll appreciate the flip-top rigging of the mower deck, too. An easy lift on the front edge turns it up for full access to the cutter blades. A bonus is possible here if you buy an electric drill with a grinding attachment. Keening up the blades takes only a flip of the deck and a few min-

[Continued on page 118]

Edge comes out of pressurized can as a gel on your fingers (below) and turns into lather on your face (right). Johnson Wax, maker of the new product, says that the gel medium enables it to load Edge with extra lubricants and moisture to provide increased protection against nicks and cuts.



## Bag Inside a Can

**New kind of pressurized package keeps product and propellant separate**

You've probably used hundreds of aerosol cans to dispense everything from shaving foams to vermouth with astonishing ease.

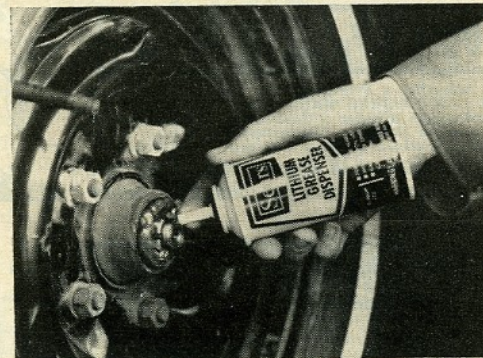
But so far, these pressurized cans have only been able to dish out sprays and foams. Now science has perfected a new type of pressurized package that will let you dispense more viscous substances, like gels, greases, and caulks, with aerosol convenience.

A new shaving preparation called Edge, by Johnson Wax, is one of the first products to be packaged in this second-generation pressurized can. Unlike other whisker-wilters, which emerge as foam, Edge oozes out as a gel—but foams into lather on your face.

What keeps Edge a pressurized gel? It is stored in a plastic bag within the can and thus separate from the propellant, whereas in aerosols it is dissolved. The propellant pressurizes the bag to squeeze out its contents. And the bag folds up until all the contents are gone.



**New shaving product** comes in Sepro can, made by Continental Can Co. The can has a plastic bag inside to separate product from propellant.



**Sears lithium grease** is another viscous product that comes in new can. Caulks and ointments are also available in this dispenser.

## Fantastic Elec-Trak

[Continued from page 70]

utes with the grinder, driven by power from the tractor plug-in.

**Emergency power.** Customers with an eye to home power failures may contemplate the potential of the tractor powerpack for emergency power. GE has thought about this, too. They offer an inverter to provide 60-cycle, 115-volt power for lighting, and they're working on a unit that would keep your furnace or well pump going for a while during emergencies.

Okay. What about the batteries? How long will they last, and what would it cost to replace them?

- A charge will give you six or seven acres of grass cutting.
- Warranty life is five years; expected average life is eight to 10.
- Batteries cost \$32 each, \$192 for all six.

In practical terms, the tractor will run longer on a single charge than any ordinary owner is likely to use it in a continuous session. The batteries, an advanced lead-acid design, actually have about 25 percent more power after two years than they do new. This results from increased surface activity.

**Running costs.** If the cost of the batteries, plus the cost of charging at usual household rates, is compared with the cost of gasoline, electricity is the winner. Assuming you buy regular gas at about 35 cents a gallon and burn two gallons an hour, you're probably looking at \$58 per season (based on 20 hours a month for four months). Disregarding oil, spark plugs, tune-ups, etc., this amounts to about \$232 in four years. Even if you ignored the Elec-Trak warranty and bought a whole new set of batteries after four years, you'd spend only \$192.

Initial cost is in the ball park, as well. The recommended base prices are: \$1,150 for the 10-hp E-12; \$1,295 for the 12-hp E-15; \$1,495 for the 14-hp E-20. This is about midrange for comparable gasoline tractors.

There are, of course, differences in detail between models. For example, the two smaller machines offer the option of standard or heavy-duty batteries. The drive train, power lift, tires, and physical size are all a bit different on the big E-20. All models are 69 inches long—certainly man-sized. The E-20 is 42 inches wide, compared to 36 and 37 inches for its smaller brothers.

No matter how you look at it—from the antipollution angle, in noise abatement, safety, starting convenience, portable power features, or just performance—this tractor is going to shake up the market! 