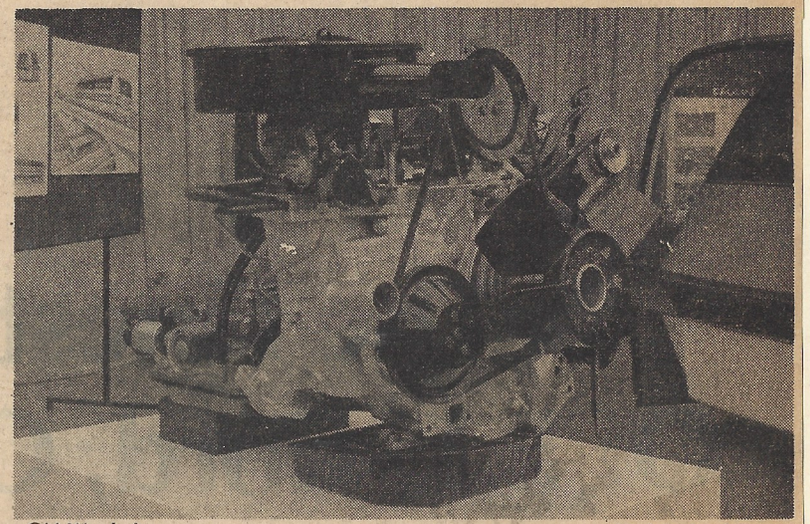
Alternative Engines, The Year after 1984

Best bets on what's going to be around.

Report by **Gary Witzenburg**



GM Wankel. (Bob Irvin photo)

Autoweek's Morning Line For Future Power

	1980	1985
Piston	2:1	5:1
Rotary	5:1	5:1
Turbine	10:1	2:1
Electric	20:1	20:1
Steam	30:1	25:1
Others	50:1	20:1

Few things are sure in the world today, but there is major certainty that most of us have only recently become aware of. And the frightening implications of that fact are just beginning to sink into our mass consumer-oriented minds. We are about to run out of fuel.

We won't run out tomorrow, or even this year, but it's only a matter of time before prices climb out of sight and supplies dwindle.

The point is that we'd better develop power plants for private vehicles which use fuel at a much lower rate than today's gasoline engine. That done, we'd better develop systems which operate totally independently of the burning of fossil fuels.

What will these engines of the future be? What follows are some of the facts and the opinions of experts, and then a few predictions.

GAS TURBINE

In 1963, Chrysler Corporation was experimenting heavily with the gas turbine as a passenger car power source. One highly publicized (and expensive) portion of this program involved a 50-car fleet of turbine cars which were driven more than 1 million miles by 203 private citizens in 48 states. The cars apparently performed well with a minimum of problems, and maintenance consisted of shaking out the air filter every 28,000 miles and occasionally cleaning the compressor (which involved tossing a couple of ounces of cleaner into it while it was running at idle).

Why didn't Chrysler proceed with the development of it's turbine and eventually put it on the market? Probably cost, since turbines are very expensive to build. And fuel consumption was high, although a gas turbine *can* run efficiently on cheap fuels such as diesel oil and kerosene. The turbine has one other inherent disadvantage: It likes to run at high and constant speeds, making it ideal for use in aircraft, trains and long-haul trucks. But usage in private vehicles normally involves a lot of stop-and-go. This means the development of power trains much more sophisticated and costly than the conventional transmission/differential combination.

But these disadvantages can probably be overcome with increasing technology, and we'll give the gas turbine high odds of becoming an important if not a dominant source of automotive power by the early 1980's. Both GM and Chrysler are back into turbine engine development on a crash program basis, and both are predicting a major shift to gas turbine power plants within the next 2 decades.

WANKEL ROTARY

Sort of a cross between a turbine and a piston engine, the Wankel is seeing a period of intense development and high popularity in some circles. Already in mass production in Japan and nearly ready to run on GM's assembly lines, the Wankel is favored for its turbine-like smoothness and relative simplicity of design. It is basically a triangular piston rotating in an odd-shaped container which opens and closes each of 3 chambers as it rotates. The chambers act as the cylinders in a conventional piston engine, sucking in fuel and air, compressing it, igniting it, producing power and exhausting the waste gases in sequence. Like the turbine, it has no complicated valve mechanisms and produces smooth, efficient rotary motion. Like the piston engine, it uses conventional and inexpensive means of intake, exhaust and ignition.

Chrysler's Research chief, George Huebner, dismisses the Wankel as being "dirty" and "a fuel hog," and it *is* just an advanced variation of the old gasoline-burning internal combustion engine. Its oxides of nitrogen emission level is high, although it probably can be cleaned up with more development. And it has an inherent problem in that efficient and durable sealing of the chambers from one another (at the tips of the rotating triangle) has so far been difficult to achieve. But like today's piston engine, the

Wankel can be greatly improved in terms of both fuel economy and pollution levels by using turbo-charging, electronic fuel injection, or a statified-charge system (more about those items later) and we give the Wankel excellent odds of being an interim engine to fill the void between the piston and the turbine.

ELECTRIC

The greatest thing that could happen to the proponents of electric cars would be a major breakthrough in our ability to store electric power. Prototype electric vehicles so far have been limited in speed, power and range by their physical capacities to hold heavy (and expensive) storage batteries. Another problem: Electric power is not as clean as one might think, since the production of electricity for the most part requires the burning of coal or oil. Without vastly better storage capability and environmentally cleaner electrical power, electric motors will not be a major automotive factor in the near future—except perhaps as short-distance, low-speed commuter or delivery vehicles for use in highly congested areas.

STEAM

With the exception of Bill Lear, inventor of the Lear Jet, there are few who see much hope for conversion to steam power in the foreseeable future. Lear has an operable steam-powered car and a bus still in the early stages of development at his Reno, Nevada headquarters, but most knowledgable people consider steam power as we know it to be far too complicated and expensive for widespread use.

OTHERS

GM alone has evaluated over 300 alternate power plant proposals over the past 10 years, and has stepped up its budget for the investigation and development of promising new engines to $46 million this year. The much-publicized **Sterling** engine of Ford is a revival of an old idea, but certainly an idea worth exploring. Another concept is the Australian **Sarich Orbital** Engine. We'll look into both the Sterling and the Sarich, as well as whatever else comes along, in future articles.

In the meantime we're betting on first the Wankel and later the gas turbine to share the field with (but not replace) constantly improving versions of the old reliable piston engine in the next 10 years. Beyond that, we can hope for new sources of fuel (nuclear, perhaps, or even solar) to supplement the world's dwindling supply of Mother Oil.

Alternate Engines, Cont.

at a reasonable price. For someone with the money and facilities to experiment, the possibilities are endless.

Gageby Carrozzeria is in St. Paul, Minn. The company is not in business to make or sell wheels—Gageby's guiding light is the design of sports racing cars. The Gageby wheel is a by-product of the car project, and he hopes to sell the 43 patents pending on it in order to finance his car-building operation.

Gageby says that if he cannot sell the patent rights to his super wheel (are you listening Minilite, American Racing, Chassis Engineering, BWA, Cromodora, E-T, Dayton Wire, etc.?) he will go into production himself. Given the necessary capital, he estimates he could begin production in 2 months.

Considering that the Gageby wheel requires only about $2 in materials (the average mag uses about $19 worth of magnesium alone) and can be hand-made in a few hours, Gageby feels that his design will compete with mags in price even if it is not mass produced. Given modern automated manufacuring procedures, the conventional mag wheel just might be priced right out of the ball game.

Gageby's phone number is (612)776-4161. Please don't call us. **G.W.**

Wheels, Continued.