and Water Pollution, to take a fairly critical view of the pleas the auto manufacturers made in behalf of the internal combustion engine. Muskie contended that the commitment to the standard engine was based on investment, consumer acceptance, and consumer familiarity, rather than on any actual superiority. "Doesn't all this," Muskie concluded, "add to the momentum of the status quo in a way that may run counter to the public interest?"

By their own admission the automotive companies have not expended the same time, energy, and commitment to steam car research that the "other side" —the steam car advocates—have. The companies' research has been minimal, and it has been heavily biased against steam cars. Ford and GM representatives contend that boiler explosions occur frequently in steam cars. They told the Senate Committee that steam vehicles would also be more cumbersome, expensive, and less efficient than the internal combustion vehicles. The proponents of steam presented an opposite picture. They said that their cars would be cheaper, less complicated mechanically, and safer. Not only were boiler explosions a thing of the past, they said, but the steam car's need for less fuel, and less flammable fuels at that, make it safer than an internal combustion vehicle. In addition, they argued, the steam car would produce practically no pollutants, and would be relatively silent. The Williams brothers said that, with some financial support, their cars could compete favorably in terms of performance with the present internal combustion vehicles.

Steam cars have come a long way since the days of the old Stanley Steamer. The Williams car, for example, can reach speeds of up to 100 miles per hour, and takes less than 30 seconds to start up in any weather. It does away with many of the parts of the internal combustion vehicles, having no need for a carburetor, muffler, distributor, or air-pollution control equipment. It also employs a much simpler transmission and starter. However, steam cars have components that the internal combustion engine does not need, such as a boiler and combustion controls. Many of the basic components are the same for both, however—such as the pistons, cylinders, crankcase, and valves—so that, on a mass scale, there should not be a great deal of difference in price between the two; steam proponents actually claim that theirs would be significantly cheaper to produce. The Williams car can use any distillate fuel to heat the water, although kerosene has been standard. It averages about 30 miles per gallon of kerosene, and can go about 500 miles on 10 gallons of water; seepage causes the need for refilling. Although the Williams brothers claim that they use regular tap water and have had success with it, they admit that distilled water is, in the long run, better for the engine.

However, without government support, steam cars face difficulty. Lloyd D. Orr, professor of economics at Indiana University, told the senators that economic factors, such as resistance to change and so-called barriers to entry, including the high capital commitment necessary to establish a new automotive corporation, all play a part in keeping the steam producers from successfully competing with the internal combustion manufacturers. Theodore Johnson, executive vice president of Thermo Electron Corporation, a company that has tried to work with the motor companies in producing steam engines possibly for boats and golf carts, raised another point. He said that "consumers today do not perceive freedom from pollution in the exhaust

University Heads Seek More U.S. Aid

Presidents of 42 of the nation's major universities issued a statement on 25 June that called for greater federal assistance to higher education.

The appeal, contained in a 30-page paper, was prepared by a five-member committee headed by Robert F. Goheen, president of Princeton University.*

The presidents warned that the "staggering gap" between university expenditures and incomes is widening. They said that despite the high federal costs of defense, the Vietnam war, and urban problems, the federal government cannot ignore the "worsening fiscal crises" in colleges and universities until after these other issues are resolved.

The Association recommended that the federal government expand undergraduate and graduate scholarships and loans, increase support for construction programs, and initiate "broadly based" general aid programs.

The 42 universities that endorsed the position paper together award 52 percent of the nation's graduate and professional degrees and 75 percent of all Ph.D.'s. They supervise more than three-fourths of all federally sponsored research performed in universities. Association executive committee leaders said that the timing of the statement was intended to alert political candidates, Congress, and the Administration to higher education needs.

Executive committee members stressed that besides the fiscal problems which confront private universities, graduate education poses special problems. They said that graduate enrollments may more than double by the end of the century and the cost of educating a graduate student is three to six times that of educating an undergraduate.

The committee also warned that new areas of study, particularly in the sciences, will require large expenditures in the future. They pointed to such fields as molecular biology, oceanography, and the introduction of quantitative methods programs into the social sciences. The committee emphasized that greater federal aid should not be a substitute for, but rather a supplement to, other sources of university income. Pointing out that present corporation and business funds represent less than 5 percent of university income, they said "there is no reason to expect a major break-through in corporate philanthropy" whereby industry and business would pick up a substantially larger share of the support than they give at present.—MARTI MUELLER

* The report and recommendations for federal financing were prepared by a five-member committee of the Association of American Universities. Chairman of the committee was President Robert F. Goheen of Princeton University. Other members were President William C. Friday of the University of North Carolina, President Fred H. Harrington of the University of Wisconsin, Chancellor G. Alexander Heard of Vanderbilt University, and President Nathan M. Pusey of Harvard University. The Association president is David D. Henry, University of Illinois president.