

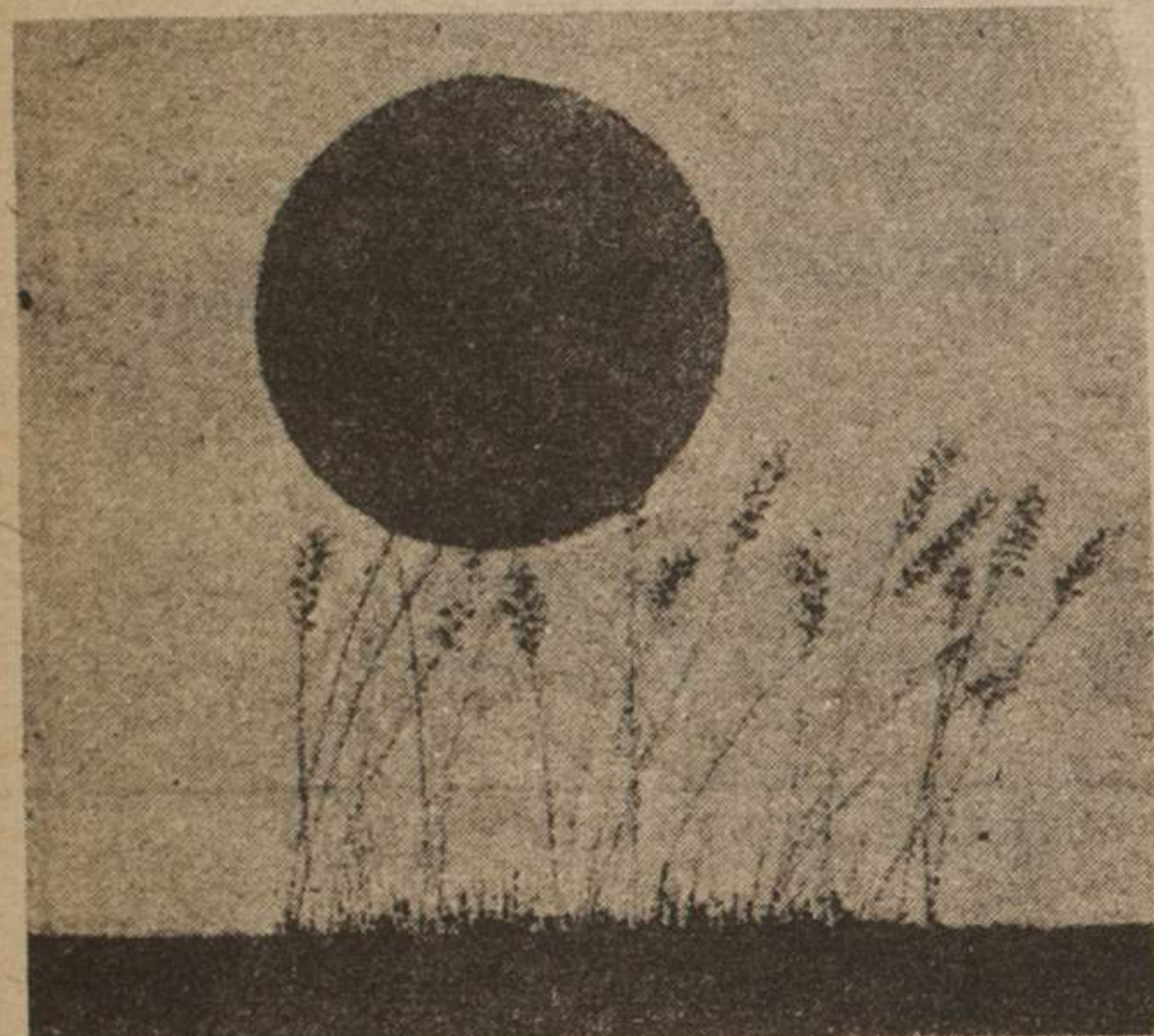
# Blowing in the Wind

Wind energy has pumped water for centuries, and it powered the world's fleets for several millennia. In the early 1900's, 6 million windmills generated electricity and pumped water all over the U.S. but by the 1950's cheap fossil fuel and rural electrification replaced most of them. Today in Kansas, hundreds of old windmills dot the countryside, most of them decaying, rusting; rarely do you see a new windmill. So quickly have people forgotten how to use the wind, wind technology is referred to as exotic.

Given the fact that electric rates will continue to climb and the promise of new breakthroughs in storage ability, wind power can once again provide people with a practical source of energy.

And, construction of wind systems could result in more jobs for local residents. Small businesses could construct windmills in local shops, using local resources and labor.

## energy



\*\*In New York City, when members of a tenant housing cooperative installed a windmill on their roof, Con Edison threatened to disconnect service to the building. The company claimed the feedback of windmill power could create "adverse effects on Con Ed's transformers and computerized control equipment and even pose a hazard to repair crews working elsewhere in the same system." However, the New York Public Service Commission ordered Con Ed to buy surplus power from the wind generator and so far, Con Ed has suffered no damage.

\*\*Windworks (Box 329, Route 3, Mukwonago, WI 53149), a small firm in Wisconsin, developed the Gemini Synchronous Inverter, which allows a windmill to feed electricity into the grid when it produces more than its user consumes. When Windworks first tried to hook an inverter-equipped windmill into the grid, Wisconsin electric refused to allow it. Eventually the utility permitted the windmill to feed excess electricity to the grid, but the utility refused to buy the surplus.



These are examples of small-scale operations. But there have been some successful giants in wind power. The largest windmill ever operated was known as Grandpa's Knob, erected in 1941. It generated power for a Vermont utility for two years, until a faulty bearing --irreplaceable during the war-- put it out of commission. Later it threw a blade, but was never repaired because by that time, cheap oil was in, and wind was on its way out. It is still considered to be a technical success by engineers.

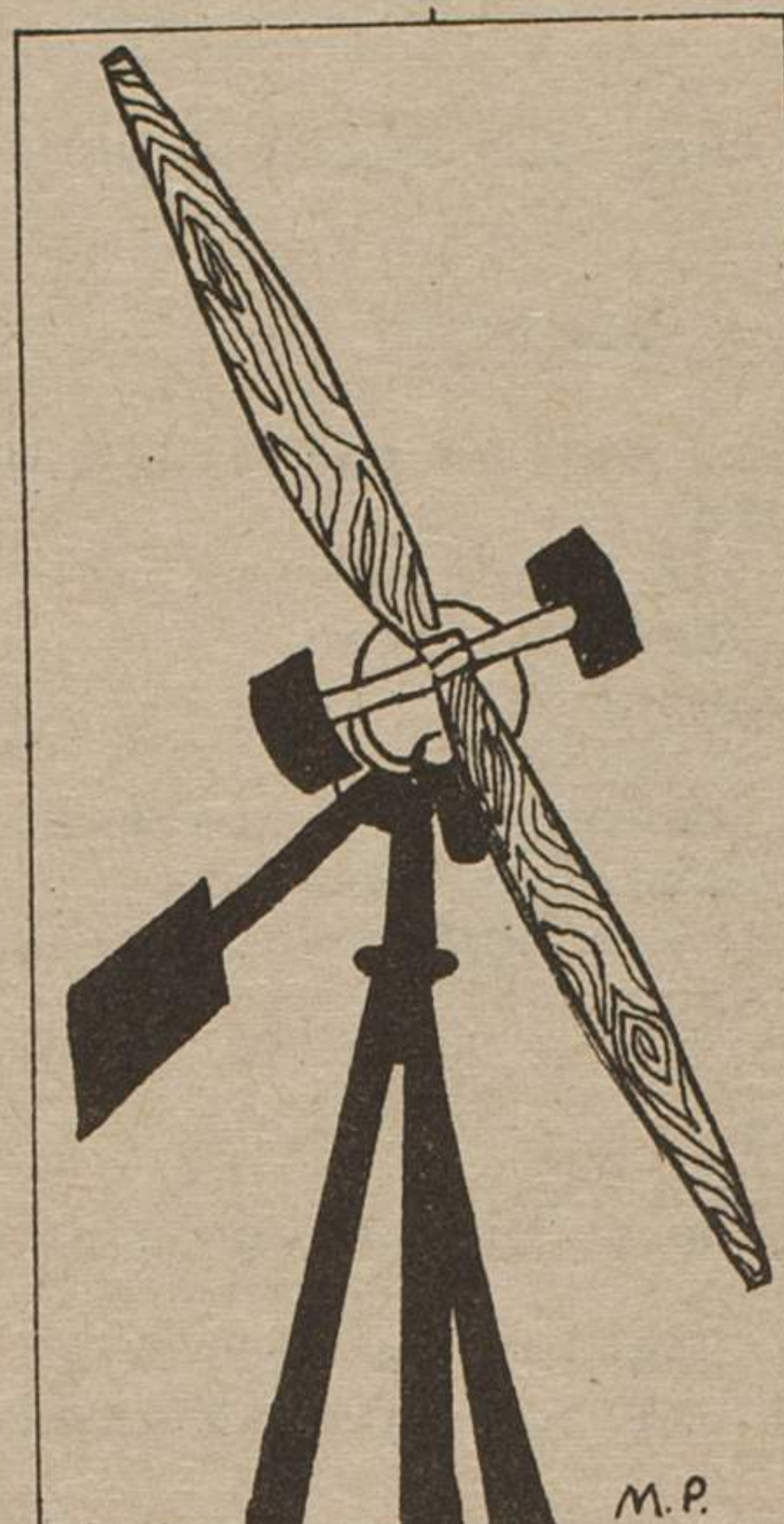


\*\*Just off the coast of Massachusetts, the island of Cuttyhunk now receives approximately half of its electricity from a windmill. The machine was manufactured by a small firm employing only 10 people. The windmill provides the 50 islanders with over 400,000 kw per year. Projected cost of electricity is 5.3 cents per kwh, which is competitive with electric rates in most areas of the country. The windmill cost \$280,000, as compared to its \$2 million neighbor on Block Island.

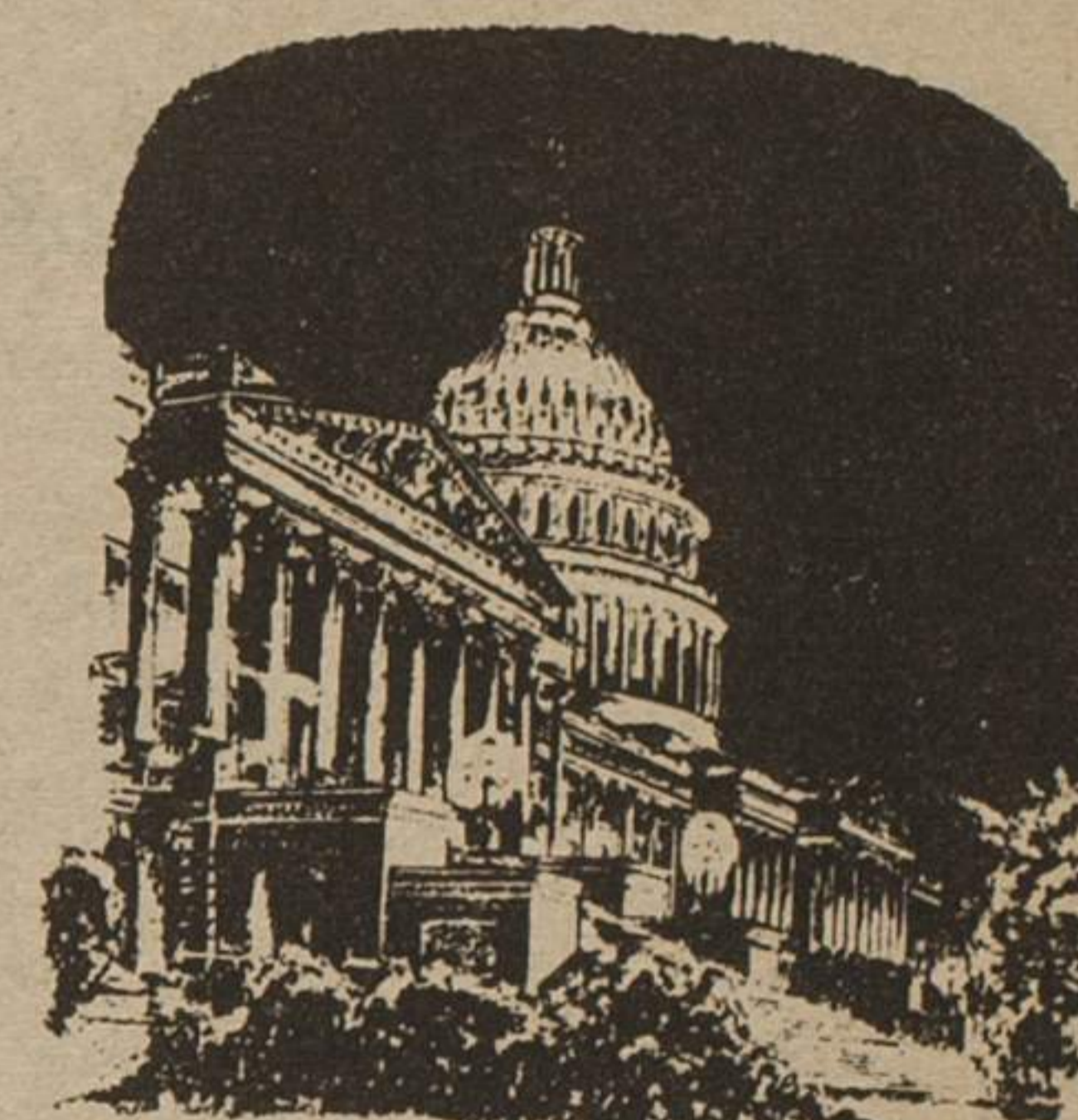
\*\*A windmill almost as big as the U.S. Wind Program's giant will be nearing completion in Denmark. The 2 Mw machine is a joint project by teachers, students, carpenters, engineers, and others in the college community of Tvind. The group's aim was to reduce the college's \$48,000 fuel bill. Since the wind at Tvind blows 280 days per year at ground level speeds greater than 9 feet per second, a windmill seemed the logical choice. The Tvind mill will cost \$300,000 compared to \$10 million for the Boeing giant.



The Federal Energy Administration, under pressure from Barry Commoner, has released a major report on photovoltaics (electrical energy from sunlight) prepared by the BDM Corp. (McLean, VA.). The report suggests that an investment of just \$500 million by the Defense Department to replace 20% of its gasoline generators would return \$2 billion in savings over a 20-year period. This market would be in the 152 Mwe range; at a market level of 500 Mwe in the 1980's, photovoltaic-generated electricity would be priced at 50¢/peak watt--a price that would make photovoltaic devices cost-effective against nuclear power by the time many proposed nuclear plants are due to be under construction.



\*\*In Denmark, where 100,000 windmills supplied the equivalent of 200,000 kw in 1900, the city of Kolding's high school receives all its electricity from a windmill. Capital and installation costs for the 8 kw machine totaled \$3200, and it will pay for itself in 3 years.



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