

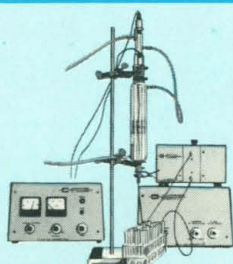
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11 December 1970

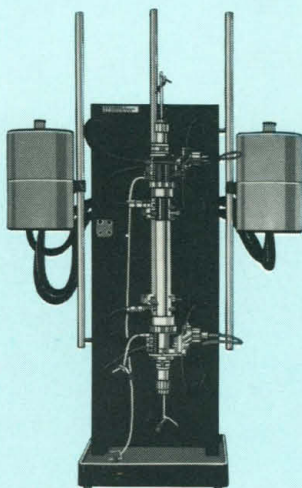
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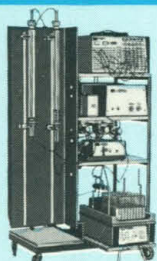
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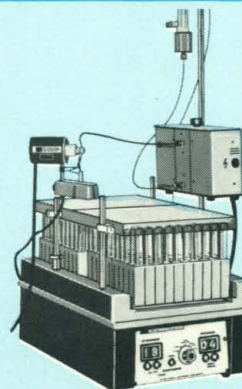
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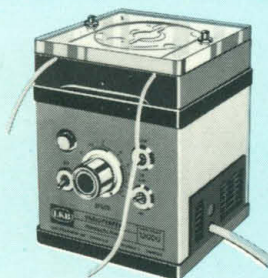


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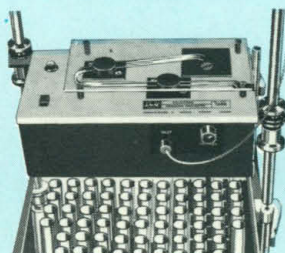
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COVER

Peruvian vessel (Mochica Period) portraying a specially processed form of dehydrated potato known as "tunta." Tunta is currently prepared by a method involving the treading, washing, and drying of a particular type of Andean potato which is somewhat bitter in its fresh form. The art of potato dehydration originated with the ancient Peruvians. See page 1161. [Donald Ugent, Courtesy of National Museum of Archeology, Lima, Peru]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

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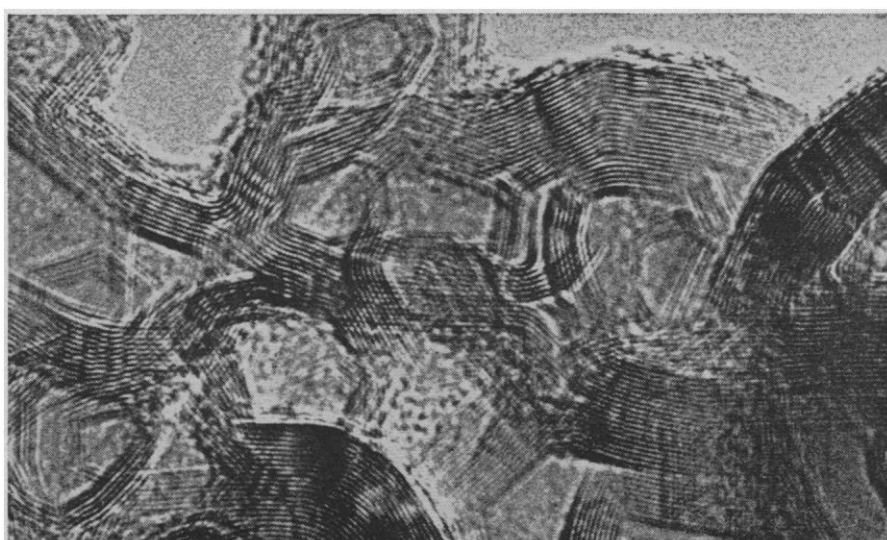
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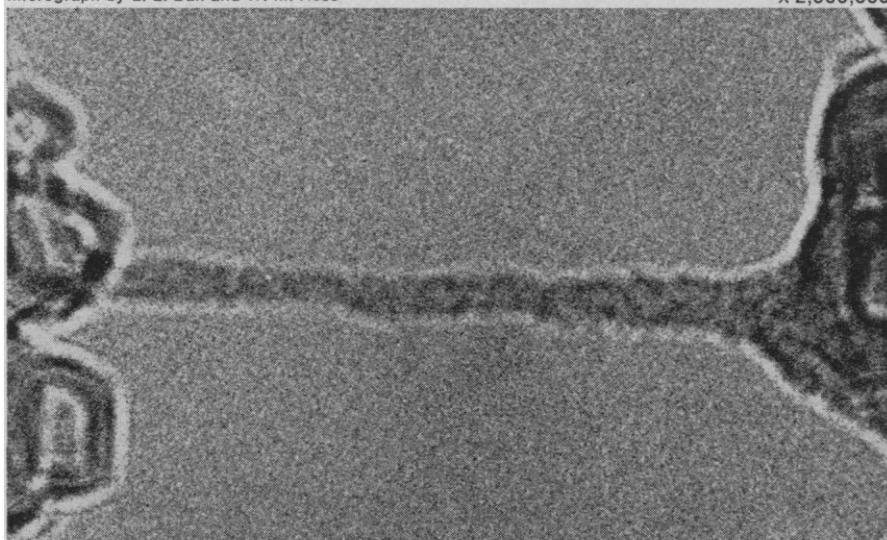
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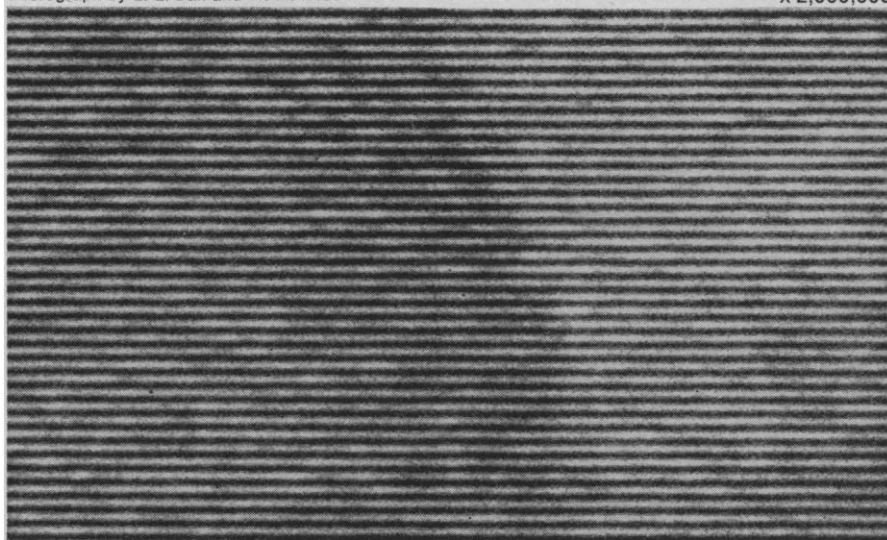
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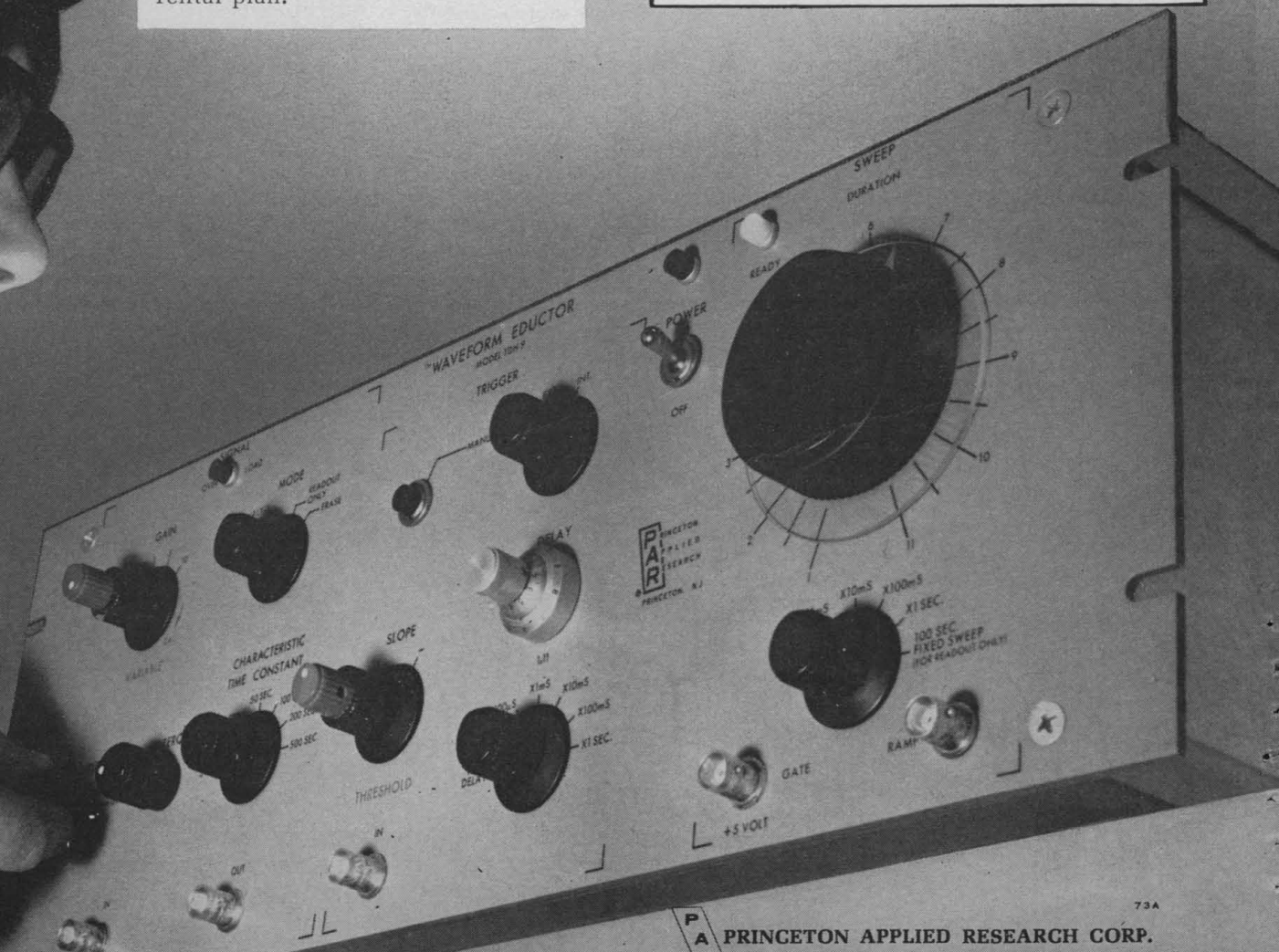
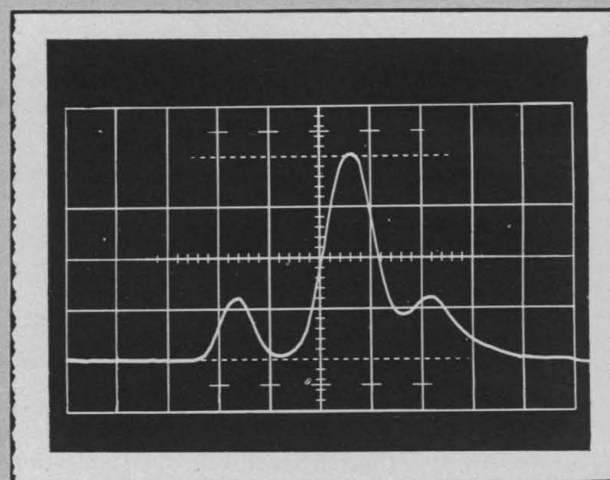
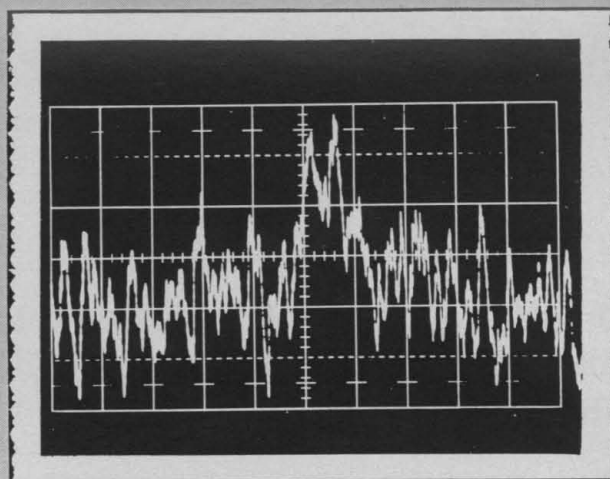
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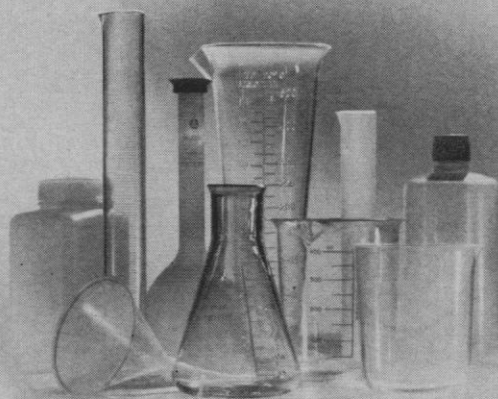
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Costs versus Benefits of Increased Electric Power

Typical estimates of future demand for electric power in the United States assume a continuation of the previous rate of growth; power consumption eight times that of the present is projected for the year 2000. Little attention is devoted to the anatomy of the future demand. It is pointed out that population is growing, the gross national product is expanding, and energy demands are expected to increase. However, it is physically impossible for exponential growth to continue indefinitely. Already it is apparent that the generation and distribution of electricity entails some damage to the environment. Utilities can be expected to minimize the damage through the use of cleaner fuels, better siting, and underground transmission of power. However, some problems will persist. If conventional fuels are employed, the increased demands on them will speed exhaustion of oil and gas, and the use of large quantities of coal is likely to despoil large areas. Nuclear power carries with it many risks. Thus the utilities can expect to face continuing opposition in their efforts to expand power generation. The outcome of the battle is likely to rest on a balancing of social costs versus benefits to the consumer.

Much of the electric power goes to industry and to commercial use. However, the public is most immediately affected by that part going to individual consumers, and the electorate is likely to base many of its attitudes on personal experience.

If private consumers were to increase their use of power by a factor of 8 by the year 2000, where would the demand come from? Only a small fraction of the increase would come from population growth. There continues to be a proliferation of electrical gadgetry, but power consumption by most of these devices is trivial. For example, an electric razor consumes only a kilowatt hour per year, which is less than an air-conditioned house uses in an hour. In general, the devices that are used intermittently consume only modest amounts annually. Major items and their approximate typical annual consumption in kilowatt hours are color television, 500; lighting, 600; electric range, 1200; frost-free refrigerator-freezer, 1700; freezer, 1700; water heater, 3500; air conditioning, 5000; home heating, 20,000.

The more affluent segments of society already have about all the television sets, lighting, and cooling that they can use. Future expansion in public power consumption is dependent on an increased standard of living by the less affluent and on widespread adoption of electricity for home heating. At present only about 3.5 million homes are heated electrically; the major potential market is in home heating. Utilities are responding to the public's concern about pollution by extolling the virtues of clean heat. They soft-pedal the fact that the pollution problem is merely transferred elsewhere. However, it is technically much more feasible to eliminate pollution at a few major emitters than in millions of individual homes. Another consideration is the thermodynamic inefficiency introduced when electrical energy is dissipated resistively. However, if heat pumps were utilized at the homes, the overall efficiency would be acceptable. So-called all-electric living has a major disadvantage that should not be overlooked. It makes society terribly vulnerable to power failure, especially in winter.

The era of unquestioned exponential growth in electric power has come to an end. The future course of expansion will be determined by the public's estimate of costs versus benefits.—PHILIP H. ABELSON

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*Can be picked up for less than \$34 at a nearby counter. Forgive us if this suggestion has failed to reach you in time for the gifting season.

TV, popular or not

"Videoplayer" is not a trademark. It's a generic noun you won't find in the dictionary yet. Better known are various proprietary designations of companies intending to compete in the business of TV that enters the home via purse or pocket, not antenna or cable. The little cartridge simply drops into the videoplayer you will have attached to your set.

The idea is too big to fit under anybody's particular tent. We needed a generic descriptor in stating *our* position. Which

is that the best thing to have in the cartridge is super 8 movie film. For very fundamental reasons: super 8 material is ex-tant in vast profusion and is also very inexpensive to create fresh (*for example, with the camera shown at left*). For subject material that interests more than a single family or classroom, a multitude of processors across the land stand willing, able, and eager to deliver as few as 5 uniform, standardized super 8 copies for distribution. To make the print order 500,000 instead of 5 is also possible with super 8, but economics does not *demand* a huge audience.

Don't we all keep telling ourselves that we are individuals, that we don't necessarily share our neighbor's preferences in all things, that life at the broadest common denominator sometimes palls?

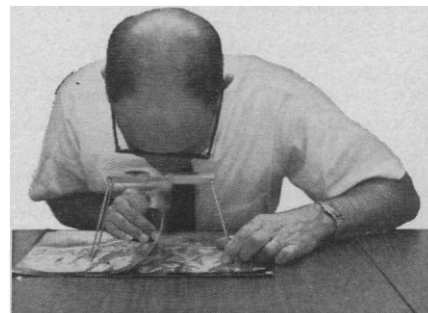
Otherwise, why a videoplayer at all?

The shape of the land

December. Low cloud covers much of America. Soon the snowdrift contours will be the shape of the land. Ski-time. Not a good time for photographic air survey to help plan how to use the land for other outdoor recreation or other needs of an urbanized society. And where not to try using it. Not a good time even if arrangements with good aerial survey houses could be made instantaneously. Good time is a short period in the spring just before the trees leaf out. If you miss that, you may wait nearly a year for a try in the fall. Let us send you *right now* the names of the aerial survey houses we know. Most of them also do business in prints from existing aerial photographs. Just possibly the photography you need has already been done.

For the names ask Dept. 926, Eastman Kodak Company, Rochester, N.Y. 14650.

Perhaps we are rushing you. Perhaps all you can profitably use at the moment is the new Kodak Publication M-76, "Photo-interpretation for Land Managers," available from photographic dealers or for \$1.50 from our Dept. 454 (instead of 926). It even tells of non-proprietary sources for air survey photographs.



Prices subject to change without notice.