is lost. Some of these compounds were labeled "chromatographically homogeneous" by manufacturers; others were listed as "99%." It should be pointed out that at least one manufacturer sells a special grade labeled "thymine-free." This indicates the vast difference between "chromatographically pure" and "purified by chromatography."

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Archives

Apropos of your recent discussions of the MURA problems (31 Jan., p. 450), I have resurrected the attached document.

AIUR never had the prestige of AMSOC, but it flourished at MIT shortly before World War II and briefly thereafter. Publication dates were irregular, and I think that this was the last. The occasion was the receipt of a letter of intent from Brookhaven for the design of the present Cambridge accelerator. I thought it might have at least historical interest for your readers.

PROCEEDINGS OF THE AMERICAN INSTITUTE FOR USELESS RESEARCH
FEBRUARY 3, 1953

Progress in the design of charged particle accelerators during the past two decades, has been marked by an exponential growth in the energies about to be achieved, of approximately 2.5 db per year. It is well established that the cost of the equipment increases at least linearly with the energy. Thoughtful scientists have been increasingly uneasy about the future because the national income has increased at the rate of only 0.5 db per year over the same period. This leads to the conclusion that there is danger the ultimate expected particle energies will be determined by the national income instead of scientifically acceptable natural laws.

Happily, the initial results of a long-range program sponsored by the Institute lay these fears to rest. Professor L. S. Coupling* reports that there is a limit to earthbound particle energies of 3×10^{15} ev. The result follows since particle energy

$$E = \frac{eb\,R\,E_0}{m_0\,c}$$

Professor Coupling assumes an iron core machine with a practically attainable flux density $B \approx 2$ webers/m^2 and a maximum radius of curvature equal to the earth's, $R \approx 6.4 \times 10^6$ meters.

At the going rate of 10^3 ev/$, the ultimate proton accelerator will cost about $3000 billion, which is only 10 db above present national income. Thus we can easily afford the machine by spreading the payments over 10 years, and a joint effort with Russia would make it even easier.

In addition to these welcome results, Professor Coupling finds that, by a fortunate coincidence, the recently established limiting rate of energy increase of 10^5 ev/cm means that the accelerator can be built to have a length very close to 36×10^6 meters, and will therefore just nicely go around the world once. Besides the economy of having the target and the injection system at the same latitude and longitude, he feels the scientific world will be esthetically gratified at this particularly elegant result. He suggests that the instrument be named the "Circumtron," although other members of the Institute feel that a Greek-derived name is more in keeping with the elegance of it, and prefer "Perimetron" or "Peritron."

* No relation to the notorious science fiction writer, J. J. Coupling.

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One-Tailed Test of Trivia

Mario Bunge is certainly correct in saying (27 Mar., p. 1394) that in research a clear statement of the problem is essential—not only to the reader of the final report but also to the researcher himself, since a careful statement of the problem often suggests the best way to attack it. But I should like to add a cautionary note to his statement that "scientific research does not begin with gathering data but with posing problems." Unfortunately, there are those who go farther and say that the gathering of data must be preceded by a specific "experimental hypothesis."

Many subjects of research involve steady accumulation of data even when the causal relations are so obscure or complex that elaborate hypotheses in advance are impossible, for example in the behavioral sciences or in meteorology. The proposition that one must always have a detailed hypothesis at the beginning and cling doggedly to it until the final bit of the Latin square falls into place is, in my opinion, responsible for many of the trivia that are cluttering our journals more and more. It also leads to that greatest abomination of all, the so-called "one-tailed test of significance," a ploy in which the researcher claims partial precognition and informs us that he knew in advance that treatment X could only produce either an increase in Y or no change, never a decrease.

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