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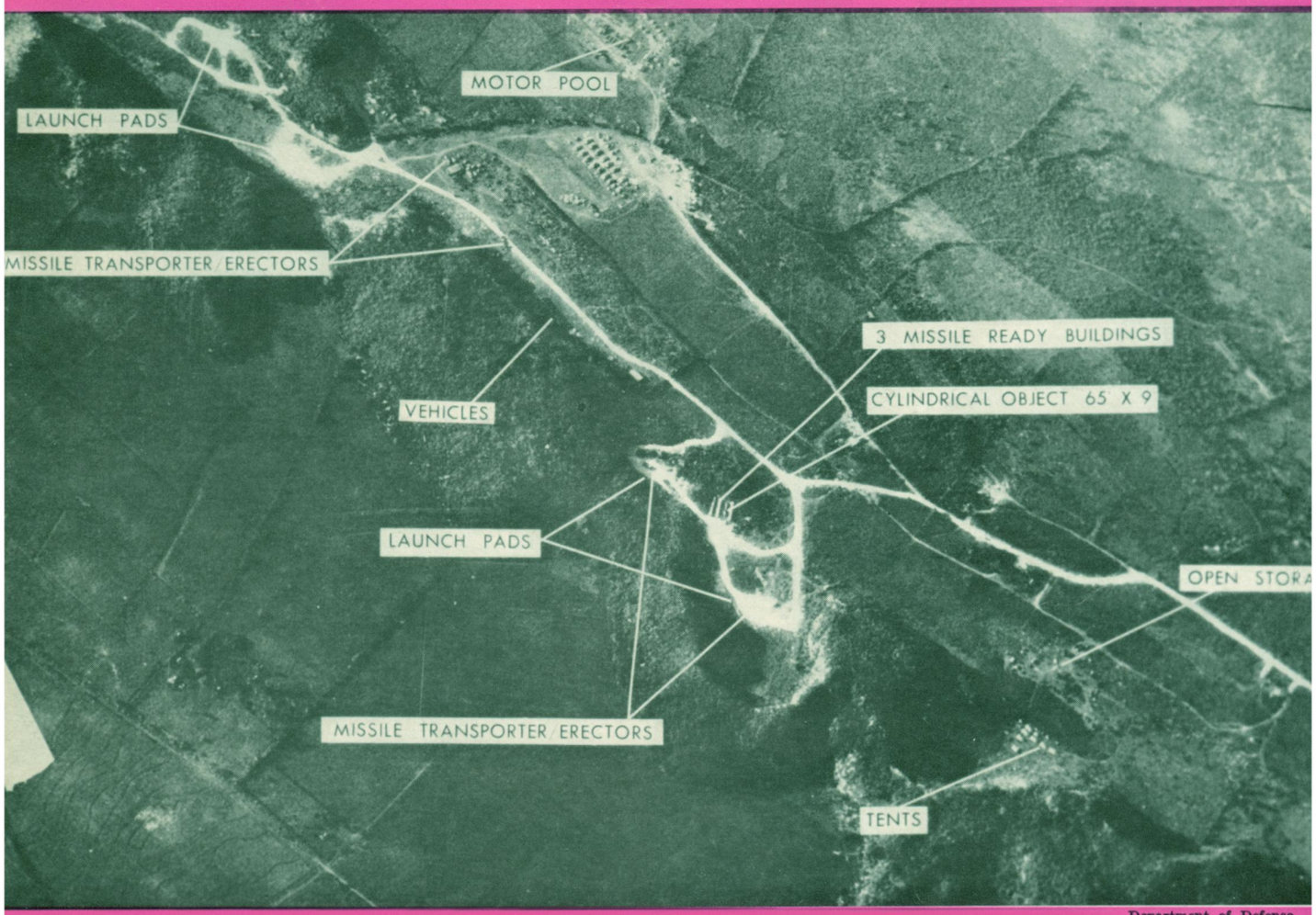
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Department of Defense

Cuban Missile Sites

See Page 283

A SCIENCE SERVICE PUBLICATION

NEWS FROM
BELL TELEPHONE LABORATORIES

New high-purity alloys make better electron tubes

Ingot of high-purity nickel alloy is removed from controlled atmosphere melting furnace. Alloy is virtually free of impurities which inhibit electron emission. The new alloying technique and the methods for making cathodes and evaluating their electron-emitting properties were developed by K. M. Olsen and H. E. Kern.

Scientists at Bell Telephone Laboratories have developed new high-purity nickel alloys which are proving highly effective in lengthening the life of advanced-design electron tubes used in the Bell System. This development meets the demand of new electronic technology for long life and high reliability in electron tubes.

One of the new alloys is now providing the outstanding performance required in the electron-emitting cathode of the traveling wave tube in the Telstar satellite.

The first step was to devise new means for the fabrication of ultra-pure nickel to eliminate those impurities harmful to cathode performance. It was then possible to add to the ultra-pure nickel the alloy constituents and activating agents desired for optimum cathode performance, and at the same time to hold the undesirable impurities at levels below 50 parts per million. These techniques involved purifying the nickel raw materials and melting, alloying and casting in controlled atmospheres of hydrogen and helium.

This development is an example of how metallurgical scientists work to improve communications. The new nickel alloys are now being produced by the Western Electric Company, manufacturing unit of the Bell System.

Bell Telephone Laboratories
World center of communications research and development

PROBABILITY AND STATISTICS KIT K22

with more than 60 Experiments and Examples in CHANCES, PROBABILITIES and STATISTICS

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- ***If a World Series team has won the first two games, what are the chances of its winning the Series?***
- ***How reliable is a sample of twenty observations?***
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The above posers are only a few of the provocative questions you can now answer with our new Probability and Statistics Kit K22—an irresistibly entertaining introduction to one of the most fascinating and far-reaching subjects in science today.

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From the Instruction Book's preface by Dr. Frederick Mosteller, Professor of Mathematical Statistics, Department of Statistics, Harvard University, Cambridge, Mass.:

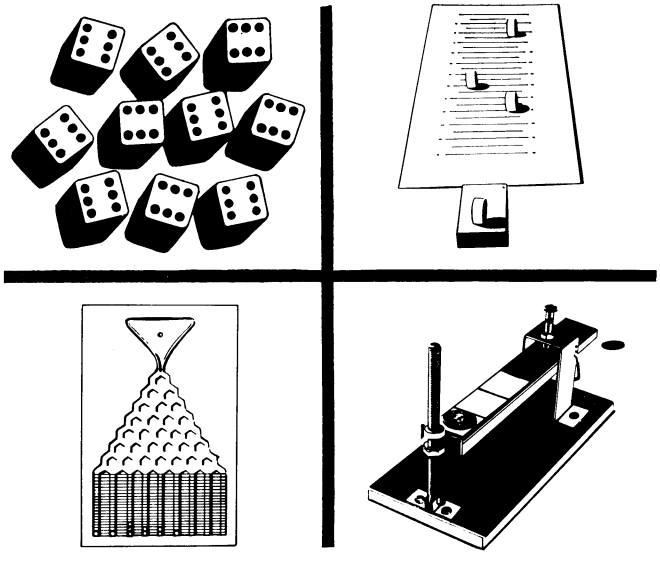
. . . Some may feel that this sort of material is only for the youth who is quick at science and mathematics, and certainly such a youngster will profit mightily. But it is not so well known that children, retarded in the mathematical areas, brighten up when presented mathematical tasks derived from experiments they have executed themselves . . .

In all the talk about science and mathematics, let's not forget that experimentation with mathematical ideas is fun. And hours and hours of such instructive fun are in the Berkeley book and lab. How do I know? In preparing this introduction, I have been greatly hampered by my not-very-studious 14-year old who busily instructs me in the use of all these materials.

Now if you'll excuse me, I have a new theory I'd like to try on the coin-flipping machine. Have fun!

SOME OF THE CONTENT OF THE EXPERIMENTS: If you flip a coin 50 times, what will happen? If you roll 2 dice, what will happen? If you roll 30 dice and do that 40 times, what will happen? How often will you get 5 sixes when you roll 30 dice? How often will you get 10 sixes when you roll 30 dice? How will raindrops be distributed? How do you use the frequency of letters to solve a cryptogram? If you have 20 black beads and 10 white beads in a sampling box, what are you likely to get in ten samples? If you have 20 black beads and 10 white beads in one sampling box and 25 black beads and 5 white beads in another sampling box, are you likely to be able to tell the boxes apart if you sample twenty times? How random is random? Can a person name 100 digits randomly out of his head? How do you measure departure from randomness?

STATISTICAL DISTRIBUTIONS DISCUSSED IN THE KIT AND EXPERIMENTS: Uniform Distribution in one and two dimensions; Binomial Distribution; Normal Distribution; Chi-Squared Distribution; Poisson Distribution; Multinomial Distribution.



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- Full descriptions of 27 Main Experiments and briefer descriptions of over 36 subsidiary experiments
- Book *"Probability and Statistics: An Introduction Through Experiments"* by Edmund C. Berkeley—140 pages—with a preface by Dr. Frederick Mosteller; includes a chapter by Martin Gardner

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