

15¢

\$5.50 A YEAR

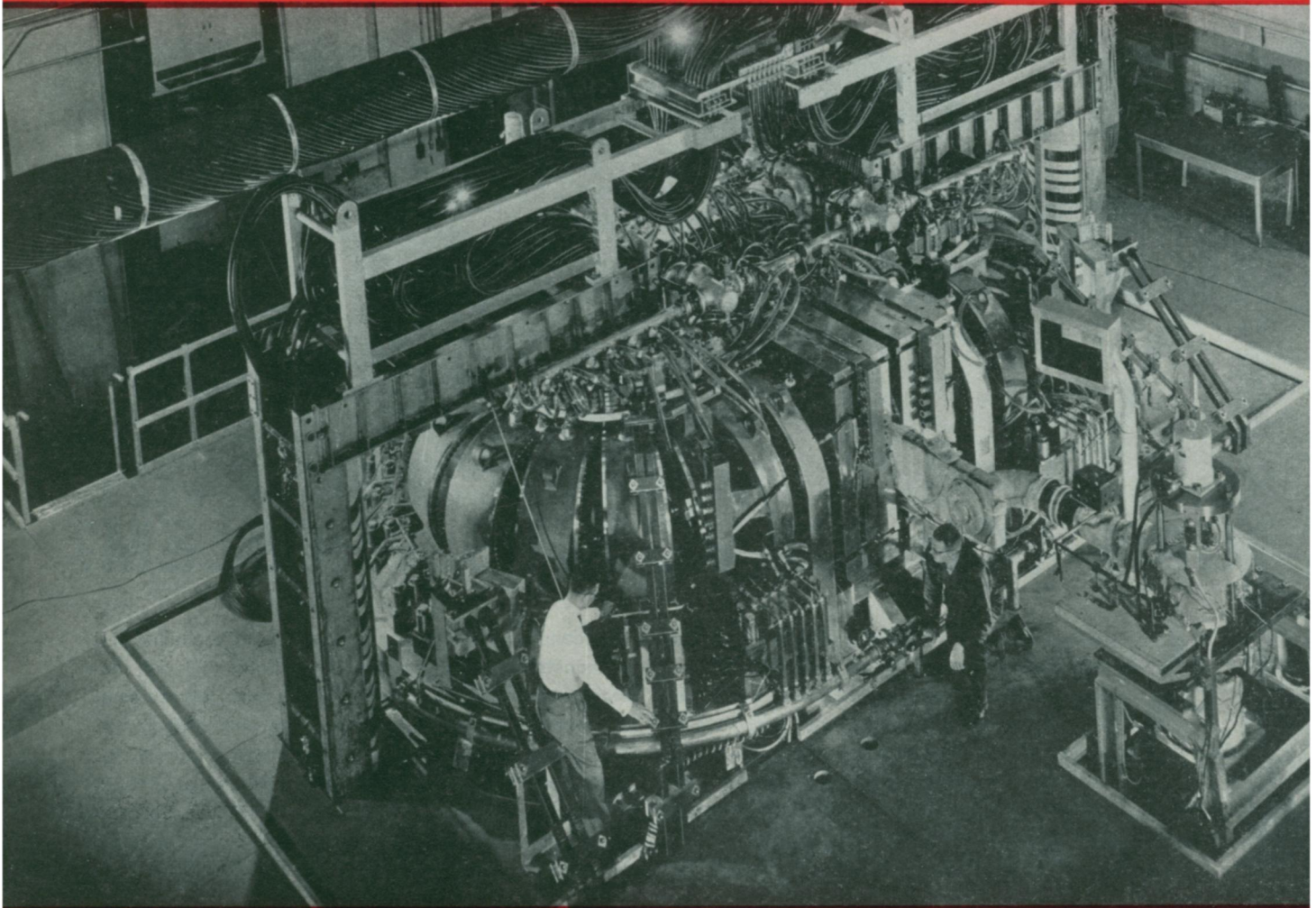
November 25, 1961

VOL. 80, NO. 22 PAGES 345-360

SCIENCE NEWS LETTER

®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Steel Stellarator

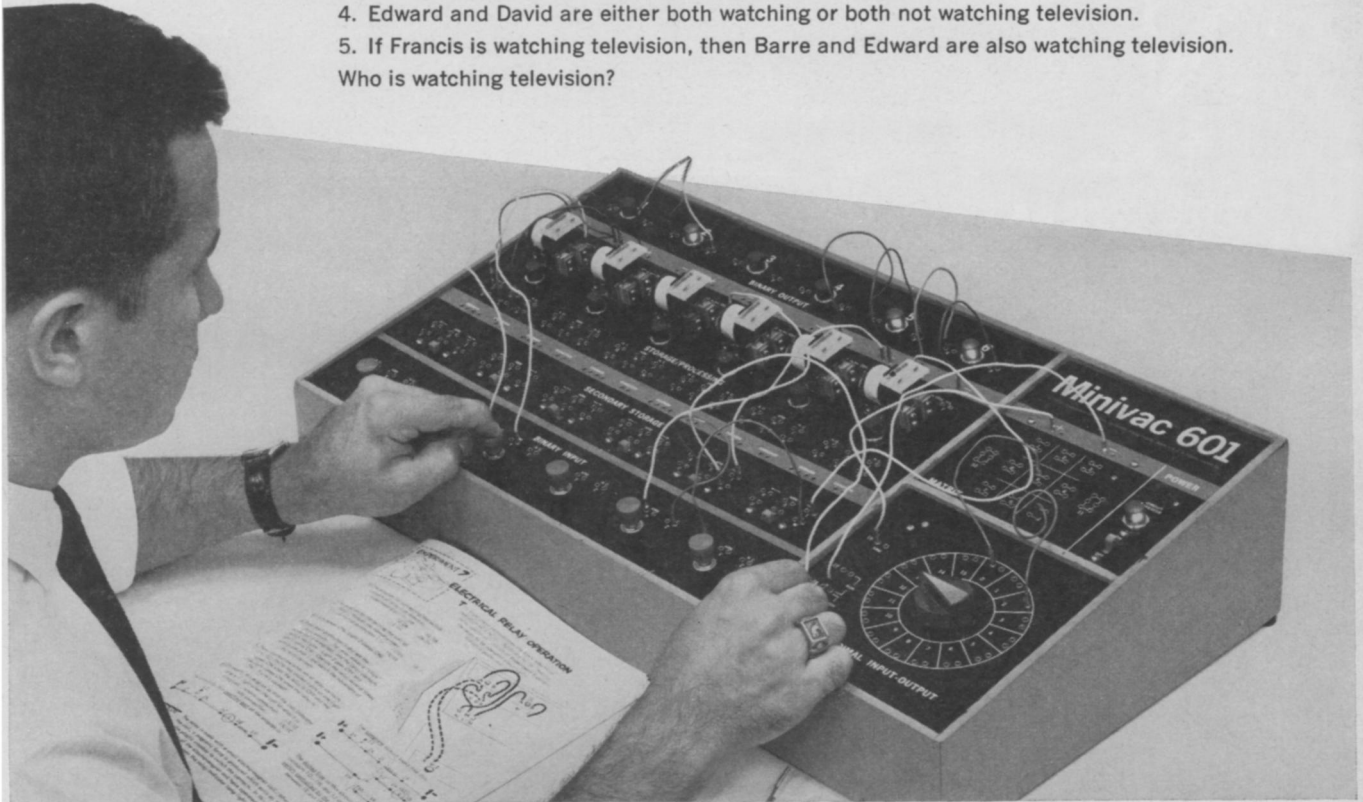
See Page 349

A SCIENCE SERVICE PUBLICATION

Q

Barre, his wife, Clara, and their children, David, Edward, and Francis are at home. It is eight in the evening.

1. If Barre is watching television, so is his wife.
 2. Either Edward or Francis, or both, are watching television.
 3. Either Clara, or David, but not both, is watching television.
 4. Edward and David are either both watching or both not watching television.
 5. If Francis is watching television, then Barre and Edward are also watching television.
- Who is watching television?



CAN YOU SOLVE THIS PROBLEM?

A Minivac® can! This is one of literally hundreds of problems that are difficult to solve with the unaided mind . . . but extremely simple with the help of Minivac. What is Minivac? Minivac is a digital training computer that can remember, think, translate languages and show you how computers can multiply your mind's capacity by a factor of thousands.

Developed as a private project by Dr. Claude E. Shannon, now Donner Professor of Science at the Massachusetts Institute of Technology, Minivac simulates computer ap-

plications in business, science, politics, and the military. It demonstrates how computers read printed material, provide automatic control, and duplicate many attributes of intelligent behavior. It can recognize geometric forms, solve simple mazes, perform mathematical operations, and translate languages. No previous knowledge of mathematics or electronics is needed to use Minivac. Six comprehensive manuals accompanying the computer guide the user in his exploration of digital computers, their application, potential and limitations.

\$85.00

SCIENTIFIC DEVELOPMENT CORPORATION

Computer Sales Department
372 Main Street, Watertown, Mass.

Scientific Development Corporation

Computer Sales Department
372 Main Street, Watertown, Mass.

Gentlemen:

Please send me

Minivac 601 Check or money order enclosed.

Minivac 601 C.O.D.

complete literature on Minivac 601.

Name.....

Address.....

City.....Zone.....State.....

GET READY FOR THE SPACE and SCIENCE ERA! SEE SATELLITES, MOON ROCKETS

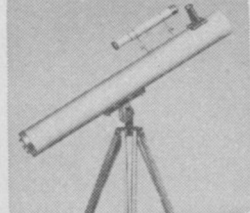


AMAZING SCIENCE BUYS

for FUN, STUDY or PROFIT



See the Stars, Moon, Planets Close Up!
3" Astronomical Reflecting Telescope
 (Famous Mt. Palomar Type)
60 to 180 Power



An Unusual BUY!

Assembled—Ready to use! You'll see the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, Star Clusters, Moons of Jupiter in detail. Galaxies! Equatorial mount with lock on both axes.

Aluminized and overcomes equipped with a 60X eyepiece and mounted Barlow Lens, giving you 60 to 180 power. An Optical Finder Telescope, always so essential, is also included. Sturdy, hardwood, portable tripod. FREE with Scope: Valuable **STAR CHART** plus 272 page "**HANDBOOK OF HEAVENS**" plus "**HOW TO USE YOUR TELESCOPE**" BOOK.
 Stock No. 85,050-Q \$29.95 Postpaid
 Send Check or M.O.—Satisfaction Guaranteed!

4 1/4" ASTRONOMICAL TELESCOPE!
 UP TO 255 POWER

New Vibration-Free Metal Pedestal Mount



With this scope you can see everything described above, but with greater power. Also, it will split closer double stars. Mirror has twice the light-gathering power. Rack-and-pinion focusing, real equatorial mounting—only one motion needed to follow the stars! Aluminum tube, 6-power finder telescope, 2 standard-size eyepieces and mounted Barlow lens give you powers of 45x, 90x, 135x, 180x and 255x. Low-cost accessory eye-higher powers. FREE with Scope: Valuable **STAR CHART** plus 272-page "**HANDBOOK OF THE HEAVENS**" plus the book "**HOW TO USE YOUR TELESCOPE**." Shipping wt. 25 lbs.

Stock #85,105-Q . . . \$79.50 f.o.b. Barrington, N. J.
 Same telescope as described above but equipped with Electric Clock Drive.
 Stock #85,107-Q . . . \$109.00 f.o.b. Barrington, N. J.

SCIENCE TREASURE CHESTS

For Boys—Girls—Adults!



Science Treasure Chest—Extra-powerful magnets, polarizing filters, compass, one-way-mirror film, prism, diffraction grating, and lots of other items for hundreds of thrilling experiments, plus a Ten-Lens Kit for making telescopes, microscopes, etc. Full instructions included.

Stock No. 70,342-Q . . . \$5.00 Postpaid
 Science Treasure Chest DeLux—Everything in Chest above plus exciting additional items for more advanced experiments including crystal-growing kit, electric motor, molecular models set, first-surface mirrors, and lots more.
 Stock No. 70,343-Q . . . \$10.00 Postpaid

NEW! STATIC ELECTRICITY GENERATOR

Sturdy, Improved Model



See a thrilling spark display as you set off a miniature bolt of lightning. Absolutely safe and harmless. Sturdily made—stands 14" high. Turn the handle and two 9" plastic discs rotate in opposite directions. Metal collector brushes pick up the static electricity, store it in the Leyden jar type condenser until discharged by the jumping spark. Countless tricks and experiments. 24 page instruction booklet included.

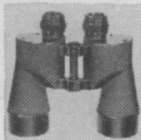
Order Stock No. 70,070-Q . . . \$12.95 Postpaid

LIFE SIZE VISIBLE HUMAN HEAD



Precise, Full Color, Take-apart Model! Study the most complex organ easily, inexpensively. Ideal for student, hobbyist, professional. You will be amazed at the detail. Molded from actual human skull. Eyes, ears, and teeth easily removed and disassembled for complete study. Entire brain, spinal cord and organs of mouth and throat presented in vivid detail. Amazingly low price—conforms to rigid laboratory standards.

Stock No. 70,447-Q . . . \$9.95 Postpaid



Here's a Terrific Buy! WAR SURPLUS! American-Made! 7 x 50 BINOCULARS

Big savings! Brand new! Crystal clear viewing—7 power. Every optical element is coated. An excellent night glass—the size recommended for satellite viewing. Individual eye focus. Exit pupil 7 mm. Approx field at 1,000 yds. is 376 ft. Carrying case included. American 7 x 50's normally cost \$274.50. Our war surplus price saves you real money.

Stock No. 1544-Q . . . only \$74.80 pspd. (tax incl.)
 6 x 30 Binoculars, abstract art—or for a terrific bargain—Stock No. 963-Q . . . \$33.00 pspd. (tax incl.)



D-STIX CONSTRUCTION KITS Great Teaching Aid!

Newest, handiest visualizing and demonstration tool for teachers—elementary, high school or college. Clever wood sticks 1/8" thick and "easy-on" rubber joints approx. 3/16" diam. fit together quickly to form all kinds of simple or complex shapes, structures. Ideal for teaching mathematics, chemistry, physics, design, engineering, architecture, abstract art—or for developing children's interest in form and structure. Work out geometric figures, molecular structures, structural members, configurations and perspectives, models of many types. 3-dimensional visualization adds interest—speeds understanding. Used by professional planners, designers, architects. Money-back guarantee.

Stock No. 70,209-Q (220 pos.) . . . \$3.00 Pspd.
 Stock No. 70,210-Q (370 pos.) . . . \$5.00 Pspd.
 Stock No. 70,211-Q (452 pos.) . . . \$7.00 Pspd.

WOODEN SOLID PUZZLES



12 Different puzzles that will stimulate your ability to think and reason. Here is a fascinating assortment of wood puzzles that will provide hours of pleasure. Twelve different puzzles, animals and geometric forms to take apart and reassemble, give a chance for all the family, young or old, to test skill, patience, and, best of all to stimulate ability to think and reason while having lots of fun. Order yours now.

Stock No. 70,205-Q . . . \$3.00 Postpaid

NEW PORTABLE ELECTRONIC SPEAKER PROVIDES "VOICE POWER" FOR INSTITUTIONAL AND HOME USE



First low-priced power speaker to do a real job. Carries your voice 500 feet or more—loud and clear. Can be modulated for shorter distances. The "greatest" for speech making—indoors and out—for use in and around schools (especially cheer leaders and athletic directors, hospitals, churches, other institutions, in the home. Wonderful plaything for youngsters. Case—impact-resistant plastic. Power—4 D cell flashlight batteries (not included). Size 8 1/2" x 5 1/2" x 2 1/2". Weight—2 1/2 lbs. Carrying strap. Up to 50 ft. extension cord may be added to mike.

Stock No. 70,502-Q . . . \$12.95 Postpaid

MAKE YOUR OWN \$300 OVERHEAD PROJECTOR FOR LESS THAN \$50



New Edmund Overhead Projector Optics Kit plus locally purchased materials gives you a projector comparable to models selling for \$300 and up. Ideal for "in-school" and industrial instruction. A remarkably versatile teaching aid. Terrific for cartoon talks and lecture work. Operates in lighted room. Kit includes condenser lens, lamp, socket and easy-to-follow directions.

S.N. 70,514-Q . . . \$15.00 Postpaid

MINIATURE WATER PUMP



Wonderful for experiments, miniature waterfalls, fountains, HO gage railroad backdrops, etc. Tiny (2 1/2" x 1 1/2") electric motor and pump ideal for hobbyists, labs, schools. Pumps continuous flow of water at rate of one pint per minute at a 12" head. With 2 D batteries in series will pump to 24" high. Runs 48 hours on battery. Works in either direction. Self priming.

Stock No. 50,345-Q . . . \$2.25 postpaid

NEW TAPE RECORDER

At an Amazing \$29.95

American Made—For Business, School or Hobby



Latest type, super-sensitive transistors in place of expensive bulky tubes is secret of low price. Excellent tone and quality. Real handy item for teachers, students, engineers, salesmen, etc. Single foolproof control changes from rewind, off, play, record. All-transistor circuit, sensitive crystal clear, loud amplification. Compact, lightweight, 8 1/2" x 9 1/2" x 3 1/4". Operates on 2 size D and one 9 V transistor battery (not included). Two 3" reels and 150 ft. magnetic tape, plus instructions (included).

Stock No. 70,480-Q . . . \$29.95 Postpaid

OFFSPRING OF SCIENCE . . . REALLY BEAUTIFUL CIRCULAR DIFFRACTION —RATING JEWELRY



Shimmering rainbows of gemlike color in jewelry of exquisite beauty; made with CIRCULAR DIFFRACTION . . . GRATING REPLICA. Just as a prism breaks up light into its full range of individual colors, so does the diffraction grating. Promises to become a rage in current fashion. 1" diameter.

Stock No. 30,349-Q Earrings . . . \$2.20 Postpaid
 Stock No. 30,350-Q Cuff Links . . . \$2.20 Postpaid
 Stock No. 30,372-Q Pendant . . . \$2.20 Postpaid
 Stock No. 30,390-Q Tie-Clasp . . . \$1.65 Postpaid

EXCITING NEW LOW-COST MOON MODEL— AN OUTER-SPACE CONVERSATION PIECE



Exact replica in relief with 30,000 formations for study—peaks, craters, the 2-million-square-mile Ocean of Storms, etc. Formations scaled to size. Distance relationships held to narrow margins—valuable teaching aid and outer-space display for museums and institutions. With "black light" . . . specing it shows Moon's Phases, and with "black light" . . . spectacular effects! Made of tough washable plastic in three colors, can be marked without damage. Reverse side blank to provide room for present and future space data. Wonderful gift for amateur astronomers—space enthusiasts. Exciting "conversation piece" for living room or den. Diam. 12" Wt. 1/2 lbs. Priced remarkably low.

Stock No. 70,515-Q . . . \$12.50 Postpaid

Terrific Buy! American Model OPAQUE PROJECTOR



Projects illustrations up to 3" x 3 1/2" and enlarges them. No film or negatives needed. Projects charts, diagrams, pictures, photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current, 6-ft. extension cord and plug included. Operates on 60 watt bulb, not included. Size 12" x 8" x 4 1/2" wide. Weight 1 lb., 2 oz. Plastic case with built-in handle.

Stock No. 70,199-Q . . . \$7.95 Postpaid

ANALOG COMPUTER KIT



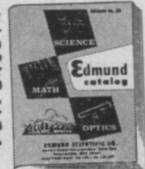
Ideal introduction to the increasingly important electronic computer field. For bright students, or anyone interested in this new science. Demonstrates basic analog computing principles—can be used for multiplication, division, powers, roots, log operations, trig problems, physics formulae, electricity and magnetism problems. Easily assembled with screwdriver and pliers. Operates on 2 flashlight batteries. Electric meter and 5 potentiometers are mounted on die-cut box. Answer is indicated on dial. Computer is 20" long, 9" wide, 2" deep.

Stock No. 70,341-Q . . . \$14.95 Postpaid

FREE CATALOG-Q

160 Pages! Over 1000 Bargains!

America's No. 1 source of supply for science experiments, hobbyists. Complete line of Astronomical Telescope parts and assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories . . . Telescopes, microscopes, satellite scopes, binoculars, infra-red sniper-scopes, items for making "Science Fair" projects, math learning and teaching aids.



Request Catalog-Q

ORDER BY STOCK NUMBER . . . SEND CHECK OR MONEY ORDER . . . SATISFACTION GUARANTEED!

EDMUND SCIENTIFIC CO. BARRINGTON, NEW JERSEY

PROBABILITY AND STATISTICS KIT K22

. . . a **NEW** kit with more than 60 Experiments and Examples in **CHANCES, PROBABILITIES** and **STATISTICS**

• Designed by the makers of the **BRAINIAC®** Electric Brain Construction Kit

• Produced under the direction of Science Materials Center (Div. of Library of Science)

. . .

- *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?*
- *Are stars in the sky distributed randomly? What about towns on a map?*

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.

With this kit—by means of more than 60 intriguing, easy-to-perform experiments and exercises—you can see for yourself, at first hand, the scientific basis for predicting events . . . drawing statistical conclusions . . . making informed estimates in many chance situations . . . analyzing the patterns of chance happenings. You acquire a firm knowledge of many of the key ideas of probability and statistics **THROUGH YOUR OWN EXPERIMENTS.**

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?

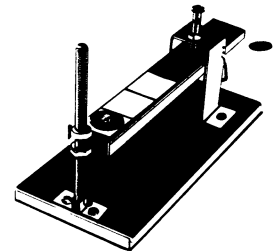
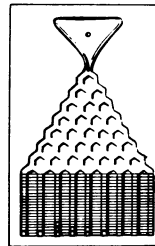
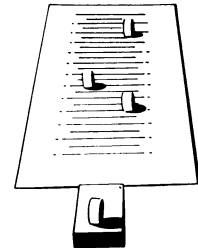
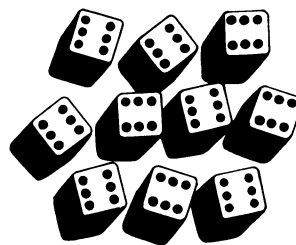
STATISTICAL DISTRIBUTIONS DISCUSSED IN THE KIT AND EXPERIMENTS: Uniform Distribution in one and two dimensions; Binomial Distribution; Normal Distribution; Chi-Squared Distribution; Poisson Distribution; Multinomial Distribution.

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!



WHAT COMES WITH YOUR PROBABILITY AND STATISTICS KIT K22?

- Every Special Part needed to perform the experiments in the kit:
 - Variable Coin-Tossing Machine—to toss coins randomly or predictably or any stage in between
 - Quincunx (or Hexstat®)—a device for producing a great variety of statistical distributions by rolling 300 little steel balls past obstacles into 9 compartments
 - 5 specially-designed Sampling "Urns" and 75 black & 75 white Beads
 - Disc, Inclined Plane, and Scale for producing normal distributions
 - 30 Fair Dice; 50 Numbered Cards; Arrow Spinner and Circular Scale; and many more parts—totaling over 300 parts!
- 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

WHO IS EDMUND C. BERKELEY? Designer of *Brainiacs*; editor and publisher of the magazine *Computers and Automation*; author of *Giant Brains or Machines That Think* (Wiley), *Computers: Their Operation and Applications* (Reinhold), *Symbolic Logic and Intelligent Machines* (Reinhold); mathematician and actuary—*Fellow of the Society of Actuaries.*

PROBABILITY AND STATISTICS KIT K22 . . . another Berkeley kit with limitless possibilities and hours of built-in fun and instruction . . . \$16.95. (For shipment west of Mississippi, add 80¢; outside U. S., add \$1.80)

Complete Kit at just \$16.95

7 Day Full Refund Guarantee If Not Satisfactory

MAIL THIS COUPON OR A COPY OF IT

BERKELEY ENTERPRISES, Inc.
815 Washington St., R242, Newtonville 60, Mass.

Please send me Probability and Statistics Kit K22. (Returnable in 7 days for full refund if not satisfactory—if in good condition.) I enclose \$_____ in full payment.

My name and address are attached.