

THE SCIENCE FAIR STORY OF **ELECTRONICS**

MAN'S DISCOVERY THAT CHANGED THE WORLD



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*FROM THE SCIENCE STUDENTS AND KIT
BUILDERS OF TODAY... WILL COME THE
INVENTORS WHO WILL SHAPE TOMORROW!*

"RADIO, TELEVISION,
COMPUTERS, RECORDERS, TELEPHONES...

SCANNERS AND MONITORS
IN HOSPITALS...

AUDIO-VISUAL TEACHING
AIDS IN CLASSROOMS..."



"THESE ARE ONLY A FEW
THINGS THAT OPERATE
ON THE PRINCIPLES
OF ELECTRICITY
AND ELECTRONICS.
MANY OF US CAN'T
IMAGINE LIFE
WITHOUT THEM."



"BUT NONE OF THESE
THINGS JUST HAPPENED.
IT'S TAKEN A LOT
OF HARD WORK BY
INVENTORS, SCIENTISTS,
ENGINEERS, AND OTHERS
TO BRING US THESE THINGS.
WE SIMPLY TURN ON,
LOOK AT, LISTEN TO, TALK THROUGH..."



IT'S ALSO TAKEN A LOT MORE TIME TO GET WHERE WE ARE
IN ELECTRONICS TODAY THAN MOST PEOPLE REALIZE.



"MAYBE ELECTRONICS BEGINS WITH AN OLD LEGEND THAT CERTAIN TREES HAD A POWERFUL ATTRACTIVE EFFECT ON SHEEP. THE SHEEP HAD TO BE PULLED OFF THE TREE ROOTS, LIKE IRON FROM A MAGNET."



"AS EARLY AS 600 B.C. THALES OF MILETUS, GREECE THEORIZED A CONNECTION BETWEEN ELECTRICITY AND MAGNETISM. THE ANCIENTS EVEN TRIED ELECTRIC SHOCKS FROM EELS TO TREAT STIFFENING DISEASES."



"ARCHEOLOGISTS HAVE DISCOVERED STRANGE CLAY POTS IN ANCIENT ARABIC RUINS WHICH INDICATE SOMEBODY WAS ELECTROPLATING JEWELRY 1000'S OF YEARS AGO."



WITH ALL THAT, WHY DIDN'T ANYONE LEARN TO UNDERSTAND ELECTRICITY?

NO ONE REALLY KNOWS! FOR SOME REASON, PEOPLE SEEMED TO THINK HUMAN KNOWLEDGE DIDN'T HAVE MUCH TO DO WITH THE REAL WORLD!



"WE THINK THE FIRST COMPASS WAS THIS ASIAN CART ARRANGEMENT FOR NAVIGATING ON THE HIGH ASIAN PLAINS. A PIECE OF LODESTONE IN THE WOOD SPINDLE KEPT ITS ARM POINTING NORTH AND A COUNTER TICKED OFF THE DISTANCE TRAVELLED."



GEE! AN AWFUL LOT OF MEN MUST HAVE STUDIED ELECTRICITY BEFORE ANYBODY COULD ACTUALLY USE IT!

YES, AND THEIR NAMES ARE STILL WITH US! THE 'GILBERT' IS A UNIT OF MAGNETISM! OTHER COMMON ONES ARE: OHM, HENRY, FARAD, AMPERE, VOLT AND SO ON!



FRANKLIN ORIGINATED THE "PLUS" AND "MINUS" SIGNS WE USE TO INDICATE ELECTRIC POLARITY! ITS ON ANY COMMON FLASHLIGHT BATTERY!



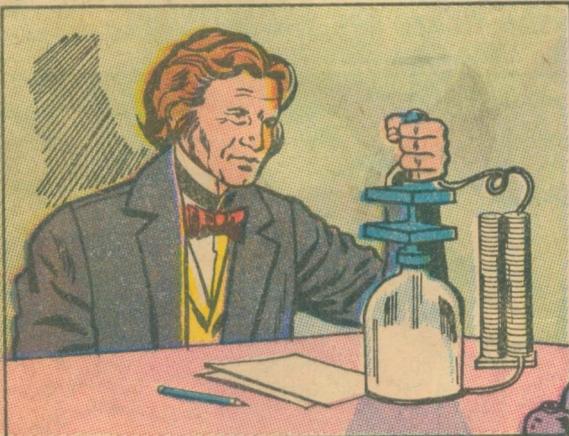
"THE FIRST REAL BATTERY WAS BUILT ABOUT 1800 BY ALESSANDRO VOLTA TO SHOW THAT CERTAIN METAL AND CHEMICAL COMBINATIONS COULD CAUSE THE FLOW OF ELECTRICITY."



"IN 1808 HUMPHREY DAVY USED A LARGER BATTERY TO POWER THE FIRST ELECTRIC LIGHT. IT WAS A SIMPLE CARBON ARC LAMP."



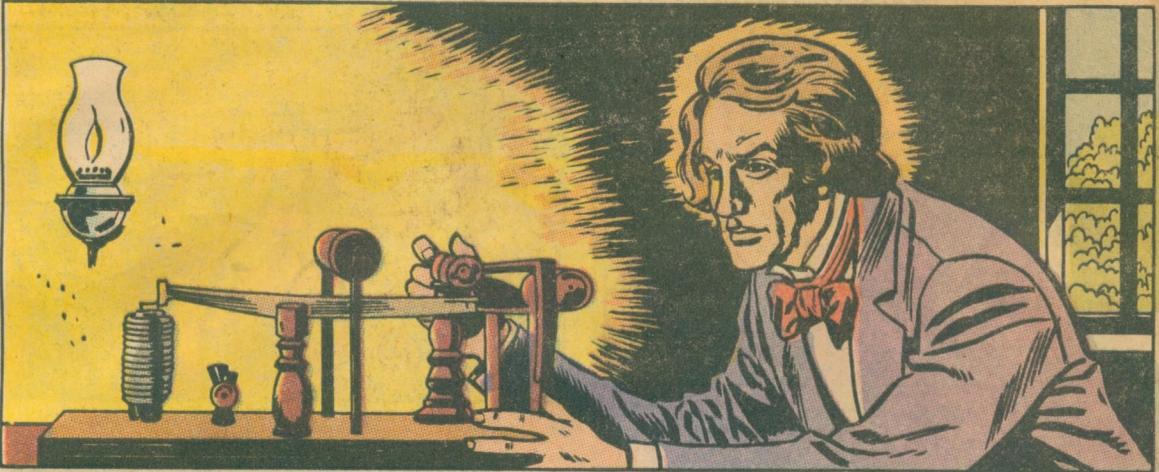
"LATER, FARADAY DEvised THE FIRST MACHINE TO MAKE ELECTRICITY FROM MECHANICAL ENERGY. IT WASN'T EFFICIENT BUT IT WORKED."



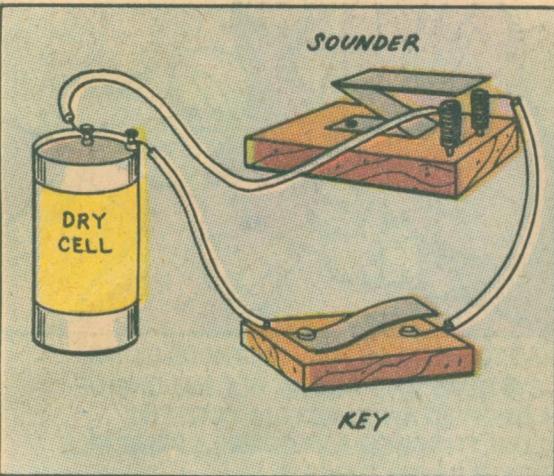
"... AND JUST ABOUT THAT TIME, JOSEPH HENRY WAS BUILDING THE FIRST (DIRECT CURRENT) ELECTRIC MOTOR IN ALBANY, NEW YORK."



"SAMUEL F. B. MORSE BUILT HIS FIRST TELEGRAPH SOUNDER IN 1836 FROM MANY MISCELLANEOUS PARTS INCLUDING AN OLD PICTURE FRAME." MORSE WAS ALSO A TALENTED PORTRAIT ARTIST."



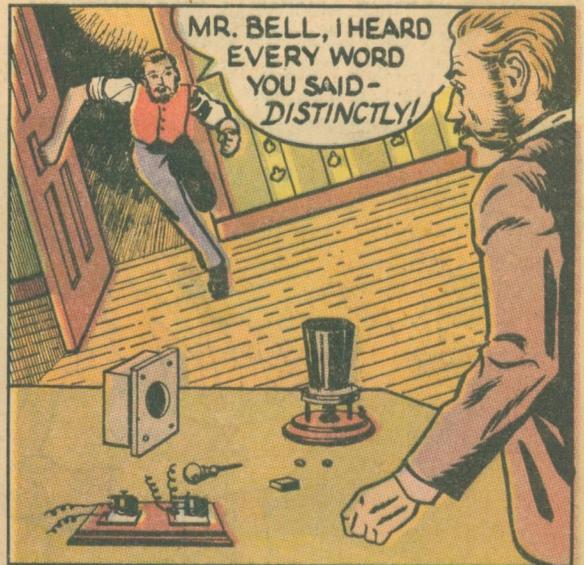
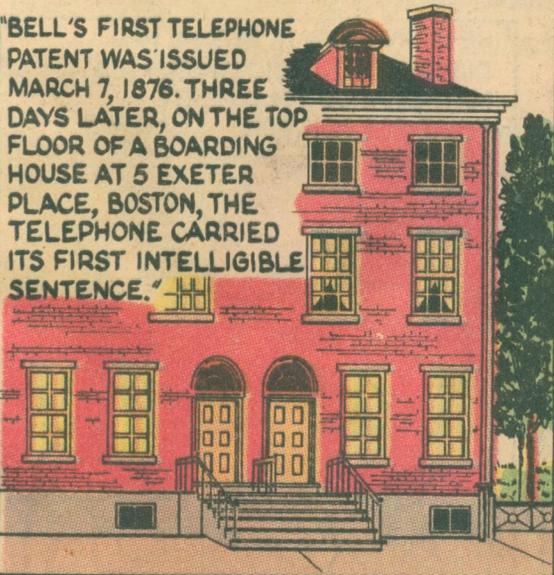
"THIS PROJECT SHOWS HOW A TELEGRAPH SYSTEM WORKS"



"HIS WIRE TELEGRAPH WAS THE FIRST PRACTICAL LONG-RANGE COMMUNICATIONS SYSTEM. IN 1861, STEPHEN FIELD SENT THE FIRST TRANSCONTINENTAL TELEGRAPH MESSAGE TO PRESIDENT LINCOLN."



"BELL'S FIRST TELEPHONE PATENT WAS ISSUED MARCH 7, 1876. THREE DAYS LATER, ON THE TOP FLOOR OF A BOARDING HOUSE AT 5 EXETER PLACE, BOSTON, THE TELEPHONE CARRIED ITS FIRST INTELLIGIBLE SENTENCE."



AS YOU BEGIN TO BUILD PROJECTS WITH THIS RADIO KIT, YOU'LL SEE THESE GREAT INVENTOR'S IDEAS AT WORK!

LOOK HERE, BOB! THIS TRANSISTOR IS A GOOD EXAMPLE! IT'S A NATURAL DEVELOPMENT BEYOND THE SWITCHES ENGINEERS USED A HUNDRED YEARS AGO.

"AT THE BERLIN EXPOSITION IN 1879, THEY HAD ONLY SWITCHES TO CONTROL ELECTRICITY, BUT AN ELECTRIC TRAIN CARRIED 100,000 PASSENGERS THAT SEASON."

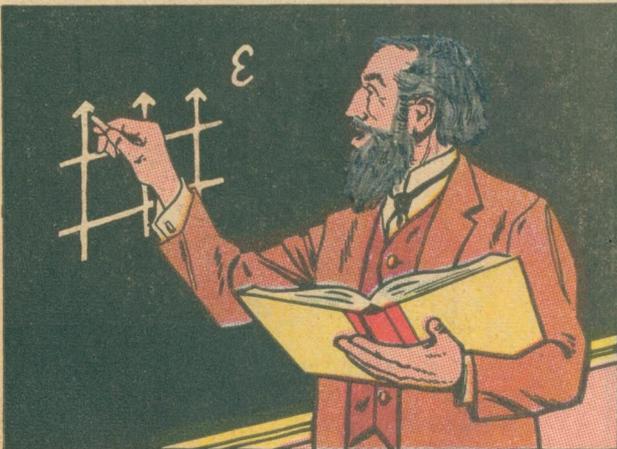


ELECTRIC LIGHTS WERE HARDER TO MAKE THAN ELECTRIC TRAINS! THAT SAME YEAR, AFTER MUCH HARD WORK EDISON CAME UP WITH AN EXPERIMENTAL LAMP THAT BURNED FOR SEVERAL HUNDRED HOURS!



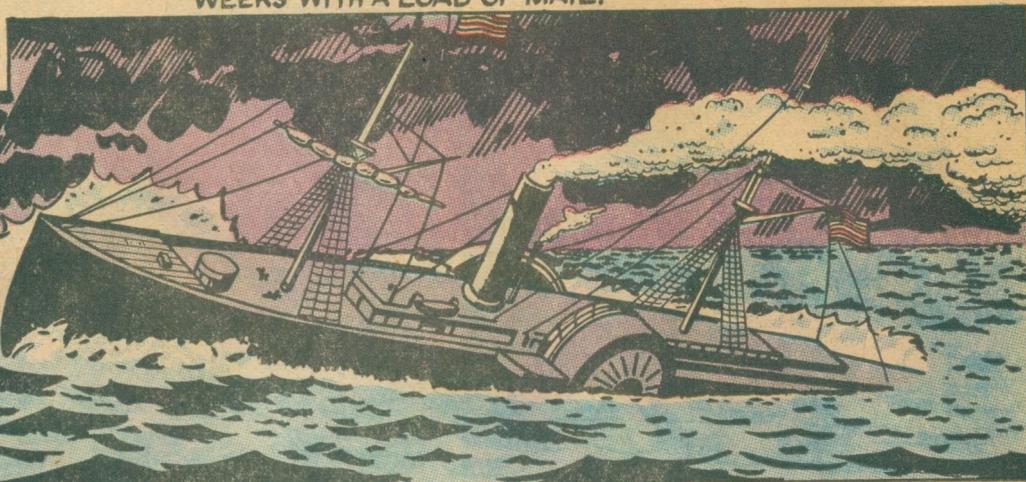
"EDISON HAD TO DEVELOP NEW METHODS USING VACUUM SYSTEMS AND GLASS BULBS! ONE OF HIS TESTS SHOWED AN ELECTRIC CURRENT COULD FLOW THROUGH A VACUUM; A PRINCIPLE LATER USED IN RADIO TUBES."

"ABOUT THIS TIME, MAXWELL WAS STUDYING THE WORKS OF FARADAY, DAVY AND OTHERS. HIS MATHEMATICS PREDICTED ELECTRO-MAGNETIC DISTURBANCES IN SPACE."



HE DIDN'T KNOW IT, BUT HE HAD DISCOVERED RADIO WAVES! HIS MATHEMATICS TOLD HERTZ WHAT TO LOOK FOR!

"IN THE 1870'S, THERE WERE NO FAST COMMUNICATIONS ACROSS THE ATLANTIC OCEAN. A GOOD SHIP COULD CROSS IN ABOUT TWO WEEKS WITH A LOAD OF MAIL."



"THE FIRST TRANSATLANTIC CABLES WERE UNRELIABLE, AND MESSAGES COST THE MODERN EQUIVALENT OF SEVERAL DOLLARS A WORD."



SO EVERYBODY WANTED WIRELESS COMMUNICATIONS ACROSS THE ATLANTIC TO SAVE TIME AND MONEY!

YES...AND FOR SHIPS AT SEA TO COMMUNICATE WITH MEN ON SHORE...



"...THERE WERE RADIO-ASSISTED RESCUES SOMETIME BEFORE TRANSATLANTIC WIRELESS COMMUNICATIONS BEGAN."



"ON DECEMBER 12, 1901, GUGLIELMO MARCONI SENT THE FIRST TRANSATLANTIC WIRELESS MESSAGE FROM ENGLAND TO NEWFOUNDLAND. THIS SUCCESS SHOWED THE LONG-RANGE POSSIBILITIES OF RADIO COMMUNICATIONS."



"IN A FEW YEARS, LONG-RANGE RADIO COMMUNICATIONS WERE ALMOST ROUTINE."



BOB, CAN YOU THINK WHAT REVOLUTIONIZED ELECTRONICS A FEW YEARS AFTER THAT FIRST TRANSATLANTIC COMMUNICATION?

SURE! IT WAS THE deFORREST "AUDION"! A RADIO TUBE BASED ON THE DISCOVERY OF ELECTRIC CURRENT FLOWING IN A VACUUM!



RIGHT, BOB! IN A FEW YEARS, RECEIVERS USING MODIFIED AUDIONS REVOLUTIONIZED RADIO COMMUNICATION. THEY HAD FAR BETTER SENSITIVITY AND SELECTIVITY!



"LEE deFORREST'S INVENTION OF THE AUDION MARKED THE BEGINNING OF REGULAR RADIO BROADCASTS INTO THE HOME."



"THEN, MAJOR EDWIN ARMSTRONG DEVELOPED THE SUPERHETERODYNE RECEIVER IN PARIS DURING WORLD WAR I." IT GAVE THE U.S. AND IT'S ALLIES A GREAT ADVANTAGE.



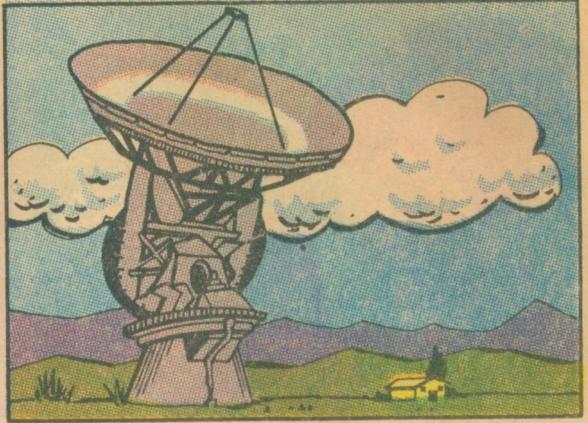
ON JUNE 9, 1922, INVENTOR/EDUCATOR JOSEPH TYKOCINER (TICK-OH-SHINER), A POLISH IMMIGRANT TO THE U.S., DEMONSTRATED THE FIRST SOUND-ON-FILM MOTION PICTURE --- THE PRINCIPLE USED IN OUR MODERN-DAY MOVIES. THE PICTURE SHOWED PROF. ELLERY PAINE RECITING LINCOLN'S FAMOUS GETTYSBURG ADDRESS.



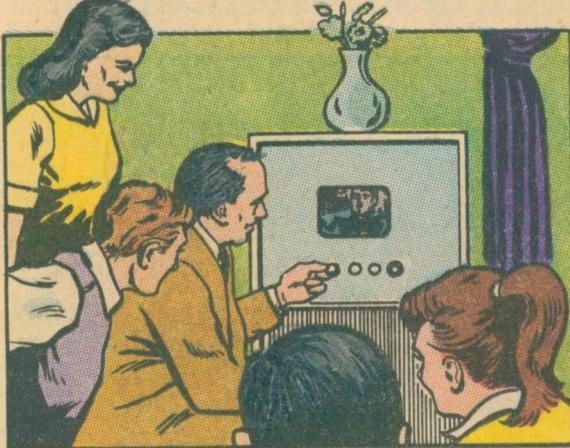
OTHER FIELDS OF ELECTRONICS BEGAN TO DEVELOP ALSO. IN 1933 KARL JANSKY ANNOUNCED THE DISCOVERY OF RADIO WAVES FROM OUTER SPACE --- THE BEGINNING OF RADIO ASTRONOMY."



"TODAY, GIANT RADIO TELESCOPES LIKE THAT OF THE NATIONAL RADIO ASTRONOMY OBSERVATORY AT GREEN BANK, WEST VIRGINIA, AID IN LEARNING MORE ABOUT OUTER SPACE."



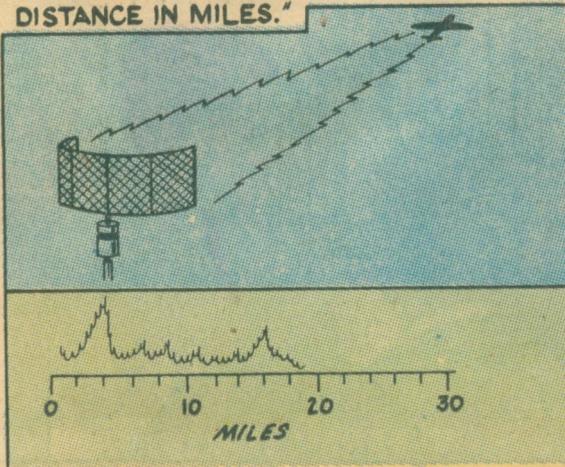
"BY 1939 ELECTRONICS WAS A VERY ACTIVE BUSINESS AND INDUSTRIAL FIELD. THERE WERE EVEN SOME COMMERCIAL TV SETS IN PRODUCTION."



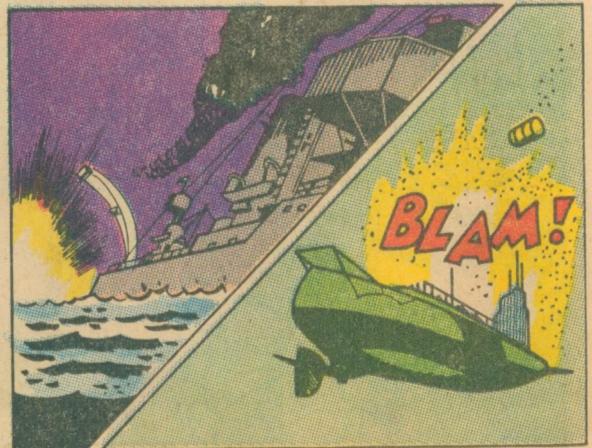
"THE BLASTS OF WORLD WAR II BROUGHT RAPID DEVELOPMENT OF THE ELECTRONICS INDUSTRY AND IT PLAYED A VITAL ROLE FOR THE ALLIES. TAKE THE INVENTION OF RADAR, FOR EXAMPLE."



"RADAR IS A SYSTEM WHERE A RADIO SIGNAL IS SENT OUT AND IS REFLECTED OFF AN OBJECT, LIKE AN AIRPLANE, BACK TO A RECEIVER WHICH IS SCALED TO SHOW THE DISTANCE IN MILES."



"WAR BROUGHT DEVELOPMENT OF DEEP-SEA RADAR, TOO. WE CALL IT SONAR. TODAY SONAR IS USED BY SUBMARINES, NAVY SHIPS, AND UNDERSEA RESEARCH VESSELS EXPLORING THE OCEAN FLOOR."



WHEN THE WAR ENDED, RESEARCHERS BEGAN TO FOLLOW UP ON SOME NEW IDEAS! THEY DISCOVERED SOMETHING VERY IMPORTANT...

I KNOW! THE TRANSISTOR!



YES, THE NOBEL PRIZE IN PHYSICS WAS SPLIT BETWEEN THREE MEN FOR THE INVENTION OF THE TRANSISTOR: JOHN BARDEEN, WILLIAM SHOCKLEY, AND WALTER BRATTAIN. IT REVOLUTIONIZED THE ELECTRONICS INDUSTRY.



JOHN BARDEEN

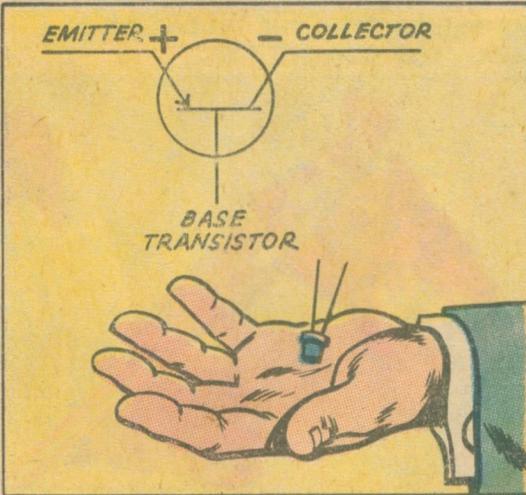


WALTER BRATTAIN

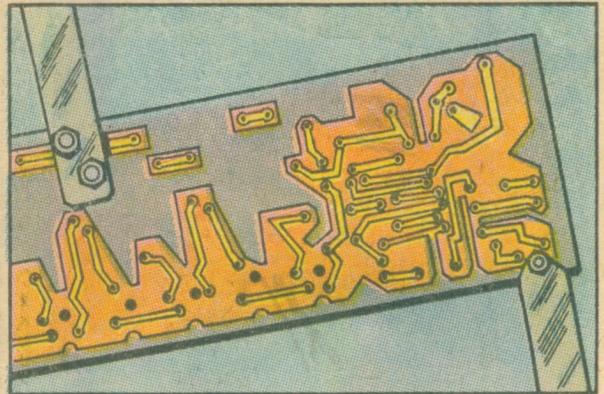


WILLIAM SHOCKLEY

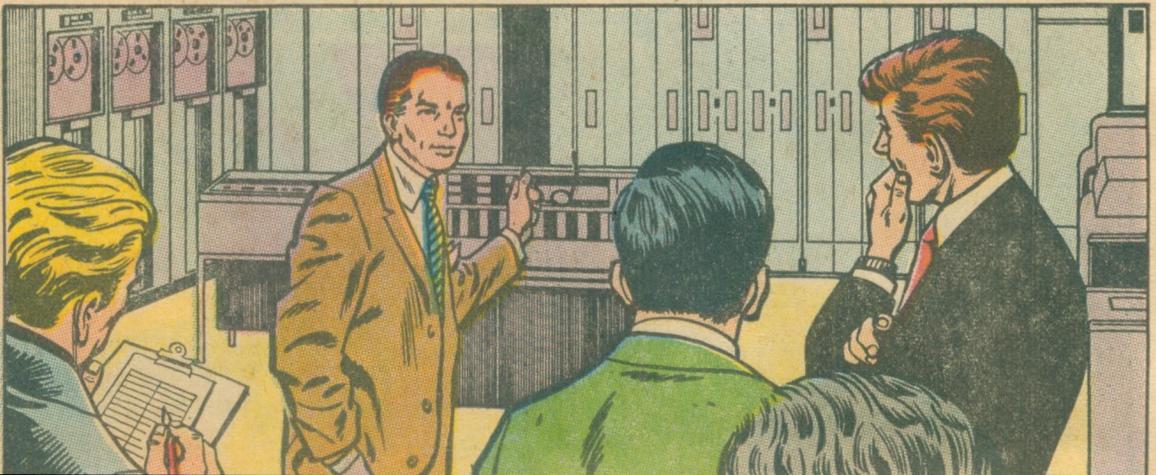
"THE ELEMENTS OF A TRANSISTOR ARE SHOWN IN THIS WAY IN A SYMBOL."



"ANOTHER GIANT STEP OF THIS EVOLUTION TOWARD MINIATURIZATION WAS THAT OF PRINTED CIRCUITS. SOLID WIRE CONNECTIONS AND TUBES WERE BEING REPLACED BY PRINTED CONNECTIONS ON A FLAT CIRCUIT BOARD."



"COMPARED TO TUBE EQUIPMENT, TRANSISTORS ARE MORE EFFICIENT, LIGHTER, MORE RELIABLE, AND RUN COOLER. THERE IS NO DELAY IN WARMING UP, AND THEY PRODUCE VERY LITTLE HEAT."



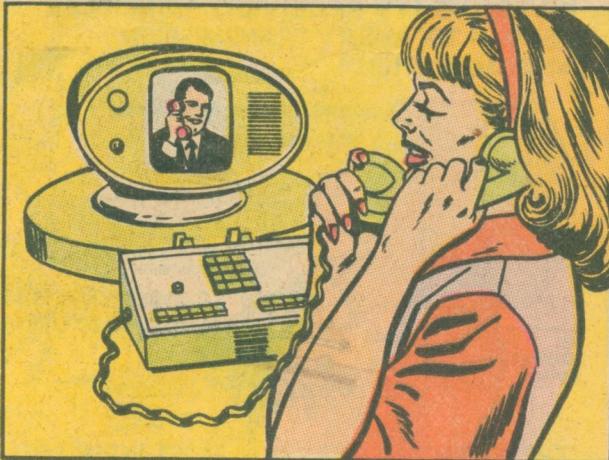


"THIS IS KNOWN AS MOLECULAR ELECTRONICS, WHERE MATERIAL ONLY A MILLIONTH OF AN INCH THICK IS USED. SOMEDAY, THIS CIRCUITRY BUILDING WILL BE DONE ENTIRELY WITH AN ELECTRONIC BEAM."



"COMMUNICATIONS IN GENERAL HAVE SHRUNK THE SIZE OF THE WORLD. WITH THE PROSPECT OF 600,000,000 TELEPHONES IN OPERATION BY 1980, ELECTRONIC EQUIPMENT WILL MAKE IT POSSIBLE TO DIRECT DIAL ANY ONE OF THEM."

"ELECTRONIC DEVICES WILL MAKE IT POSSIBLE TO ORDER GROCERIES BY A COMPUTER AFTER SEEING AND EVALUATING FOOD BY TV PHONE."



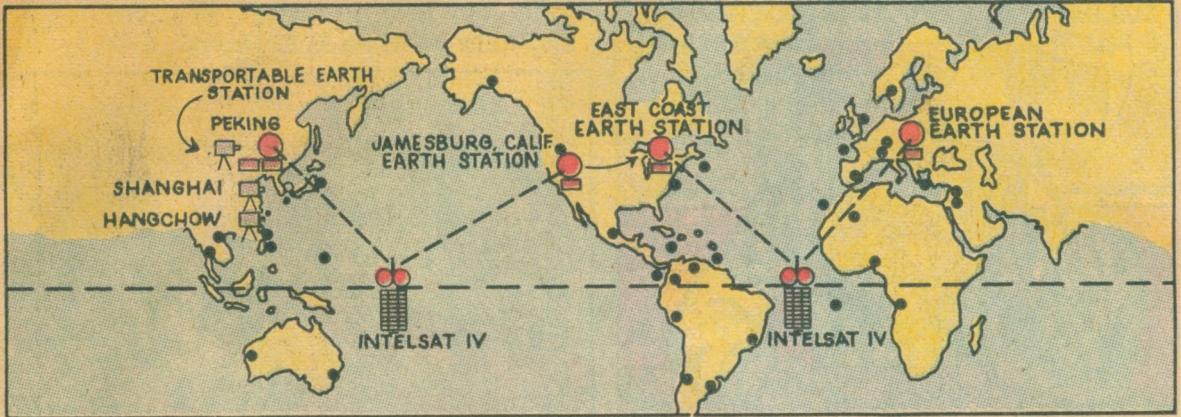
"OF COURSE, THE GREATEST EARTH-SHRINKING ADVANCE IN COMMUNICATIONS CAME IN 1962 WITH THE U.S. INVENTION OF THE TELESTAR SATELLITE. THIS WAS A COMPACT ROUND BALL FILLED WITH MINIATURIZED TRANSISTORIZED COMPONENTS. IT COULD RELAY TV AND VOICE SIGNALS FROM STATIONS THOUSANDS OF MILES APART."



"IN 1964, WE IN AMERICA WERE ABLE TO WATCH OUR ATHLETES PERFORM IN THE TOKYO OLYMPICS... VIA U.S. BUILT SATELLITE TV, OF COURSE."



"THE WORLD GREW EVEN SMALLER BY 1972, WHEN PEOPLE AROUND THE WORLD WERE ABLE TO VIEW LIVE TELECASTS OF THE U.S. PRESIDENT'S VISIT TO THE PEOPLE'S REPUBLIC OF CHINA VIA THE U.S. BUILT INTELSAT - IV IN ORBIT ABOVE THE EARTH."



WOW! THAT'S SOME IMPROVEMENT OVER THE ORIGINAL TV SETS BACK IN 1925!

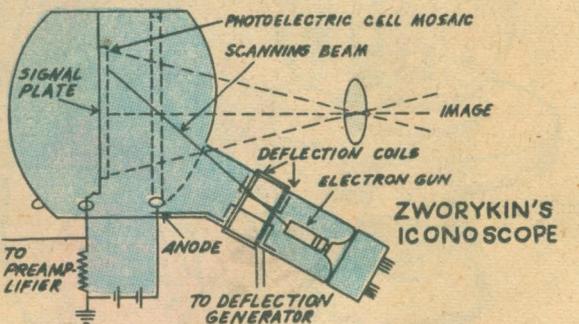
PEOPLE COULD HARDLY SEE THE 1925 PICTURE AT ALL. THAT SET UTILIZED 30-60 SCANNING LINES COMPARED TO TODAY'S SET WHICH USES 525!



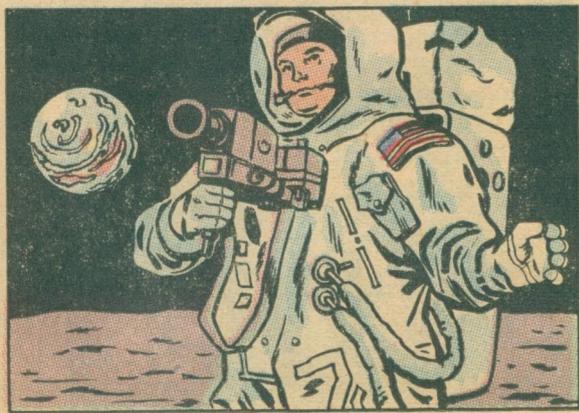
"IMPROVEMENT SINCE 1960 INCLUDE LENS ZOOMING AND INSTANT VIDEO TAPE RECORDING LIKE THOSE USED IN SPORTS TELECASTS FOR INSTANT REPLAY OF THE ACTION. TODAY, MANY PEOPLE ARE VIDEO-TAPING THEIR OWN "HOME SHOWS," AND VACATION SIGHTS."



"ALTHOUGH MANY OTHER INVENTORS MADE IMPORTANT CONTRIBUTIONS TOWARD THE DEVELOPMENT OF TELEVISION-NIPKOV, CAREY, FARNSWORTH, ALEXANDERSON, AND OTHERS-THE REAL BREAKTHROUGH CAME WITH VLADIMIR ZWORYKIN'S ICONOSCOPE (TV CAMERA) AND LATER HIS KINESCOPE (TV RECEIVER) PRINCIPLES USED IN TODAY'S TV TRANSMISSION AND RECEPTION."



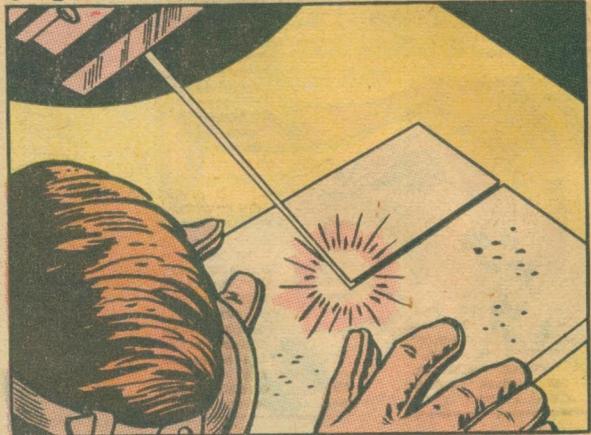
"THE POTENTIAL OF TV IS ALMOST INFINITE. TV PORTABILITY AND ADAPTIBILITY TO STRANGE ENVIRONMENT MADE TV A VALUABLE SCIENTIFIC TOOL. ON JULY 20, 1969, IT SHOWED US THE FIRST MEN ON THE MOON."



HOW DO INVENTIONS LIKE THE LASER BEAM FIT IN?

THE LASER GENERATES A BEAM OF REMARKABLY PURE CONTROLLABLE LIGHT!

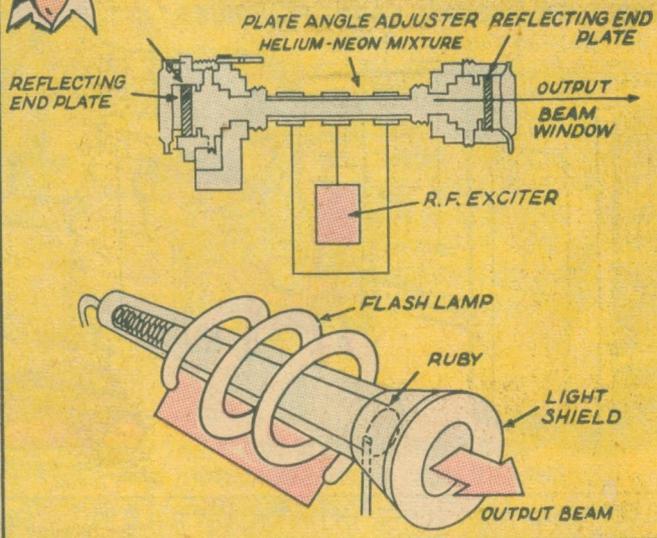
"A LASER CAN FOCUS ENORMOUS ENERGY ON A VERY SMALL AREA TO CUT STEEL OR BURN HOLES IN DIAMOND WIRE DIES."



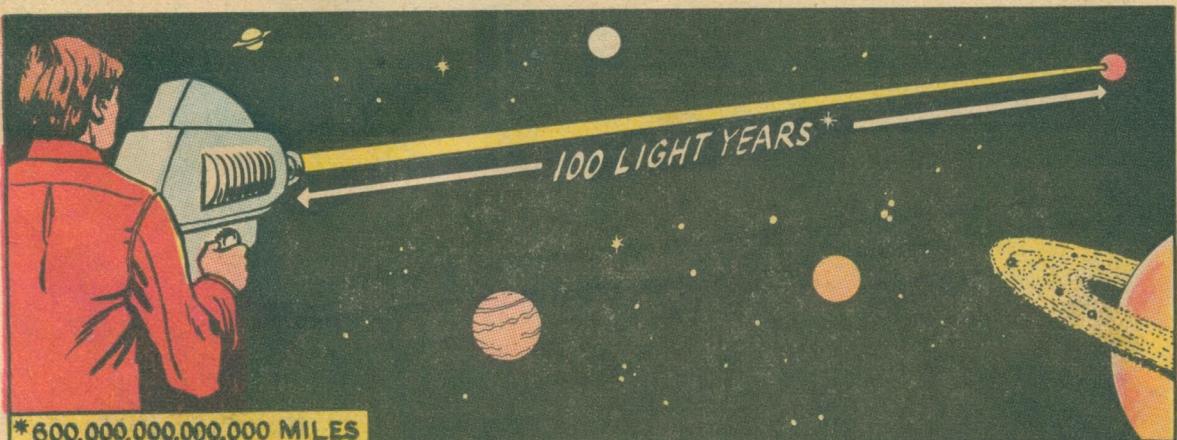
'AND BECAUSE IT CAN BE CONTROLLED WITH GREAT ACCURACY, THE LASER IS USED IN BOTH EYE AND BRAIN SURGERY.'



"THE ABILITY OF THIS BEAM TO PINPOINT REMOTE TARGETS IS VERY USEFUL FOR MEASURING VAST DISTANCES."



"MAYBE WE COULD TALK TO PEOPLE AROUND OTHER STARS. A LASER BEAM PROJECTED FROM EARTH COULD STILL BE DETECTED AT 100 LIGHT YEARS DISTANCE."

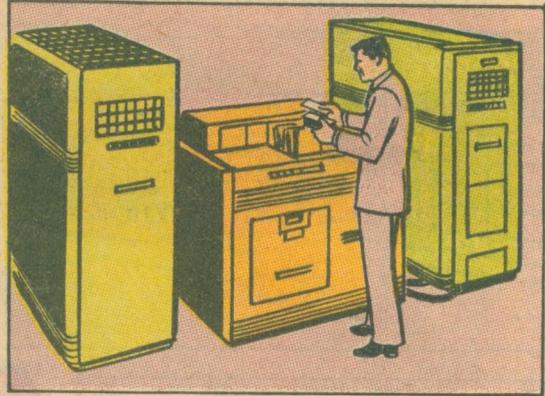




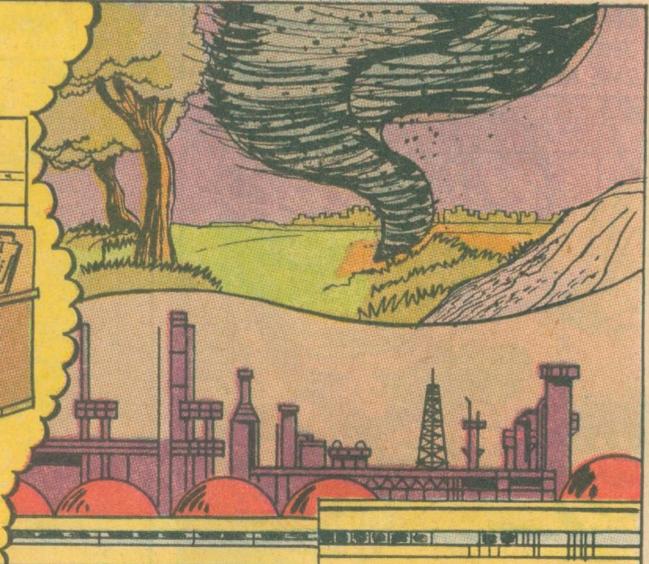
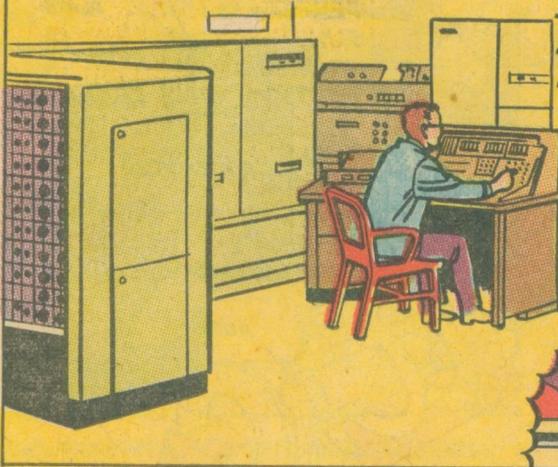
MODERN COMPUTERS ARE ANOTHER IMPORTANT DEVELOPMENT. . . A LARGE ONE CAN DO A MAN-YEAR OF WORK FOR ABOUT 5 CENTS, THOUGH IT COSTS HUNDREDS OF DOLLARS PER HOUR TO RUN!



"COMPUTERS WERE DEVELOPED BECAUSE THEY COULD DO ROUTINE WORK FAST AND RELIABLY. EVEN A SMALL COMPUTER REPLACES A ROOM FULL OF CLERKS DOING TEDIOUS WORK."



"NOW BIG COMPUTERS CAN PREDICT WEATHER AND SEVERE STORMS. THEY CAN EVEN OPERATE LARGE FACTORIES."

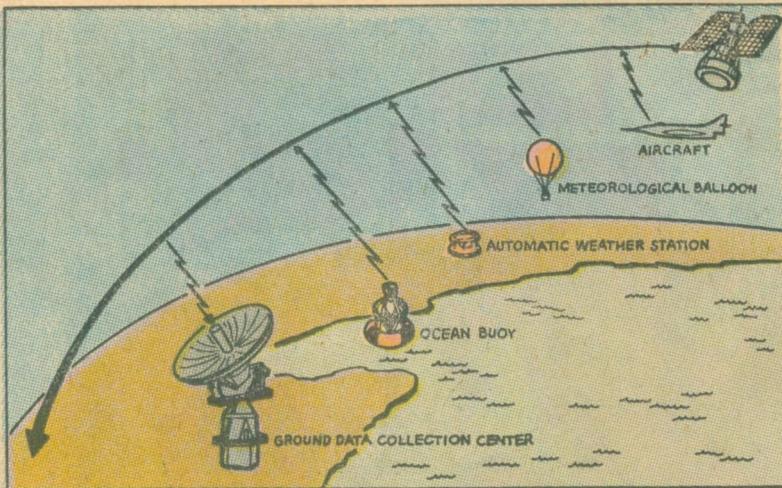


"ELECTRONICS ALSO PLAYS AN IMPORTANT ROLE IN AIR SAFETY. A 747 JET CAN LAND OR TAKE OFF IN PITCH DARKNESS, RAIN, SNOW, SLEET OR FOG IN REASONABLE SAFETY BECAUSE OF RADAR AND OTHER ELECTRONIC COMMUNICATION DEVICES."

SOLID-STATE ELECTRONICS MADE POSSIBLE NOT ONLY OUR GIANT COMPUTERS, BUT ALSO OUR TINY, POCKET-SIZE CALCULATORS IN EVERYDAY USE BY STUDENTS, BUSINESSMEN, AND HOUSEWIVES.

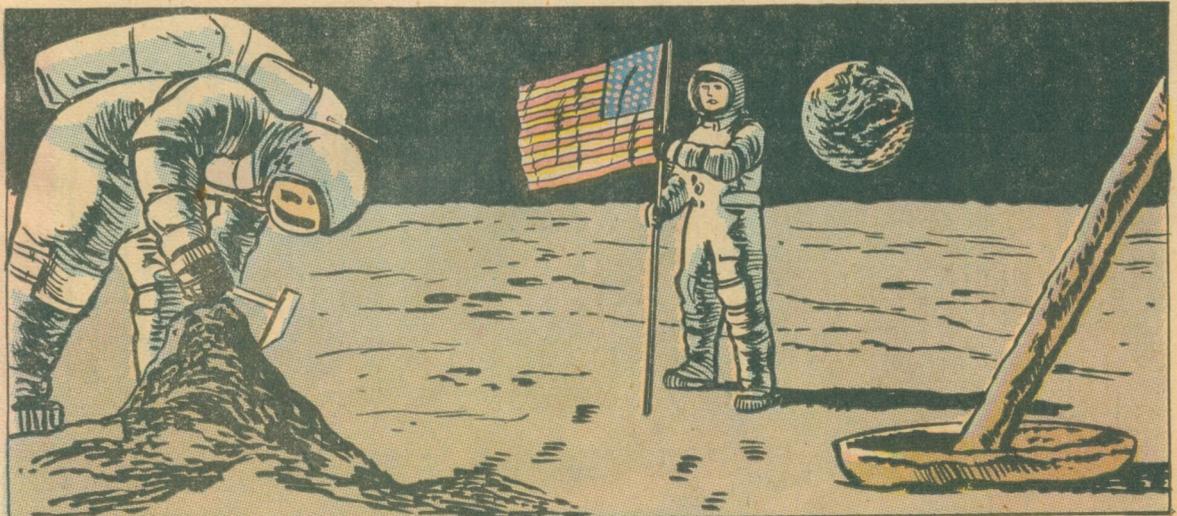


"ELECTRONICS HAS ALSO COME TO AMERICA'S KITCHENS. NOW, A MICROWAVE OVEN COOKS A HAMBURGER IN A MINUTE... BAKES A CAKE IN 3 MINUTES... OTHER FOODS IN SECONDS. YET, IT IS NOT MUCH BIGGER THAN A PORTABLE TV SET. HOUSEWIVES CAN SPEND LESS TIME IN THE KITCHEN."

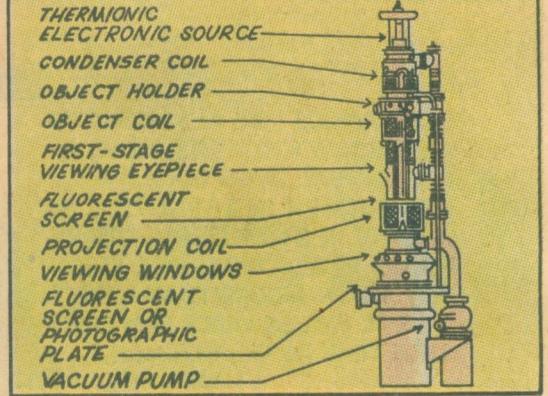


"SATELLITES IN ORBIT AROUND THE EARTH, LIKE THE FAMOUS U.S. NIMBUS-D, PERFORM MANY ECOLOGICAL FUNCTIONS... OBSERVATION OF WILDLIFE ACTIVITY, SPOTTING DEVELOPING VOLCANOS, DETECTION OF FOREST FIRES, ICEBERG WARNINGS, AND THE GATHERING OF SCIENTIFIC INFORMATION FOR LONG RANGE WEATHER FORECASTS."

"ELECTRONICS ENABLED THE UNITED STATES TO LAND THE FIRST MEN ON THE MOON -- NEIL ARMSTRONG AND EDWIN ALDRIN. THE YEAR WAS 1969. SINCE THEN, OTHER LANDINGS ON THE MOON HAVE BEEN MADE BY U.S. ASTRONAUTS WHO HAVE ALSO SET WORLD RECORDS FOR TIME SPENT IN ORBITING LABORATORIES ABOVE EARTH. OUR SPACE VEHICLES ARE ALSO PROBING OTHER PLANETS IN OUR SOLAR SYSTEM, LIKE MARS AND VENUS."



"SCIENCE OPENED A WHOLE NEW WORLD FOR MEDICAL SCIENCE WITH THE INVENTION OF THE ELECTRON MICROSCOPE. IT VIEWS AN AREA AS MINUTE AS ONE-BILLIONTH OF AN INCH."



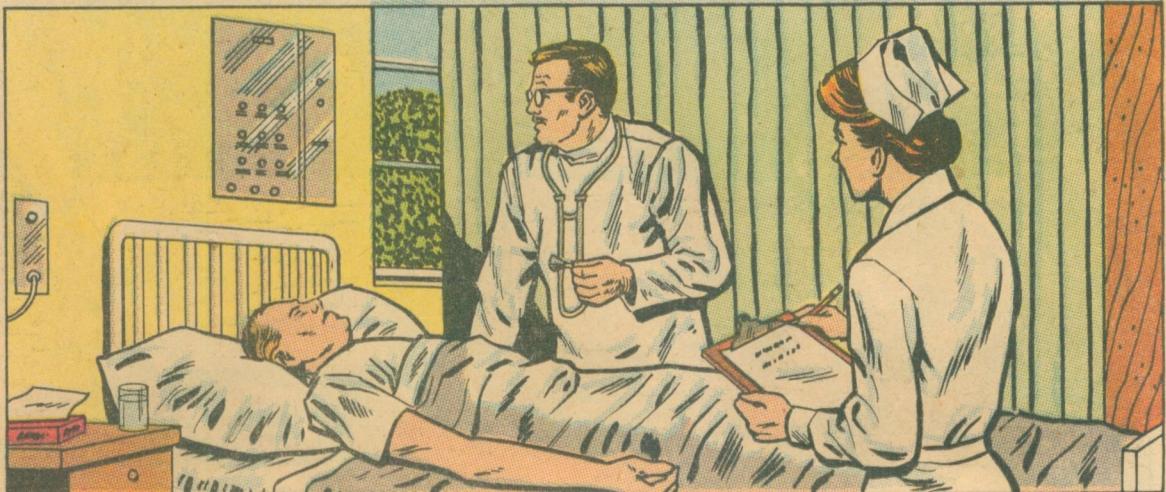
"IN ADDITION TO HIS TV INVENTIONS, VLADIMIR ZWORYKIN'S RESEARCH IN ELECTRON OPTICS HELPED TO GIVE MANKIND THE ELECTRON MICROSCOPE... AN INVALUABLE AID TO MEDICAL SCIENCE."

"INTENSIVE CARE AND RECOVERY ROOMS IN TODAY'S HOSPITALS USE ELECTRONIC DEVICES TO KEEP A CLOSE CHECK ON A PATIENT'S HEART ACTION, BREATHING, TEMPERATURE AND OTHER VITAL BODY FUNCTIONS."

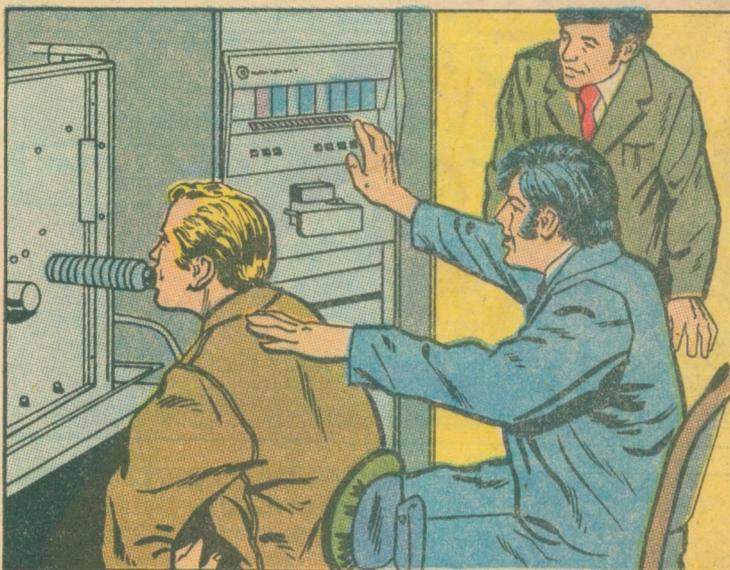
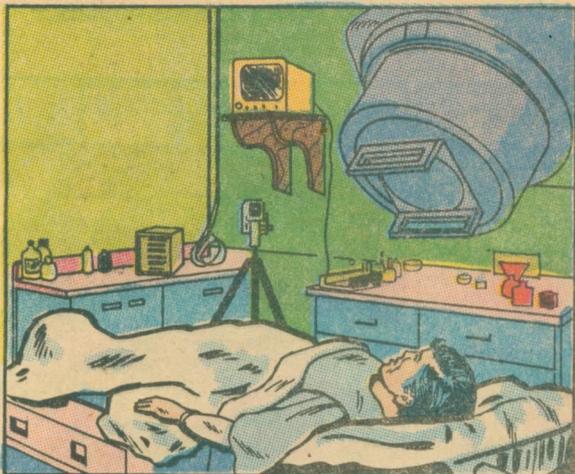


WARD RECEIVER CONTAINING VISUAL DISPLAY

"IF ANY MEASUREMENT SHOULD RISE OR FALL OUTSIDE THE NORM, THE PATIENTS NUMBER FLASHES ON A PANEL. THE NURSE THEN DIALS THE PATIENT'S BED AND THE INFORMATION IS DISPLAYED FOR THE DOCTOR TO SEE."



"TODAY COMPUTER-CONTROLLED RADIOTHERAPY MAKES POSSIBLE THE TREATMENT OF MORE PATIENTS PER DAY WITH GREATER SAFETY... AN INVALUABLE AID IN SAVING THE LIVES OF CANCER VICTIMS."



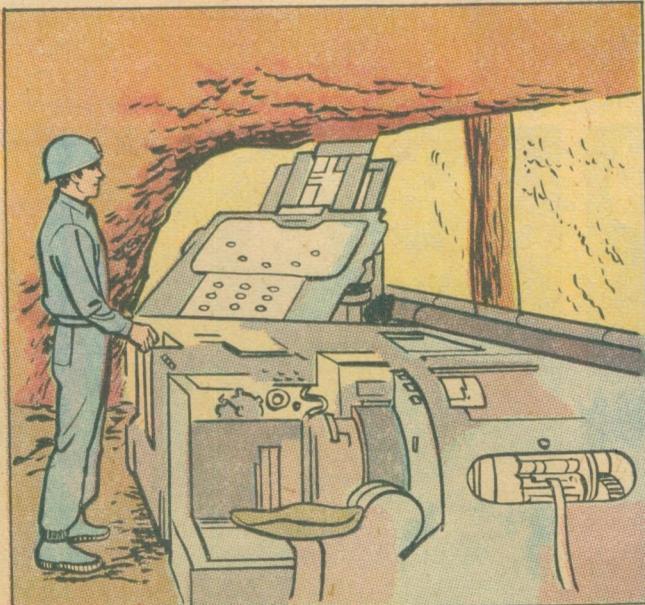
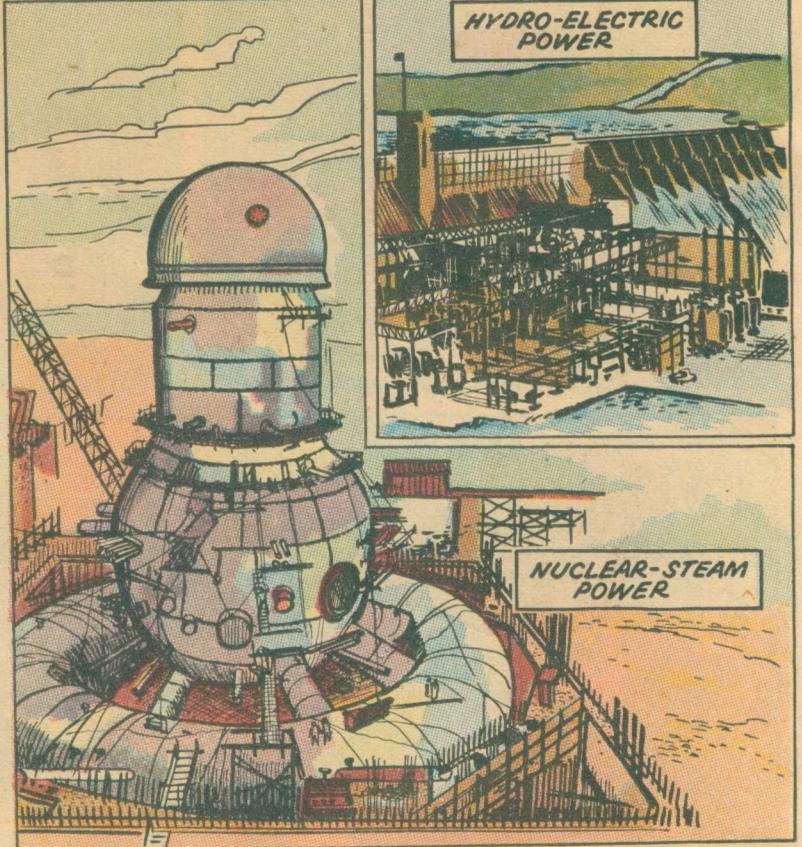
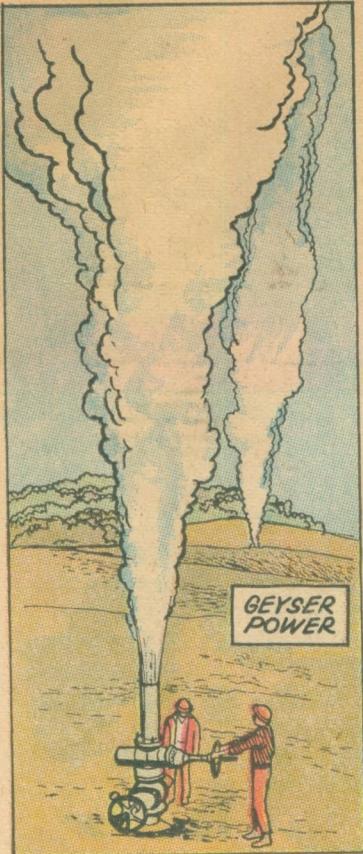
"ANOTHER MARVEL OF MODERN MEDICAL SCIENCE USES A COMPUTER AND SPIROMETER DEVICE TO DISCOVER LUNG AILMENTS IN ONLY 90 SECONDS. SOON, IT MAY BE POSSIBLE TO DO RAPID, MASS LUNG EXAMINATIONS OF PEOPLE WHO LIVE IN THICKLY POPULATED AREAS OF THE WORLD."

ELECTRONICS AND ELECTRICITY WORKING HAND-IN-HAND ARE GIVING MANKIND A LONGER, HEALTHIER, AND HAPPIER LIFE...



"... AND REMEMBER, TOO, THE A.C. ELECTRICITY WE USE IN OUR HOMES, HOSPITALS, BUSINESSES, AND INDUSTRY CAME FROM THE INVENTION OF AN AMERICAN IMMIGRANT, NIKOLA TESLA."

"TODAY, THE UNITED STATES PRODUCES AND CONSUMES A THIRD OF THE WORLD'S ELECTRIC ENERGY TO GIVE ITS CITIZENS THE BEST STANDARD OF LIVING EVER ACHIEVED BY MANKIND. WE CONTINUE TO PROBE THE FORCES OF NATURE FOR SOURCES OF ENERGY... COAL, GAS, STEAM FROM GEYSERS, WATER-POWER, NUCLEAR POWER, AND POSSIBLY SOLAR POWER TO TURN TURBINES THAT PRODUCE OUR ELECTRICITY..."



"... JUST AS HE HAS SOLVED COUNTLESS "CRISES" DOWN THROUGH THE CENTURIES. HE WILL CONTINUE TO EXPLORE... TO DISCOVER... TO REACH OUT FOR NEW HORIZONS."



SCIENCE FAIR® QUIZ

WHO ARE THESE FAMOUS INVENTORS FROM...

HISTORY'S HALL OF HONOR

(ANSWERS ON NEXT PAGE)



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2. _____



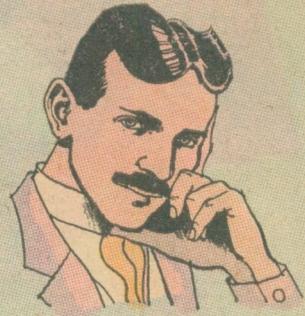
3. _____



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7. JOHN _____



8. _____



9. _____



10. _____



A. JOHN _____



B. _____



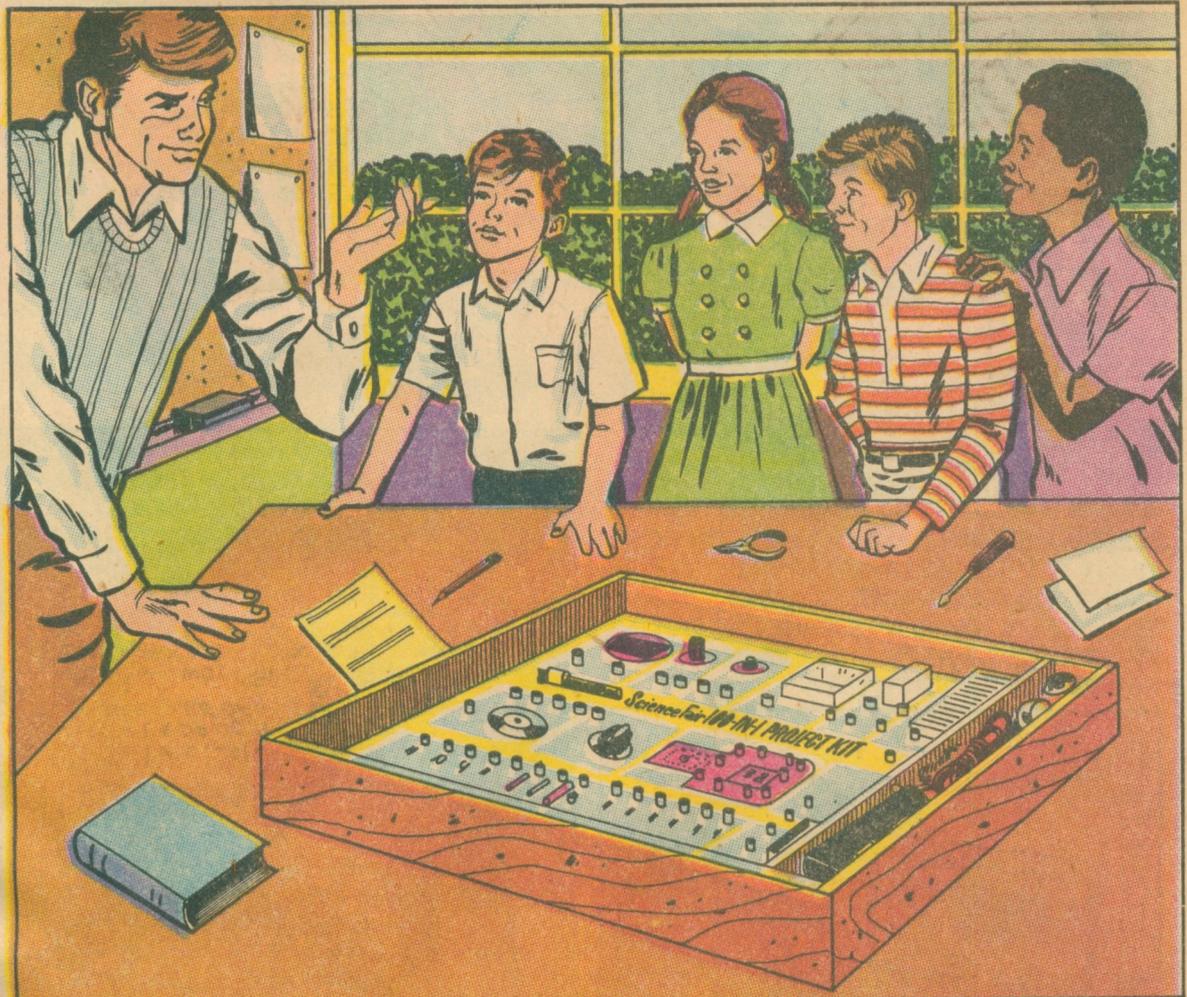
C. _____

11. _____

ELECTRONIC TEACHING AIDS GIVE TODAY'S BOYS AND GIRLS A MUCH QUICKER WAY TO LEARN THAN WAS POSSIBLE A CENTURY AGO!



GEE! I HADN'T THOUGHT ABOUT THAT. WE'LL BE ABLE TO LEARN MORE THINGS, TOO. THAT'S THE REASON WE'LL BE ABLE TO SOLVE REAL TOUGH PROBLEMS IN ENERGY, ECOLOGY... AND RUNNING OUR COUNTRY AND BUSINESSES.



"THAT'S RIGHT, BOB! JUST IMAGINE HOW HAPPY STUDENTS WOULD HAVE BEEN ABOUT 25 OR 30 YEARS AGO... TO BE ABLE TO WORK OUT AS MANY AS 100 EXPERIMENTS WITH ONLY ONE SMALL, LOW COST, ELECTRONIC LAB KIT LIKE THE STUDENTS AND HOBBYISTS CAN TODAY. THAT KIND OF EQUIPMENT WOULD HAVE COST A SMALL FORTUNE WAY BACK THEN."

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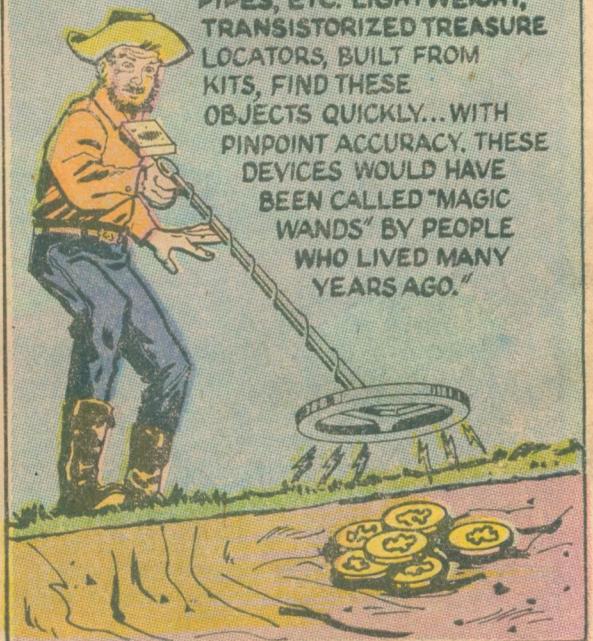
"YOUNG SCIENCE ENTHUSIASTS OF TODAY CAN BUILD SOLID STATE ELECTRONIC PROJECTS THE "BREADBOARD" WAY LIKE INVENTORS. THE SPACEAGE WAY TO LEARN ELECTRONICS AS YOU BUILD. LEARN HOW TRANSISTORS ARE USED TODAY INSTEAD OF RADIO TUBES IN SMALL AM RADIOS; OR SHOW HOW A BROADCAST STATION'S TRANSMITTER WORKS BY BUILDING AN AM MIKE STATION THAT SENDS YOUR VOICE TO A TRANSISTOR RADIO IN THE NEXT ROOM. MAKES LEARNING FUN."



"EDWIN H. ARMSTRONG DISCOVERED THE ELECTRONIC PRINCIPLE OF "REGENERATION" TO GET BETTER RECEPTION OF RADIO SIGNALS. SMALL, SHARP-LOOKING SOLID-STATE RADIO KITS MAKE USE OF THIS PRINCIPLE USING TINY TRANSISTORS INSTEAD OF RADIO TUBES."

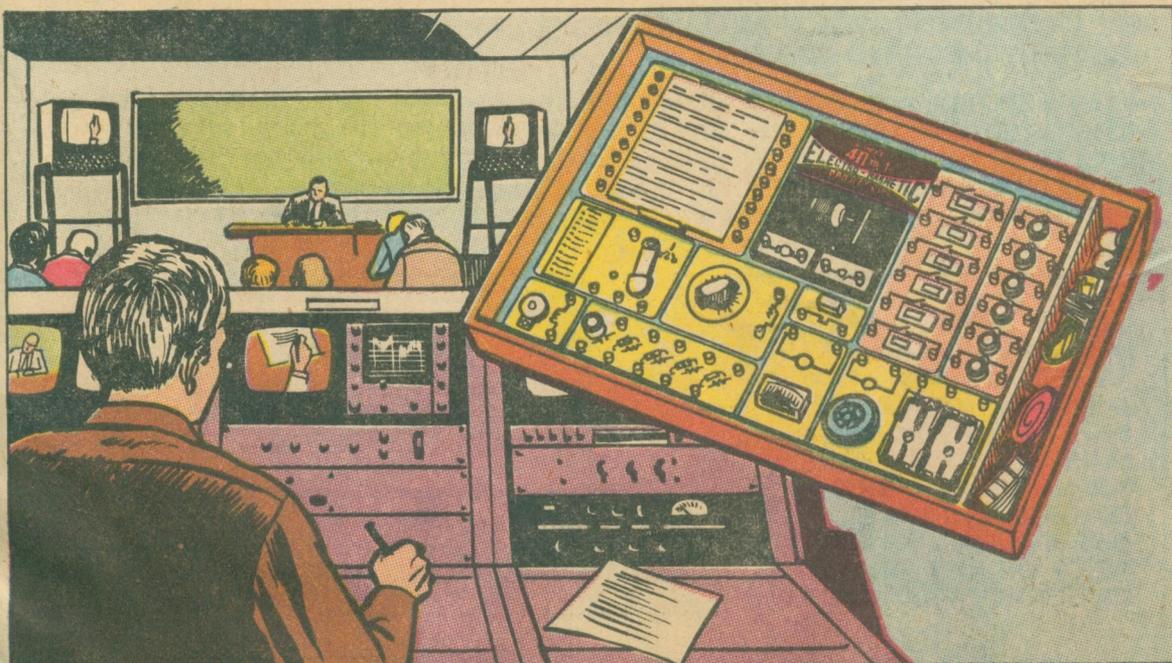


NO WASTED TIME DIGGING FOR COINS, GOLD, SILVER, LOST VALUABLES, BURIED METAL PIPES, ETC. LIGHTWEIGHT, TRANSISTORIZED TREASURE LOCATORS, BUILT FROM KITS, FIND THESE OBJECTS QUICKLY... WITH PINPOINT ACCURACY. THESE DEVICES WOULD HAVE BEEN CALLED "MAGIC WANDS" BY PEOPLE WHO LIVED MANY YEARS AGO."





AFTER READING THE SCIENCE FAIR® STORY OF ELECTRONICS IT IS EASY TO SEE THE IMPORTANCE OF ONE OF MAN'S GREATEST INVENTIONS, THE TINY TRANSISTOR--- FIRST SHOWN TO THE PUBLIC IN NEW YORK CITY IN 1948, ONLY 26 YEARS AGO. IT BROUGHT US "POCKET RADIOS", MINIATURE COMPUTERS OPERATING IN SPACE CRAFT THAT LANDED AMERICAN ASTRONAUTS ON THE MOON, COMPACT COMPUTER INSTALLATIONS THAT HELP TO SPEED THE WORK OF GOVERNMENT, BUSINESS, AND INDUSTRY-- EVEN COMPUTER- CONTROLLED "PEOPLE- MOVERS" LIKE AIR TRANS AT THE WORLD'S LARGEST AIR TERMINAL, DALLAS-FT. WORTH INTERNATIONAL AIRPORT...

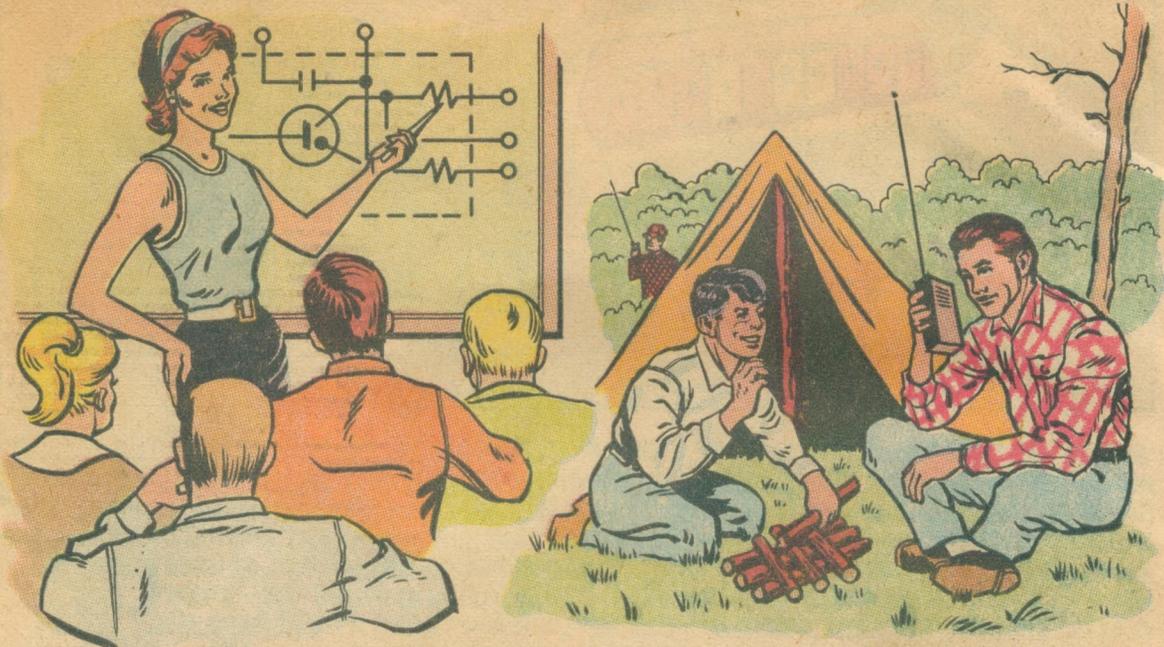


... AND PERHAPS MOST IMPORTANT OF ALL... THE TRANSISTOR HAS BROUGHT NEW IDEAS AND EQUIPMENT TO AID IN LEARNING--- QUICKER, BETTER, AND MORE INTERESTING WAYS TO LEARN ABOUT SCIENCE. A WONDERFUL OPPORTUNITY FOR BOYS AND GIRLS... KIT BUILDERS OF TODAY... TOMORROW'S INVENTORS AND ENGINEERS WHO WILL CONTINUE THE TASK BEGUN BY MAN IN THE DIM PAST: MAKING THE WORLD A BETTER, HAPPIER PLACE TO LIVE.



TEACHERS, CLUBS, SCHOOLS...

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