

Common Science

BY JOE JEFFERS, Ph.D.
Practical Applications
Of Lasers

Can you imagine a technology selective enough to burn ink off of paper without damaging the paper, powerful enough to shatter an enemy missile long before it poses a threat to home soil, sensitive enough to probe blood for one molecule in a quadrillion, and yet generally useful enough to speed your check out at the supermarket? The technology involves lasers, extremely intense, very pure beams of light.

Albert Einstein first recognized in 1917 the existence of what was to become known as lasers, but not until the 1950's were methods found to be able to use them in devices. Today laser technology is in widespread use accounting for over two billion dollars worth of industrial good per year, and the technology is in its infancy.

The word LASER is an acronym for Light Amplification by Stimulated Emission of Radiation. Emissions in atoms and molecules may exist at high or low energy levels. Electrons excited to high energy levels give off light when they return to low energy levels. Only light is emitted in many different wavelengths (colors) and does not lend itself to many useful applications. However, if during the brief instant that the electrons are excited, light of a certain wavelength strikes them, the atoms can be stimulated to emit light of exactly the same wavelength as the striking light. If a device is constructed to bounce this same light back and forth through the container of atoms or molecules, very concentrated beams of light of the highest purity are produced. The great variety of uses of lasers stems from the great variety of wavelengths of light that can be so stimulated. These wavelengths include light we can see, such as visible light, an light we cannot see, such as infrared, ultraviolet, x-rays and microwaves.

Today most lasers are sold for producing the straight line needed in surveying than for any other purpose. Thus land can be precisely leveled for rice farming and tunnels can be constructed with high precision. So precise is the laser's straight line that the distance from a point on the surface of the earth to a point on the surface of the moon can be measured to within one inch. By bouncing laser light off satellites or reflectors or the moon, precise measurements of the movement of the earth's crust can be made. A laser beam down to earth lasers used in conjunction with computers can read the product code from an item at the grocery store and print out the name and price of the item on your cash receipt while keeping track of inventory for the grocer.

Laser power is rated like light bulb, in watts. A one-watt laser beam can be focused using lenses into spot so small that it produces 100 million watts per square centimeter. Lasers can concentrate 10 billion watts onto a place the size of our finger tip. Such lasers can be used to cut fabric for suits, to cut teeth in saws, to drill holes in diamonds or baby bottles, tiplets, and to weld parts in automobile manufacturing.

In surgery lasers can be matched so well to specific body tissues that the light can pass harmlessly through the pupil of the eye to perform operations within. Blood vessels can be cut and cauterized without harming any tissues around them. Plaques in blocked arteries can be blasted off the walls very precisely.

Since such substance in the atmosphere or in a solution can be uniquely identified by absorbing or reflecting light of a certain wavelength, lasers can be used to detect pollutants in the air or to detect trace quantities of chemicals in blood, sweat or tears. By directing the laser at oxygen in the atmosphere, precise measurements of atmospheric pressure and temperature can be determined. Thus lasers will play a part in future weather forecasts.

The number of available frequencies for radio stations in an area are limited. If there are too many they interfere with one another. For the same reasons the number of telephone conversations sent on a single telephone wire is limited. A single light beam, however, has enough available frequencies to carry all the radio, television and telephone calls in the world at any given time without interference. Research is being conducted using glass fibers one-tenth the size of a human hair to transmit this light.

X-ray lasers will someday have military applications capable of tremendous destruction. Fuel pellets shattered by laser power may someday provide enough fusion energy production to take care of all our energy needs. Highly accurate clocks that are produced that are off by no more than a second every few million years. Three dimensional movies and television will appear. Information storage will be so compact that all of the information in the Library of Congress will be stored on a medium the size of a sugar cube. Science fiction, science fact. If all comes together in this fascinating technology of lasers. For further reading see the March 1984 issue of National Geographic.

PART-TIME HONORS

Joyce Zagrobely of Potsdam was among 18 part-time students at Mater Dei College receiving recognition for academic achievement for the fall semester.

**Sperling's
FINAL
6-HOUR
JANUARY
CLEARANCE
SALE**

SAVE \$112...Kelvinator 16 cu. ft. upright freezer, adjustable control, built-in lock, REG. \$480... **\$368**

SAVE 56...COMPACT MICROWAVE OVEN REG. \$150... **\$94**

SAVE \$72...Sanyo deluxe compact microwave oven, 30 min. timer, start button, REG. \$270... **\$198**

SAVE \$132...Sanyo compact microwave oven with variable power, 30 min. timer, REG. \$330... **\$198**

SAVE \$152...Sanyo full-size microwave oven, variable power selection and probe, REG. \$400... **\$248**

SAVE 31...HOVER UPRIGHT VACUUM REG. \$100... **\$69**

SAVE \$82...Hoover Concept 1 power-drive upright vacuum, REG. \$250... **\$168**

SAVE \$91...Sanyo 6,900 BTU kerosene heater, battery ignition, REG. \$140... **\$49**

SAVE \$91...Sanyo 9,900 BTU kerosene heater, safety shut-off, REG. \$170... **\$79**

SAVE \$101...Sanyo 12,900 BTU radiator type kerosene heater, safety shut-off, REG. \$200... **\$99**

SAVE \$61...Sanyo 14,600 BTU convection type kerosene heater, safety shut-off, REG. \$210... **\$149**

8 RAYMOND ST. POTSDAM

A. Sperling's POTSDAM & WATERTOWN

FINAL SIX-HOUR JANUARY CLEARANCE SALE

WEDNESDAY, JANUARY 29, 1986 — 4 P.M. TO 10 P.M.

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| <p>CONTEMPORARY SOFA Rollarms, Hartan Cotton REG. \$549 \$299</p> | <p>PANEL WATERBED SYSTEM Complete, SuperSingle, Queen or King Size REG. \$500 \$298</p> | <p>COLONIAL LOVESEAT SLEEP-SOFA Wing back, Herculon® Plaid, Queen or King Size REG. \$349 \$198</p> | <p>CONTEMPORARY CORNER BOOKCASE Almond Finish, Brass Accents REG. \$190 \$88</p> | <p>SOLID MAPLE 5 PC. DINING SET Extension Table and 4 Matching Mate's Chairs REG. \$1208 \$598</p> |
|---|---|---|--|--|

RECLINERS/CHAIRS

REG. \$850...3 pc. fireside chair set, Mr. and Mrs. wing chair with ottoman, cotton plaid, shirred skirt... **\$455**

REG. \$350...Contemporary occasional chair, nylon velvet, parson's leg... **\$188**

REG. \$140...Country rocker, solid pine frame with Herculon® plaid reversible cushions... **\$77**

REG. \$299...Occasional corner chair, plump pillow back, tufted in Herculon® velvet... **\$99**

REG. \$199...Traditional swivel rocker, tufted barrel back in nylon velvet... **\$99**

REG. \$399...Action® by Lane recliner, deeply tufted high back, nylon tweed... **\$189**

BASSETT ORIENTAL 6 PC. SLEEP-SOFA
Triple Dresser, Mirror, Chest Full/Queen Headboard & 2 Night Stands
REG. \$2070 **\$998**

BEDROOMS

REG. \$1130...3 pc. contemporary suite, almond finish, triple dresser, mirror, chest, full/queen headboard and night stand... **\$588**

REG. \$840...Colonial 5 pc. suite, pine finish, triple dresser, hutch mirror, chest, full/queen headboard and night stand... **\$538**

REG. \$1296...Solid maple 4 pc. suite, triple dresser, hutch mirror, chest and full/queen headboard... **\$598**

REG. \$1800...Country pine 5 pc. suite, triple dresser, hutch mirror, armoire, full/queen bed and night stand... **\$998**

REG. \$1430...Stanley contemporary 5 pc. suite, triple dresser, twin mirrors, chest, full/queen headboard and night stand... **\$1098**

LIVING ROOMS

REG. \$699...Contemporary sofa, flared arm, parson's leg, Jacquard tapestry... **\$399**

REG. \$1099...Contemporary sofa and loveseat, high layered pillow back Herculon® tweed... **\$699**

REG. \$1030...Country sofa and chair, wing back, shirred skirt, cotton tapestry... **\$588**

REG. \$1295...Classically styled genuine leather sofa, high tufted back... **\$699**

REG. \$999...Colonial incliner sofa, incliner unit at each end, soft, flat Herculon® wing back with wood trim... **\$488**

REG. \$1030...Country sofa and chair, wing back, cotton tapestry, shirred skirt... **\$588**

REG. \$1591...Harden traditional sofa, Lawson style, Jacquard tapestry... **\$966**

REG. \$899...Contemporary sofa and chair, shaped back, parson's leg, natural wave fabric with coordinated bolsters... **\$577**

OPEN A NEW ACCOUNT OR ADD ON TO THE ONE YOU HAVE.

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WEDNESDAY ONLY

JANUARY 29, 1986

4:00 P.M. - 10:00 P.M.

6 hr. Sale

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For six hours — Wednesday, January 29, 1986 from 4 p.m. — 10 p.m. — is Northern New York's most opportune time to save big money on beautiful furniture, bedding, and carpet. Credit terms are flexible, delivery is free and the savings are important. Get to your Sperling's Potsdam or Watertown Stores tomorrow for the most important six hours this year!

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REG. \$80...Oak side chair, cane seat and back... **\$39**

REG. \$685...Solid maple 5 pc. set, round table with leaf and 4 matching mate's chairs... **\$338**

REG. \$905...Solid oak 5 pc. set, round table with oak, 2 arm and 2 side Windsor chairs... **\$598**

REG. \$1340...Contemporary 5 pc. dining set, brass and glass table with 4 fully upholstered arm chairs... **\$668**

REG. \$3670...Bassett 9 pc. Oriental master suite, lighted china, table, 4 side and 2 arm upholstered chairs and server, authentically accented... **\$2468**

REG. \$2228...Solid pine 6 pc. master suite, china, rectangle table and 4 ladderback side chairs... **\$1098**

REG. \$820...Contemporary 5 pc. set, rectangle table with leaf and 4 upholstered chairs... **\$498**

REG. \$300...Contemporary rectangle table with protected top... **\$198**

REG. \$2675...Solid oak 6 pc. suite, china, rectangle table with leaf and 4 Windsor side chairs... **\$1798**

JUST LIKE ON TV! DELUXE ADJUSTABLE BED
Twin Size with Vibrator
REG. \$800 **\$388**

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REG. \$500...Queen-size bookcase hutch waterbed system — includes frame, mattress, decking, mattress pad, sheets pillow cases, delivery and set-up... **\$348**

REG. \$830...Queen-size soft-side water mattress, foundation and heater... **\$468**

REG. \$180...Simmons twin-size mattress and box spring set... **\$98**

REG. \$700...Simmons Beautyrest® king-size 3 pc. set — mattress and 2 box springs... **\$598**

REG. \$600...Simmons Beautyrest® queen-size mattress and box spring set... **\$348**

SOLID BRASS STIFFEL TABLE AND FLOOR LAMPS

IN STOCK REDUCTIONS!

PRICED FROM **\$140**

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REG. TO \$60...Select group twin-size bedspreads, several decorator colors, YOUR CHOICE... **\$39**

REG. \$60...Electric table lamp, rust pottery... **\$29**

REG. \$130...Table lamp, solid dark pine, authentic reproduction from Williamsburg... **\$49**

REG. \$100 Each...Accent lamp, solid oak with attractive complementary shades, PAIR... **\$99**

REG. \$260...Contemporary floor lamps, chrome... **\$69**

REG. \$470...Stanley provincial canopy bed, decorated white, twin-size... **\$248**

REG. \$200...Queen-size spindle headboard, tarnish proof... **\$98**

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High back, Herculon® Tweed
REG. \$349 **\$149**

LANE LOVE CHEST
Cedar Lined
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DISCONTINUED COCKTAIL & END TABLES
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Woodgrain Extension Table and 4 Coordinated Chairs
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