

### Various Beams of Light Are Made With New Lasers

New York, N.Y.—(Scientific American Feature) — Light beams of almost any desired color and intensity from infrared to ultraviolet can now be produced by lasers.

According to Arthur L. Schawlow, professor of physics at Stanford university, advances in the capabilities of the laser have come so swiftly since its announcement three years ago this month that scientists are embarrassed by their riches, and as a consequence have scarcely begun to find applications for the invention that promises to revolutionize fields of application as diverse as electrical communications and eye surgery.

"By conservative estimate," Schawlow states, "500 research groups are now engaged in laser development and exploitation in the U.S. alone. Much of this effort is directed toward the use of laser beams in communications systems. The amount of information that can be carried by a communication channel is proportional to its frequency. In principle the visible region of the spectrum from red to blue could accommodate some 80 million television channels. The realization of this potential is still far in the future. Generating the light beams is one thing. Harnessing them to carry signals is another. Outside the field of communications — in chemistry, medicine and several other disciplines — many possible uses of a strong beam of monochromatic laser light are being intensively explored."

#### First Working Laser

"The first working laser, developed by T. H. Maiman three years ago, emitted only pulses of deep red light. Its rays fascinated scientists because they vibrated at a single frequency, much as a piano emits a single note when one key is struck. Ordinary lamps emit many frequencies, comparable to the noise or discord that a piano would produce if all keys were struck in unison. The pure monochromatic light of the laser can be focused more sharply than ordinary light and beams of laser light do not spread or scatter appreciably. Moreover, lasers in effect provide a means for concentrating the energy of a wide spectrum of light into a single color of great intensity. In the case of Maiman's laser this was accomplished by focusing the rays of a powerful flash lamp onto a short, cigarette-sized rod of specially treated ruby. The ruby absorbed the flash and re-emitted the concentrated energy as a thin red ray that could easily vaporize tungsten and other highly refractory substances.

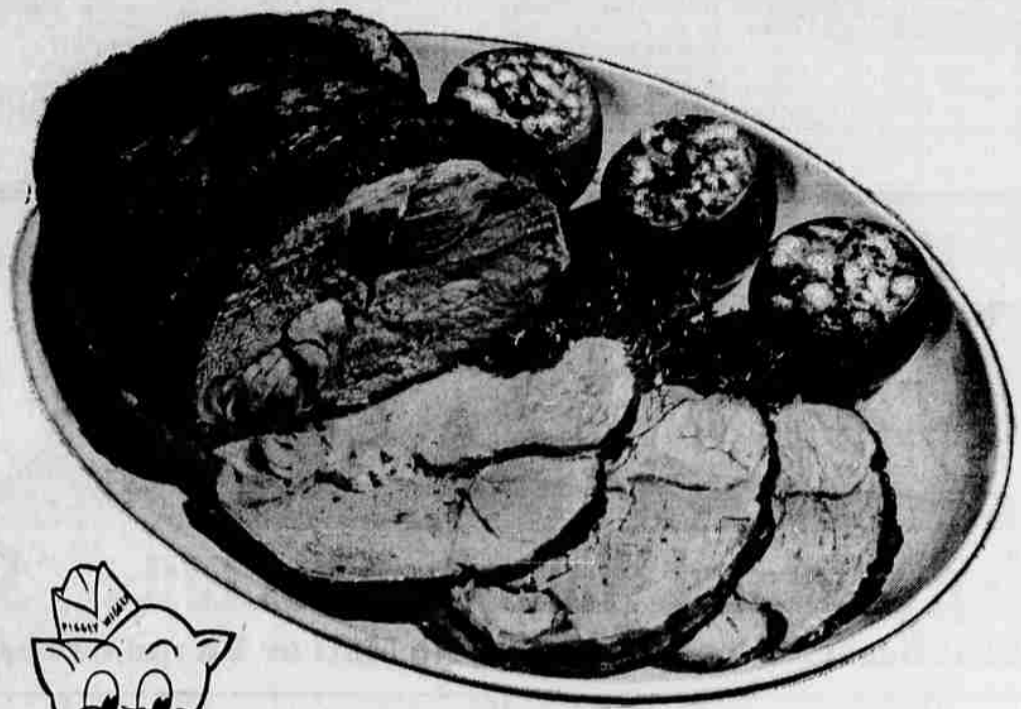
"It has now been found that many substances other than ruby can similarly concentrate light of other colors. The substances include exotic elements such as europium, samarium, ytterbium, and gases such as helium, krypton, xenon.

"With radical advances in laser technology appearing literally every few days, there has been little chance to do the careful, detailed development work needed to realize practical applications. Some proposed applications, particularly military ones, require much higher output energies than those now available. Until the efficiency and the average output power are increased, it will not be practical to use lasers for large scale cutting and welding. There is no apparent reason in principle why this cannot be done eventually.

#### Related Application

"One related application has already been realized: When the retina of the eye has been torn or injured, it is now possible to 'weld' the retina to its support by coagulation with an intense spot of light. The short flash is delivered so abruptly that the eye does not require immobilization during the treatment. Other potential applications include the triggering of chemical reactions, measuring distances, motions and time with unprecedented accuracy, and determining the nature and characteristics of substances that defy conventional analytical techniques.

"No single laser can combine all of the attributes necessary to all applications. The immediate engineering task is to select the proper combination of properties for any proposed application and to design the particular laser to fit it. This should become increasingly easy because one can be sure that there will continue to be surprising innovations and advances in laser development."



# PORK ROAST

# 39<sup>c</sup>

lb.

Boneless, rolled pork roasts cut from Swift's Premium tender, young porkers. There's less waste with a boneless roast.

Lean and Tender  
**Pork Steaks**  
lb. **49<sup>c</sup>**

Ocean-Caught  
**Salmon**  
Sliced, lb. **79<sup>c</sup>**  
Half or whole, lb. 69c


Bread and Fry  
**Pork Cutlets**  
lb. **59<sup>c</sup>**

Fry Like Clams  
**Sea Scallops**  
**89<sup>c</sup>** lb.

Save at Piggly Wiggly  
Brentwood

## Cottage CHEESE

Serve Pineapple and Cottage Cheese Salads



# 17<sup>c</sup>

Pint Carton

Plus S & H Green Stamps

Shop Piggly Wiggly and  
**Win \$100 Cash**

Shop Piggly Wiggly and enter the weekly cash give-away contest... \$100.00 awarded each week in the special drawing. There's nothing to buy... just ask for your free entry. (Children under 18 not eligible to enter)

LAST WEEK'S WINNER:  
GENE DEPUY  
1509 Jasper St.  
Medford, Oregon

U.S. Choice or Swift's Premium  
**Beef Short Ribs** ..... lb. **39c**

U.S. Choice or Swift's Premium  
**Ground Chuck** ..... lb. **69c**

U.S. Choice or Swift's Premium  
**Blade Pot Roast** ..... lb. **59c**

U.S. Choice or Swift's Premium Boneless  
**Beef Cubes** ..... lb. **79c**

U.S. Choice or Swift's Premium  
**Tender Rib Steaks** ..... lb. **89c**

Hudson House  
**Sliced Pineapple**  
25c Each  
5 No. 1 1/4 tins **\$1.00**

Franco-American  
**Spaghetti**  
5 15-oz. tins **59<sup>c</sup>**

C-H-B  
**Jams & Jelly**  
10-oz. Jar  
3 jars **99<sup>c</sup>**

Save at Piggly Wiggly

# HI-C DRINKS

Refreshing orange or grape drink at a special low price... 29c each.



# 4

46-oz. tins

# \$1.00

Save at Piggly Wiggly

# Giant RINSO

Rinso Blues as It Washes



# 49<sup>c</sup>

Giant Package

Plus S & H Green Stamps

Piggly Wiggly Fresher Produce

## CANTALOUPE

JUMBO VINE RIPENED **10<sup>c</sup>** lb

Package of Six **29<sup>c</sup>**

4-lb. Gello Bag **69<sup>c</sup>**

2 lbs. **29<sup>c</sup>**

Snoboy Quality Sunkist  
**LEMONS**

Snoboy California Valencias  
**ORANGES**

Golden Ripe Hands  
**BANANAS**

Large, Well Filled Ears  
**SWEET CORN** 6 for **49<sup>c</sup>**

Vine Ripened, Salad Size  
**TOMATOES** **25<sup>c</sup>** lb