SHOOTS THE MOON

Sophisticated Laser Devices Developed by Palmdale Youth

By CHUCK SMITH

What is a laser beam?

For the thousands who saw Ian Flemings "Goldfinger" there is no doubt. But everyone knows that "Goldfinger" was not as realistic as our life today. So, let's come down to earth and reality once again, and learn what a laser beam actually is.

The best way to begin the explanation is to define the word "laser". The word is merely initials for Light Amplification by Stimulated Emission of Radiation, and in English the word simply means "a glorified light bulb."

Mark Morgan, a June graduate of Palmdale High School, recently performed an experiment in which he transmitted and used a laser beam to broadcast nine minutes from radio station KRLA of Pasadena to and from the moon.

About 25 interested spectators witnessed the world-wide first from Mark's backyard in Palmdale, 37304 Mahonia Ave., as the moon slowly crept over the horizon on that dark, starlit night.

The spectators anxiously awaited the moment when the moon would be visible and after waiting excitedly for hours, there it was. It seemed to rise from the floor of the desert and had a chunk out of it about the size of a thumb nail.

Before all this anticipated excitement came to a head Mark patiently explained the workings of the laser.

"The laser has the unique ability to generate and amplify light waves as specific wave lengths by means of exciting atoms of an active medium just as radio waves are generated and amplified at specific wave lengths," he began. Mark gave the following example to clear up in the mind of those interested, what was happening.

You tune in your radio to a station which, of course, is one frequency out of many on your radio dial. The laser amplifies light of one frequency out of many. Light generated by a laser is known as "coherent" light because it is "pure," predominantly of one frequency.

He continued his example by adding, "Light waves coming from the sun or from incandescent or fluorescent lamps consists of a broad band of frequencies all mixed together. In addition, light from these sources can be considered, or having been emitted from an infinite number of sources and polarizations with respect to one another. We call this kind of light 'incoherent'."

Mark explained that both a radio transmitter and a laser generate coherent radiation that is predominantly of one specific frequency. The differerence between the two is that the radiation produced by the laser is very much higher in frequency and therefore a much shorter wavelength, so that it falls within the optical portion of the electromagnetic spectrum.

At visible frequencies, radiation must be generated on an atomic level, as in a laser. This is made possible by the fact that the atoms of certain materials, when excited by large doses of energy, ruby for example, made up of atoms which can be excited, and which will, at a certain point, emit coherent or "pure" light.

A laser beam, because of its extremely short wave length and because it is generated at the atomic level with all of the light energy in phase, is a very narrow beam of extremely high energy. This energy, concentrated at a single point, can burn through steel.

The fact that a laser beam can be modulated (alteration of the amplitude or frequency of a wave in accordance with speech or a signal) is expected to be of great importance in future applications. The transmission of a voice by radio requires a band of frequencies several thousands of cycles wide.

The transmission of a television signal complete with sound takes up six million cycles of the available spectrum. By and large, the radio portion of the spectrum is now overcrowded, and the situation is expected to get progressively worse.

Mark continued by saying, "The use of optical frequencies for communications opens up great new vistas. In the visible white portion of the spectrum alone, the number of frequencies available is 250 million megacycles. This figure represents thousands of times more frequency space than in all the radio frequency bands combined. One laser, relayed as microwaves are now, could carry all of the communications traffic in America from coast to coast — telephone calling cable services, television programs, computer date, and facsimile!"

The first successful pulsed optical laser generated a peak power of 10 kilowatts for very short intervals. The duration of the beam of the pulsed laser is approximately seven-one-millionths of one second.

Mark had listed numerous uses for the laser beam, both present and in the future.

Uses for the pulsed laser today, listed by Mark, are as follows: used to perform micro-surgery-delicate eye surgery has already been demonstrated — precise enough to allow cutting of a single human cell; it is being used in the steel industry as a quick inexpensive method of cutting large amounts of steel with unbelievable precision; it is rapidly being put to use in the diamond cutting industry; and is being used to speed up chemical processes thousands of times, such as those that take pace during photosynthesis.

You may be wondering what lies ahead for the laser beam. The following uses were listed by Mark as possible use in the years to come:

To transmit a billion simultaneous telephone conversations on a single thread of light one millimeter in diameter without interference; to reach billions of miles into space with a beam powerful enough to guide and power a spaceship, and possibly communicate with life on planets in other solar systems; to transmit electric power through space as we transmit electrical power from its course to our homes; at optical frequencies and with narrow beam angles concentrating all the radiated energy into a small cone, a television station in color with sound could be established between earth and saturn with only about 500 watts, while a radio station could be established with Pluto with as little as five watts; to reach billions of miles into space with a beam powerful enough to guide a spaceship, communicate with life on planets in other solar systems; to investigate the possibility of transmitting electric power through

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Now all those "Goldfinger" fans can realize the actual potential uses of the laser in a peacelike manner. Naturally the above list is not exhausted; there are undoubtedly many more used now, and to be discovered.

The important thing is that Mark Morgan, a graduate of Palmdale High School, has accomplished the first continued transmission from the moon right in his own backyard.

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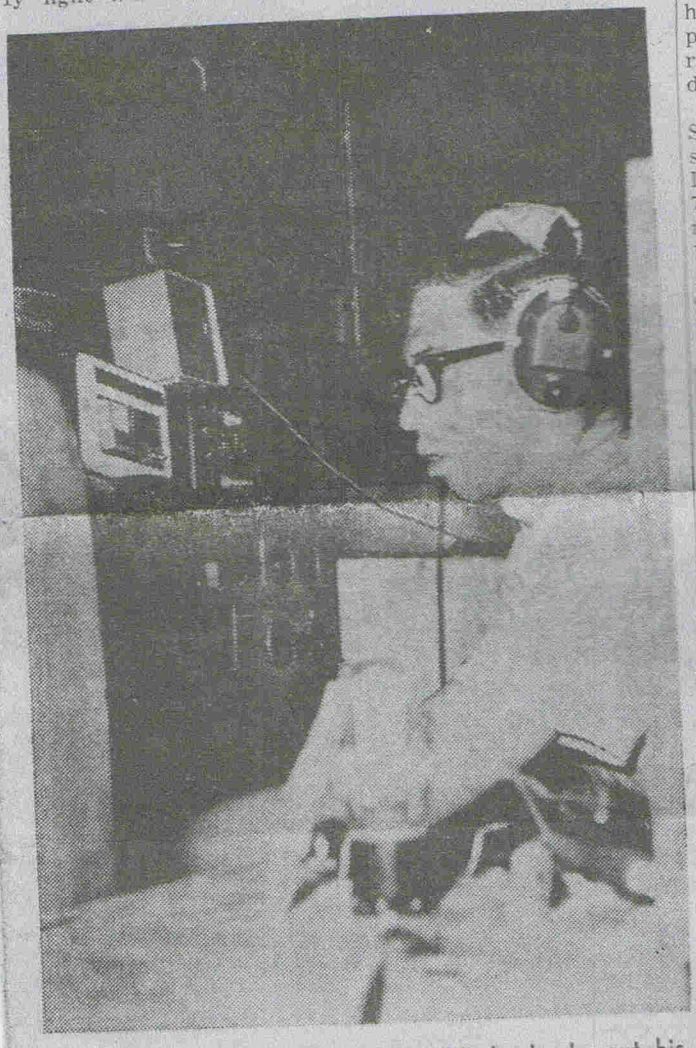

MOON SHOT PREPARATION—Mark checks out his system before the moon shot last week. He has built most of the equipment in the garage, where his setup is. His transmission was from a tape recorder to the moon, through the laser, and back to his yard where an antenna was set up to receive the light rays. It was then transferred to another tape recorder.

—valley press photo

Gross Retail Sales More Double in Lancaster in

Taxable sales in Lancaster have almost doubled in the past seven years and gross retail sales have more than doubled in a ten year period.

Figures released by the State Board of Equalization show that taxable sales in Lancaster in 1957 totaled $44,768,000 and have grown yearly to $71,559,000 for the year 1964.

After applying a factor to create an estimated gross retail sales figure, the Lancaster Chamber of Commerce shows that from [illegible] sales have grown [illegible] 000 which more than [illegible] the 1955 figure.

In 1955, the total retail sales was calculated at $[illegible] 417,000. In 1964, sales soared over the $100 million to a new high of $104,361,850.

The Board of Equalization reports that there were [illegible] permits in effect as of Jan. 1, 1965, and of that number there are 25 apparel stores, 25 [illegible]

Business Up Says Bank

Southern California's business activity eased up slightly during August after racing at a record level in the previous month, John Upchurch, manager of Security First National Bank's Palmdale branch, reported today.

Based on the bank's index of business conditions, the local area's economy was estimated at 143.6 for August. This compares with July's index reading of 144.1 (preliminary) which equaled the all-time high mark set earlier in May.

According to Upchurch, the August, 1964 business index stood at 141.6.

Mixed trends highlighted the Southland business scene during August. Construction activity, based on the number of permits authorized, rose moderately after adjustment for seasonal influences, following a slight decline in July.

Department store sales and real estate transfers, two of the bank's index components which were up in July, proceeded to taper off in August. Bank clearings continued to **places the bank's index** about one per cent above a year ago.

For the first time in several months, employment in the Southland metropolitan areas was down slightly. During July, the latest month for which figures are available, employment dipped approximately 22,000 from the record high of more than 4.2 million set in June.

The employment decline was attributed to the construction industry strike which affected the labor market in several counties.

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NANGLE, Sharon Michele, born August 29, daughter of Mr. and Mrs. Thomas Nangle of Lancaster.

RUTAN, Dawn Annette, born August 30, daughter of Mr. and Mrs. Elbert Rutan of Lancaster.

TATE, Susan Elaine, born August 30, daughter of Mr

LASER MECHANISM—This is the actual laser used in the transmission to the moon. Mark has built the device himself. This is a continuous flow laser which is not harmful. However, Mark does have the pulsed type laser which can penetrate one-half inch steel plates.

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ANTELOPE
Valley Press

More Antelope Valley People Read The Valley Press Than Any Other Newspaper

Fiftieth Year—No. 31 | Palmdale, California, Sunday, September 5, 1965 | 20 Pages—Price 10 Cents

Firms, Offices To be Closed For Labor Day

Most businesses and public offices in the Antelope Valley will be closed Monday, Sept. 6 because of the Labor Day Holiday.

There will, however, be a few markets open to handle weekend needs.

The Antelope Valley Press's Paalmdale and Lancaster offices will be among those business observing the holiday.

On a final summer fling, before school commences for most youngsters, the Valley is hosting many visitors along with the heavy traffic passing through over this three-day holiday.

Train-Car Collision

City of Palmdale Doubles Size by Annexing Plant 42

No Protests Presented; 10 Square Miles Added

Palmdale City Council Friday night took action to annex Air Force Plant 42 more than doubling the size of the city.

No one appeared to protest the action during a public hearing and it was reported that no written protests had been filed.

Following the hearing, the council—meeting in the Palmdale School Administration board