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MILWAUKEE SCHOOL OF ENGINEERING

Radio and Television services

1025 North Milwaukee Street, Milwaukee 1, Wisconsin

1963 SOUNDS OF ENGINEERING SCIENCE - WISN and MSOE RADIO PROGRAMS

Saturday, 12:25 and 8:25 p.m.

Sunday, 8:25 p.m.

February 23 - 24

Eugene Alm
Instructor, Electrical Engineering Department

"TV ON A LIGHT BEAM"

(15 second musical introduction)

ANNOUNCER:

--- INTRODUCTION ---

LAST WEEK WE WERE INTRODUCED TO THE LASER AND HOW IT OPERATED.
IS THE LASER JUST A GOOD ACADEMIC EXPERIMENT, IS IT USEFUL,
OR IS IT AS WORTHLESS AS SCREEN DOORS ON SUBMARINES?

ALM:

IF YOU ARE SELLING SUBMARINE SCREEN DOORS, I MIGHT SUGGEST
CHANGING JOBS AND START SELLING LASERS AS SOON AS THEY BECOME
AVAILABLE. THEY HAVE MANY SELLING POINTS IN THEIR FAVOR.
WE HAVE SEEN THAT THE LIGHT FROM THE LASER TRAVELS IN ~~ALL~~
ONLY ONE DIRECTION AND THAT ~~XX~~ IT IS OF ONE COLOR ONLY. THIS
MEANS THAT THE LIGHT BEAM COULD BE FOCUSED WITH LENSES TO A
VERY SMALL POINT. BUT THIS LIGHT BEAM IS ALSO ENERGY, SO YOU
HAVE AN AMOUNT OF ENERGY CONCENTRATED AT A VERY SMALL POINT.
THIS IS THE TYPE OF LIGHT THAT WAS USED IN MAY 1962 TO LIGHT
A SMALL PORTION OF THE SURFACE OF THE MOON. THIS WAS THE FIRST
TIME THAT A CELESTIAL BODY WAS MADE VISIBLE BY MAN MADE
ILLUMINATION. THIS COULD NEVER HAVE BEEN ACCOMPLISHED WITH
WITH ORDINARY LIGHT. THE INTENSITY OF LASER LIGHT IS MORE

AIM: (continued)

...INTENSE THAN ANY OTHER LIGHT SOURCE.

ANNOUNCER:

IS THE LASER BEAM MORE INTENSE THAN THE SUN?

AIM:

YES, IT IS. WHEN THE BEAM IS BROUGHT TO A FOCUS, THE TEMPERATURE AT THE FOCUS POINT IS ABOUT 72,000 DEGREES, WHICH IS HOTTER THAN THE SURFACE OF THE SUN. ONE USE IS THEREFORE OBVIOUS. IT CAN WELD MATERIALS TOGETHER AND IS USED FOR THIS PURPOSE IN DELICATE INSTRUMENTS. THE SIZE OF THE FOCUS POINT IS SO SMALL THAT EYE DOCTORS HAVE USED THE DEVICE TO REPAIR MICROSCOPIC EYE DEFECTS. SURGEONS HAVE USED THE DEVICE TO BURN AWAY DISEASED TISSUE AND TUMORS THAT ARE SO SMALL THAT THEY CANNOT BE SEEN WITH THE NAKED EYE. THE USES IN THE MEDICAL PROFESSION ARE ALMOST UNLIMITED.

ANNOUNCER:

DO YOU MEAN TO TELL ME THAT THE BUCK ROGERS RAY GUN HAS BEEN DISCOVERED?

AIM:

IT SEEMS AS THOUGH IT HAS. DIAMOND IS THE HARDEST MATERIAL KNOWN, BUT THE LASER BEAM CUTS THROUGH IT AS THOUGH IT WEREN'T EVEN THERE. THEY EVEN BURN HOLES IN TEMPERED STEEL. IT IS MY OPINION THAT THE SAFECRACKER OF THE FUTURE WILL BE ARMED WITH ONE OF THESE INSTEAD OF THE CONTEMPORARY TOOLS. RADIO WAVES TRAVEL WITHOUT WIRES AND IT HAS BEEN A DREAM FOR A LONG TIME TO TRANSMIT POWER TO HOMES WITHOUT WIRES. THIS IS A POSSIBILITY, BUT WON'T HAPPEN IN THE NEAR FUTURE. WITH PROPER FOCUSING, THE WIDTH OF THE LASER BEAM IS ABOUT SIX INCHES WHEN YOU ARE 1,000 MILES AWAY FROM THE LASER. YOU COULD GO OUT CAMPING AND TOAST YOUR BREAD IF YOU AIM YOUR LASER AT THE CAMP SITE.

ANNOUNCER:

CAN THE LASER BE USED FOR OTHER THINGS BESIDES TOASTING BREAD OR CUTTING HOLES IN THINGS?

ALM:

YES, AND THEY SOUND UNBELIEVABLE. FOR INSTANCE, ONE LASER BEAM COULD CARRY ONE MILLION TELEVISION PROGRAMS, SIMULTANEOUSLY. THAT WOULD SAVE LAYING A LOT OF UNDERGROUND CABLES. ONE LASER BEAM COULD CARRY 100 MILLION TELEPHONE CALLS SIMULTANEOUSLY. SINCE THE BEAM IS SO SMALL IN DIAMETER, IT COULD BE USED TO SUPPLY ENERGY TO SATELLITES OR SPACE VEHICLES. IT COULD ALSO BE USED FOR COMMUNICATION BETWEEN EARTH AND THESE SPACE VEHICLES.

ANNOUNCER:IS THE COMMUNICATIONS INDUSTRY USING LASERS FOR ANYTHING?

ALM:..... ON JULY 10, 1962, THE BELL SYSTEM LAUNCHED TELSTAR. THE RECEIVING EQUIPMENT ON THE GROUND CONTAINED ONE OF THESE DEVICES. YOU MIGHT ~~XXXXX~~ ASK WHY THEY USED ONE OF THESE DEVICES INSTEAD OF TUBES OR TRANSISTORS. THIS DEVICE AMPLIFIES THE SIGNAL FROM THE SATELLITE ABOUT 1,000 TIMES WITHOUT INSERTING MUCH NOISE. TUBES AND TRANSISTORS ARE VERY NOISY AND THE NOISE THAT THEY WOULD HAVE GENERATED WOULD HAVE COVERED UP THE SIGNAL FROM TELSTAR. PROJECT ECHO, THE SATELLITE REFLECTION TEST SET UP BY THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ALSO USED A RUBY LASER FOR THE SAME REASON. NOISE GENERATED WITHIN CONVENTIONAL EQUIPMENT IS EXCESSIVE AND THEREFORE THE LASER OR MASER IS THE LOGICAL SOLUTION. NOISE IN A RADIO SOUNDS LIKE A HIS OR CRACKLING, WHILE WITH TELEVISION, IT IS COMMONLY REFERRED TO AS "SNOW."

ANNOUNCER:

THE FUTURE OF THE LASER IS OBVIOUS. IT'S HERE TO STAY.

ALM:

THAT IT IS. AT THE PRESENT STATE OF THE ART, ONLY A LIMITED AMOUNT OF ENERGY IS AVAILABLE, BUT EVEN WITH THIS AMOUNT,~~XXXXXXXXXX~~ A LOT HAS BEEN ACCOMPLISHED. THE SUCCESS OF THE LASER OR ANYTHING FOR THAT MATTER, IS DEPENDENT UPON MAN'S QUEST FOR TRUTH IN THIS WORLD OF OURS AND IN ANY POSSIBLE FUTURE WORLDS. THE LASER WAS BUILT BY APPLYING KNOWN FACTS IN A NEW WAY. THIS DEVICE, AS WELL AS THOSE THAT PRECEDED IT AND THOSE THAT WILL SUCCEED IT, ARE BASED ON THE APPLICATION OF CERTAIN FUNDAMENTAL PRINCIPLES. ~~XXXXXXXXXXXX~~ I THINK THAT IT IS THEREFORE OBVIOUS THAT ONLY THROUGH KNOWLEDGE CAN WE BETTER KNOW AND UNDERSTAND THE WORLD AROUND US.