Matsushita Electric. The target

is made of an amorphous zinc-

selenium layer backed by an-

timony trisulfide. Sensitivity is

similar in construction to the

vidicon, but different materials

are used for the target plate to

obtain the desired photoelec-

Teletext and Videotex:

the most exciting area in the

field of communications. These

are information retrieval ser-

vices that display data on spe-

cially equipped TV sets of the

residential or business users.

Some interesting protocol

standard issues arise in rela-

Teletext is a simple one

way system that uses unallo-

cated portions of bandwidth of

a broadcast TV signal. At the

transmission end, a fixed set of

pages of text is sent repeatedly

in round-robin fashion. The

instructed to do otherwise.

Teletext is oriented pri

marily to the home market.

Different sets of service could

be offered on different chan-

nels. Information presented by

this system are stock market

reports, weather reports

news, leisure, information, and

viewdata which is an interac-

tive system designed to serve

both home and business needs.

It is a general purpose data

base retrieval system that can

use the public-switched tele

phone network or an interac

tive metropolitan cable TV

maintains a variety of data

bases on a central computer.

Some of these are public data

bases provided by the videotex

system. Others are vendor

supplied services, such as a

presents information in pages

as represented by the user.

The key differences are: video-

tex can handle a large number

of pages and with videotex,

user represents are serviced

by the central computer rather

than the local device. Clearly

videotex is more flexible and

electronic message centre.

remote conserence, video

games, public opinion polling,

payment of bills, stock market

prices, buying and selling,

banking at home, purchasing

theatre tickets, hotel and air-

lines reservation, catalogue

shopping and other areas are

also possible.

As with teletext, videotex

stock market advisory.

The Videotex provider

Videotex may be called

tion to these services.

ordinary TV set.

recipes

system.

Teletext and videotex are

All these camera tubes are

also very high.

tric characteristics.

Television with Ever Newer Look

HE word television means "to see at a distance." Television was first demonstrated by J. L Baird at the Royal Institution of London in 1926. Experimentally the British Broad casting Corporation (BBC) Began television broadcast in 1930

Commercially, television broadcasting began in 1945. The first popular TV receiver was Radio Corporation of America (RCA) model 630 TS, marketed in 1946 at a cost of about \$400. It contained 30 vacuum tubes, including a monochrome picture tube with a 10-inch round screen. Columbia Broadcasting System (CBS) used a rotating colour wheel but in 1954 the Federal Communications Commission (FCC) adopted a revised colour system prepared by the National Television System Committee (NTSC) of the Electronic Industries Association (EIA)

The NTSC of EIA prepared the standards for monochrome (B&W) TV in the United States. The FCC approved the monochrome standards in 1941. The NTSC colour TV system was adopted in 1954. But experimentally colour TV broadcasting started in 1949 with two competing systems by RCA and CBS.

In Europe, the main colour TV systèms are phase alternation by line (PAL) and SECAM. The PAL system is similar to the NTSC system, but in it for each successive line one component of the chrominance signal is reversed in polarity. The purpose is to average any errors in hue phase. This system is used in Germany and many European countries. SE-CAM is a French system with a sequential technique and memory storage.

In 1962 worldwide television transmission was first made possible by using a satellite above the earth.

TV Broadcasting and Receiving System

The diagram shows that the transmitting antenna radiates electromagnetic radio waves from broadcasting centre which can be picked up by the receiving antenna. TV transmitter has two functions: to see and the hear. Both the AM picture signal and FM sound signal are emitted from the common radiating antennas. The service area is about 121 km in all directions from the transmitter. In visual transmission, the light image converts into video signal through the camera tube which is a cathode-ray tube (CRT) with a photoelectric image plate and an electron gun enclosed with a vacuum glass envelope.

takes an optical image of the scene on its photoelectric plate, which is scanned in horizontal lines by the electron beam. The scanning goes from left to right and top to bottom, as viewed by the camera. It takes as sec to scan the entire picture frame, comprising a total of 525 scanning lines. As a result, the output of the

OR as long as fish pois-

study is the world's first scien-

tific test of the use of the drug

mannitol as a remedy for an

illness that has no proven cure.

significance to populations in

island and Asian nations,

whose diets rely heavily on

fresh fish. Although new tests

are being developed to test

fish for poison prior to con-

sumption, these preventive

measures are not yet widely in

Health Service commander

who is also the medical direc-

the Marshall Islands, is head-

ing the study, which also in-

volves the Johns Hopkins Uni-

versity and the University of

Hawaii medical schools in su-

pervising the study design and

Use of mannitol, an inex-

pensive diuretic designed to

relieve brain swelling, is in-

creasingly widespread in the

treatment of ciguatera fish poi-

soning as more doctors have

come to find that it works, Dr

analysing the results.

tor of preventive services for

Dr Neal Palafox, a US Public

The study is of particular

by Rathindra Nath Sanyal camera tube is a sequence of electrical variations — the video signal amplified, and synchronizing pulses are added. Amplitude modulation of the picture carrier results in the AM picture signal. The picture and sound carrier signals are received by the antenna. This signals are amplified and then detected to recover the

The video detector output includes the video signal is

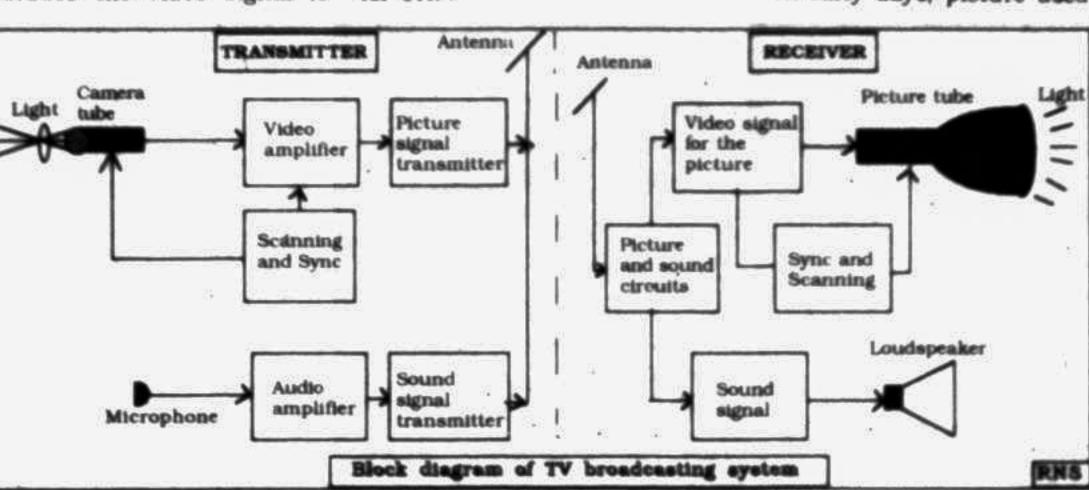
original modulation.

eral Communications Commisston (FCC). Television channels are divided into three bands and 2 to 83 numbers of chan-

Low band very high-frequency (VHF) channels from 2 to 6, high band VHF channels from 7 to 13, and ultra high frequency. (UHF) channels from 14 to 83. The range of frequency for VHF is 30 to 300 MHz, and 300 to 3000 MHz

transmit still pictures, such as documents and drawings, over narrow-band telephone lines. Space-probe TV is perhaps the most exciting application of slow-scan TV, combined with digital techniques. The pictures taken by the TV cameras in the Voyager space probe were stored in digital form until they were read out.

Types of Camera Tubes In early days, picture used



needed to reproduce the picture. The detected video signal is then amplified enough to drive the grid - cathode circuit of the picture tube (CRT). The CRT face-plate contains phosphor screen and when electron beam is emitted from the electron gun and strikes the screen, light is emitted.

Black and white picture shown on the screen depends upon the grid voltage of the electron gun: more negative and less negative voltage. When more negative voltage, then automatically the beam current is cut off i. e. no light output in the black portion of the image. Again, when less negative voltage, then beam current increases and as a result light is

-

white part of the image.

more brighter, which is the

in colour TV the same

principle is followed, but a

colour camera and a colour

picture tube are used. The

mission was direct i. c. life

programme. Now it is much

easier after invention of stor-

specific camera frequency of

each channel of 6- MHz wide.

has been assigned by the Fed-

Television channel with a

age facilities of programme.

=

Different Types of TV Systems

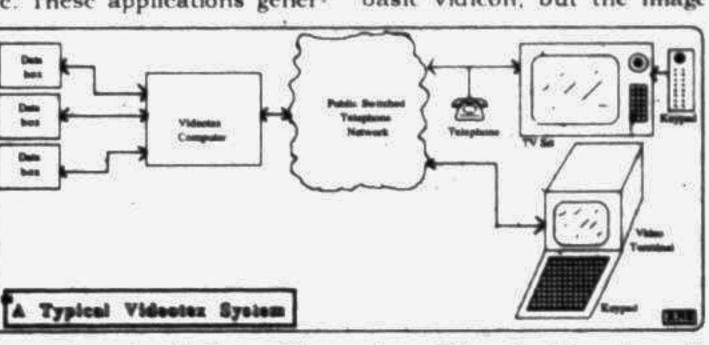
CATV is cable television system which provides a distribution system with coaxial cable. It is similar to a wired telephone system, but used for TV programmes.

CCTV stands for closed-circuit television, a system where there is no need of broadcasting facilities. TV cameras are set up for banks, traffic control system, teaching of multiple classes, group business meeting, remote guidance of military weapons etc and then the output of the camera are connected with a TV monitor directly by a 75 ohms coaxial cable. These applications gener

to be taken by mechanical scanning with the Nipkow disk. In this system, a photo electric tube is used with a rotating wheel punched with small holes spiraling in towards the centre to scan the picture elements. This type of camera tubes were used in TV broadcasting from about 1932 to 1945. First generation camera named as Image Orthicon (IO) was developed in 1945,

Vidicon: The photosensitive target, or image plate, is made of antimony trisulfide in this basic type of camera tubes. Plumbicon: This name is a

trademark of NV Philips. The camera tube is similar to the basic vidicon, but the image



ally use base-band video, with out modulated carrier, in a closed-circuit cable system.

Master antenna television (MATV) system uses a smaller cable distribution network, in applications for a hotel, a mosystem.

In infrared television system a special vidicon camera Earlier, the mode of trans- tube is used and that has an image plate sensitive to the spectrum of light.

Slow-scan television is the motion in TV pictures that requires fast scanning and high video frequencies, up to 4 MHz, in a 6 MHz broadcast channel. It can be used to

plate of the plumbicon is made of lead oxide (PBO). Its sensitivity is better for blue light than for red. Saticon is a trademark of

made of selenium, arsenic, and

Hitachi Ltd. Image plate is

tage is extremely high sensitiv ity for low-light applications. Chalnicon is a trademark of

Toshiba Electric Co. Ltd. The target is a complex multi-layer arrangement consisting of tin oxide, cadmium selenite, and arsenic trisulfide. It is also a very high sensitivity type cam-

Newvicon is a trademark of

Making Diamonds at Home

a mineral because of its clarity, lustre, extreme hardness and resistance to corrosion. It is expensive because it is so rarely found in

Since 1797, when Tennant proved that it was only a crystallised form of carbon, several attempts were made to synthesise this gem, notably by Hannay and Parsons in England and Mossan in France.

Detailed measurements made after those early days have established that while graphite is normally the most stable from of carbon on earth, the diamond phase is prefered at pressures of more than 20,000 atmospheres.

Extremely high pressures and temperatures in excess of 4000 degrees Celstus have to be achieved to crystalise carbon into diamond. Uniform conditions of pressure and temperature over very long times are necessary to grow large gem quality crystals of diamond.

After 15 years of research receiver consists of a special General Electric of USA decoder and storage unit, a achieved diamond synthesis in keypad for user entry, and an 1955. Eleven years later the technique was improved to The user keys in the nummake significant quantities of ber of page desired. The deindustrial diamond out of carcoder reads that page from the bon in any form, be it naphthaincoming signal, stores it, and lene, wax, sugar or even displays it continuously until

groundnuts. Currently General Electric produces about 100 million carats of industrial diamond grit. De Beers have diamond factories in South Africa, Ireland and Sweden. Some Japanese, Russian and American companies are also into diamond synthesis.

Synthetic grit is found to be tougher than natural diamond grit because natural grit is made by crushing waste diamond pieces and the cracks and fissures caused by the crushing process allow the particles of this natural grit to break up under the abrasive pressure. Two-thirds of the world's industrial diamond consumption is provided by synthetic grit.

In 1971, Wentorf and his group synthesised large gem quality crystals which were later faceted to one carat diamonds. Improved technology

by Dr Nataraja Sarma

will, no doubt, reduce the price of synthetic gem diamonds and with the rapidly increasing price of natural stones, synthetic diamonds may one day capture the jew-

ellery markets of the world. Chemical vapour deposition (CVD) is a new technique that promises a revolution in the synthetic diamond industry. This process obviates the need for the large and expensive equipment required to generate high and expansive equipment required to generate high pressures and tempera-

After 15 years of research, General Electric of USA achieved diamond synthesis in 1955. Eleven years later the technique was improved to make significant quantities of industrial diamond out of carbon in any form, be tt naphthalene, wax, sugar or even groundnuts.

tures. In fact, for some years now. CVD apparatus has been manufactured in India for less than Rs 100,000, though its use in this area has not been exploited.

CVD of diamond was first reported in 1911 but was not pursued as the growth of diamond was extremely show and contaminated with graphite. The recent discovery that hydrogen could eliminate the graphite and encourage diamond formation has triggered intensive research all over the world.

methane or acetylene, is do composed at low pressures. The carbon atoms of the hydrocarbon deposit on a nearly hated surface to form diamond crystals, provided the conditions are suitable. Four decomposition tech-

niques are popular. The gas

mixed with hydrogen is di

rected towards a hot (2200

degrees Celsius) filament

which breaks up the hydrocar-

Sun Rises to the Challenge

In CVD a hydrocarbon gas

A glow discharge created by a direct current high voltage or a radio frequency or microwave oscillator is a cold al-

ternative. The combustion flame technique is the most familiar where an oxyacetylene flame is directed on to a suitable substrate or surface. If the gas flow, flame geometry and the temperature of the substrate

are optimised, diamond crystallites nucleate and grow The flame process seems the most promising as large samples of complicated shapes can be coated with diamond. The application to diamond

tools is apparent. Research reported so far suggests that a 47 per cent admixture of hydrogen in the hydrocarbon is essential for appreciable growth rates but the reasons for this are not clear. Hydrogen does, however, passivate the diamond surface and removes graphite. A small oxygen component also helps in etching out the graphite deposits.

The temperature of the substrate should be around 900 degrees Celstus. Carbid or carbide forming surfaces generally exhibit good quality growth of diamond films, suggesting that tungsten carbide tools could be further hardened by diamond coatings.

With intensive research in progress, the technological feasibility of diamond coatings is also being explored. Apart from the obvious application to diamond tools, drill bits, and wire drawing dies, the inertness of diamond raises possibilities for diamond coated biomedical implants. The use of diamond films in microelectronics is obvious.

The new discoveries in the synthesis of diamond combined with the already sophisticated thin film technologies will no doubt change the diamond from being merely a decorative stone to an industrially significant material. Such a change has been seen for ruby, where the synthesis of ruby has been directed towards laser applications than to produce gemstones.

open-ended system. Typical colour camera provides video services are airline schedules, signals for the red, green and tel, or an office building. VCR tellurium. bus schedules, bulletin boards, Silicon vidicon is a silicon blue picture information and may be a source for pro-But the trick is to make semiconductor junction and is entertainment listings, educagrammes. Also CATV channels colour picture tube produces sense of the raw satellite imused for the target material in tional material, library card can be inserted into the MATV the image in red, green and the silicon vidicon. The advan-Basically the camera tube catalogues, news, sports, blue with all their colour mixweather, educational activities, tures including black and

ng many earthly benefits. It can be a powerful tool for

environmental management; it can help miners find minerals, farmers manage their land, and unlock the secrets of the

NFORMATION beamed do-

wn from satellites can bri-

"It is a popular package and has the potential for greater sales. The demand for image processing and graphics software is expanding rapidly, and Sun is very pleased to have such high-quality software associated with our platform.

Sun promotes DISIMP through its world-wide marketing programme, detailing it

John O'Callaghan, Chief of CSIRO's Division of Information Technology, is very bullish about the future of image processing and related information systems. "New applications for these systems are developing rapidly," he says. "DISIMP already sells worldwide, and we are boosting our efforts in a market, estimated



CSIRO's Phil Robertson working with the DISIMP image processing software

by Giff Johnson

World's First Antidote Against Fatal

Fish Poisoning

oning has been visiting agony on tens of thousmunity to use mannitol beands of people annually cause it has not been scientifidoctors have been unable to cally proven that it works," he find a remedy says. Doctors in the United But physicians in this tiny States have remained sceptical central Pacific island nation of this treatment because of believe they have discovered a concern for malpractice law cure. And the US National Insuits, he adds.

stitutes of Health (NIH) is Besides the Marshalls, sepover-seeing a landmark study arate studies by physicians in that could produce confirma-Australia, Tahiti and the tion of the first major break-United States have shown good through in the battle against results. Dr Palafox says. ciguatera fish poisoning. "Scientists cannot figure out The NIH-sponsored study why mannitol works, but they started in June, ten years after know from the clinical trials doctors in the Marshall Islands that it does. They are all comstumbled on what they believe ing up with the same results. It is an antidote to the often fatal effects of fish poisoning. The

Australia have attempted to show a connection between the more than 200 nuclear tests conducted by France in French Polynesia and the large number of ciguatera cases reported there. Symptoms can range from

the mild discomfort of having hot and cold sensations reversed and nausea, to severe paralysis, coma and, in extreme cases, death.

The discovery that mannitol helps victims of fish poisoning came about entirely by accident. In 1982, Dr Luis Jain, a physician working at Central Hospital in the Marshalls' capi-

It is the first scientific test of the drug mannitol, a remedy for ciguatera fish poisoning that has no proven cure. It is relevant to island and Asian nations which rely heavily on fresh fish

But mannitol's effectiveness must be proven in a study where the patients' and doctors' knowledge of mannitol does not influence the results. The NIH has established a study design that will blind both doctors and patients to the treatment being given. The study is tremendous,"

says Dr Palafox. "Small countries can really contribute to solving a major problem, even through there are not many people here."

About 150 ciguatera fish poisoning cases are reported to hospitals in the Marshalls each year. But worldwide, ciguatera poisoning affects tens of thousands of individuals

There is no known cure for ciguatera fish poisoning. Fish become contaminated by eating coral from reefs tainted by disturbances, such as storms or siltation from earthmoving in coastal areas. Researchers in

tal of Majuro, responded to a call for an emergency medical evacuation from an isolated atoll for two critically poisoned

When Dr Jain arrived at the atoll by plane, the two men had been unconscious for nearly three days. Fearing that the critical condition of the two patients might result in brain swelling, he administered a dose of mannitol.

"One patient stood up and asked for orientation within ten minutes after mannitol therapy was started; the other patient, though confused, sat up after five minutes," Dr Jain and Dr Palafox reported in an article published in the Journal of the American Medical Association (JAMA) in 1988. The two patients "were discharged fully recovered in 48

"It was just a shot in the dark, but it worked," says Dr

A few weeks after this 1982 discovery, Dr Palafox said he was treating a patient who was paralysed from the neck down from fish poisoning. Following Dr Jain's advice, he injected mannitol and in a few minutes the patient got up and walked out of the hospital. Subsequently, these two

doctors used mannitol successfully on 24 patients through 1985, forming the basis for their report in JAMA. Dr Palafox said since then mannitol has been a standard treatment for all patients suffering from fish poisoning in the Marshall Islands.

The fish poison study in the Marshalls is known as a "double blind single cross over" because both the doctors and the patients will be "blind" to the medication that is being given. The patient's reactions and the doctor's report will not be influenced by what they believe is being administered Doctors treating fish poison patients will have two coded bottles, one containing a measured dose of mannitol, the other a similar amount of glucose (sugar) water.

The three hour intervals were chosen because mannitol is almost entirely flushed from the patient's body in three

Dr Palafox says that in a controlled setting, "there is no down side to this treatment regimen.

He says that all patients in volved will be receiving treat ment for their fish poisoning symptoms during the study. They may have to wait three hours for the first injection of mannitol. But, he says, fish poisoning is a long term illness that will not change critically in a matter of a few hours.

The patient will get benefit within hours," says Dr Palafox. - Depthnews Asia

New Catalytic Converters for Leaded **Petrol and Diesel Engines**

NEW catalytic converter technique for twostroke engines, diesel engines and industrial application has been launched by REEcat IMCS AB in Laulea, north Sweden.

The active substance in the converter, REElit, is patented and based on rare earth elements (lanthanides). It can be used with leaded petrol and is said to be as effective as platinum to remove hydrocarbons and carbon monoxide from exhausts.

REEcat IMCS, established in 1987, manufactures catalytic materialand also sells semi-manufactures catalytic products and licences. A subsidiary company will this year start manufacture of converters for second-hand cars on the Scandinavian market.

The converters are made of high-quality casing materials, a nickel alloy shock absorbing meshwork and monolithic REElit ceramics.

Sweden has some 140,000 snow mobiles which operate in an often sensitive environ ment. Their emissions of hydrocarbon are estimated at some 7,500 tons, according to calculations by the Department of Environmental Technology at Lucia University of Technology, which cooperates with the company.

also function as efficient si-

lencers.

For diesel engines, REEcat IMCS has initiated cooperation with Unikat AB, another Swedish company marketing a wide range of converters of diesel engines. In this cleaning method, carbon monoxide, hydrocarbons and soot particles are burnt when the hot exhaust gases pass through a bed of catalytically active pellets made of REElit. The cleaners

ages. As part of the Federal Government's Partnerships for Development Programme, tems Division is providing a computing company Sun Microsystems has supported CSIRO in developing sophisticated image processing software for processing satellite

vice Independent Software for Image Processing (DISIMP). It has special features for dealing with images gathered by satellites and aircraft. A growing number of Aus-

The software is called De-

and other images.

tralian and overseas users now employ a version of DISIMP that runs on Sun workstations to meet Sun's increasing customer needs. A Melbourne based reseller,

the Clough Engineering Group, has recently been working with CSIRO to release a version running on the popular Sun Sparcstation. The Group is negotiating worldwide marketing rights for the software. Sun's Director of Business

Development for Australia and New Zealand, David Kerr, says his company's relationship with CSIRO is a continuing

DISIMP is technically a very good product," Kerr says.

in its software catalogue Catalyst and relevant supplements. Clough Engineering's Sys-

Sun-based DISIMP system to the Philippines as part of the Australia-Philippines Remote Sensing Project, an international aid programme funded by the Australian Government. The system is built around several networked Sun Sparc-

stations, and will be used in weather forecasting as well as in areas such as forestry, agriculture and minerals exploration.

Clough had previously been involved with CSIRO through a joint venture to provide several DISIMP systems to the New South Wales Government.

The General Manager of Clough's Systems Division, Dr Ted Fish, says DISIMP is already established internation ally, with many sites in Europe already using DISIMP in professional production environments.

"Providing the Sun platform to the Australia-Philippines project will be a tremendous boost to selling Australian remote sensing technology especially in the region's international markets," he says.

at \$5 billion a year."

DISIMP is used in Australia by a range of businesses and government departments, and availability of the Sun Sparcstation version is expected to widen the market further.

The software's support for the UNIX/X Windows environment makes it ideal for use with networked workstations.

The system is modular, with optional programming tools allowing users to design their own applications. A large set of utilities is also included, providing enhanced processing capabilities that are easily accessible via an easy-to-use interface built around windows, mice and pull-down

ages and graphics interactively on full-colour displays at a wide range of resolutions, and the results can be outputs to plotters, thermal printers and varous film-writers. Special facilities are pro-

Users can manipulate im-

vided for analysing satellite images, and for integrating those images with related topographic, geophysical and cultural data. - Australian Science

Palafox says. But there is still a huge reluctance in the medical com-