

THE stars are at enormous distances from us. The nearest, Proxima Centauri, is about 4.2 light years away. Because of their remoteness, except for the Sun, there is no star that can be approached closely by any known spacecraft, now or in the foreseeable future. Hence anything we know about stars, all information about the world outside the solar system, is gleaned from two sources — starlight, and cosmic rays. Most of what we know is obtained from the first source since we still aren't certain where the cosmic rays come from. We will see how astronomers analyse the light from stars to obtain a surprising amount of data about them.

Why do stars emit light? This question has been answered by analysing the stars' *spectrum*. Most stars are so hot that the matter in them is in gaseous form. At the surface of a star like the Sun, the temperature is typically several thousand degrees Kelvin, and it steadily increases towards the interior. Deep inside, the temperature is around 10 million degrees or even more. This is where the nuclear reactions which produce the star's energy take place. The energy radiation produced here slowly travels to the surface, passing from atom to atom, until it reaches the surface layer known as the *photosphere*, from where it can escape into space. The Sun's photosphere is about 320 km deep. Comparing this depth with the radius of the Sun (about 7,00,000 km), it is evident that light coming to us from a typical star like the Sun conveys direct information about only a small fraction of its total contents.

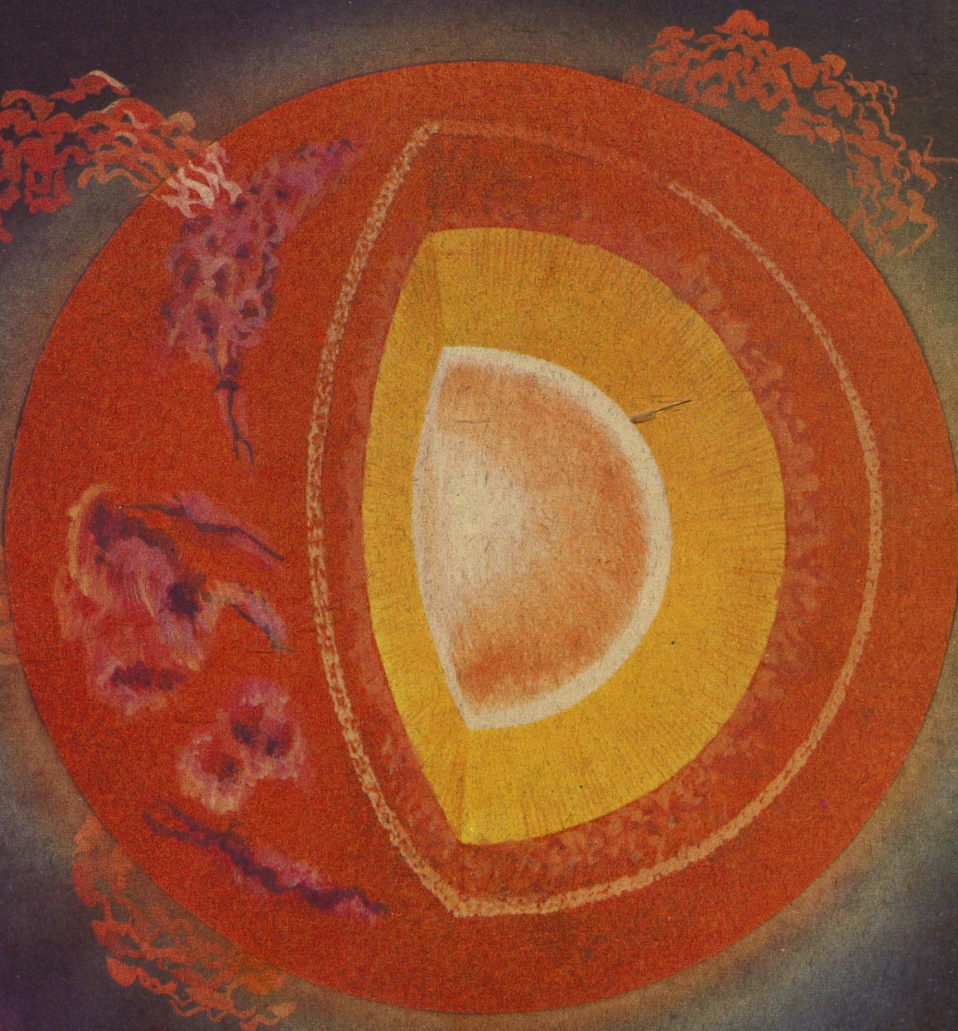
The temperatures in the various levels of a star are so high that, except in the outer layers of some of the cooler stars, chemical compounds or even simple molecules cannot exist. The gases of the star are, therefore, in the atomic state and it is these atoms that emit the radiation which reaches us as starlight. Atoms emit photons, and each photon of radiation is unmistakably stamped with the mark of its origin in the 'energy levels' of the atom. By examining these photons we can infer something about the atoms and their environment.

As is well known, the atoms of a given element can exist in any one of a number of

what starlight tells us about stars

AJIT KEMHAVI

Fig. 1 Most likely a star is made up of several concentric spherical layers, each with different properties. The temperature of the interior increases as the centre of the star is approached reaching over ten million degrees in the central core. This region is a thermonuclear reactor. The only layer we can observe directly is the outermost one — the photosphere. The temperature here is about 6000°C, cool enough for atoms to exist as atoms. Photons emitted by these atoms tell us about the chemical constitution of the photospheric layer of the star. The characteristics of the inner layers have to be inferred from theoretical analysis, since they cannot be directly observed



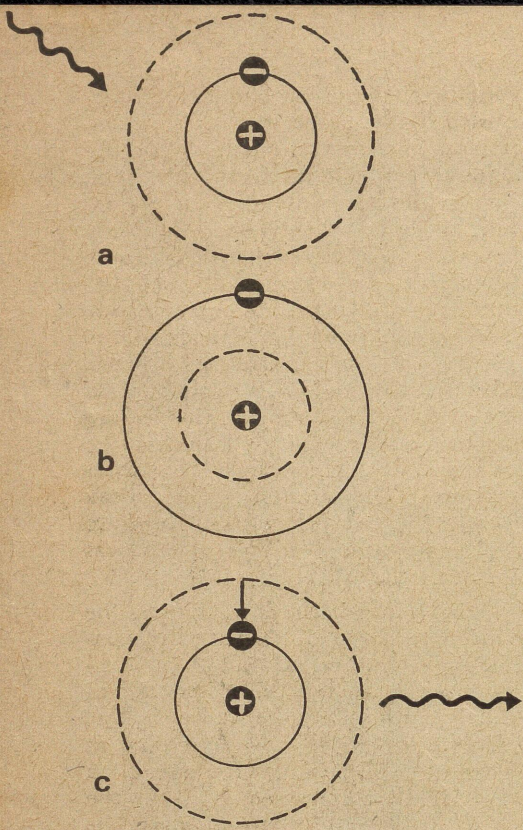


Fig. 2 (a) An atom can be excited to a state of higher energy by absorbing energy in the form of an incoming photon, depicted in the figure by a wavy line. (b) The electron simultaneously jumps from an orbit of lower energy to one of higher energy. (c) On de-excitation, the electron jumps back, and a photon of energy is emitted

discrete energy levels, of which the level of lowest energy is known as the ground state. An atom usually rests in its ground state, but it can be excited to higher energy levels by absorbing energy from external radiation or by colliding with other atoms. Both these processes are expected to take place inside the stellar gas.

The atom doesn't remain in its excited state for long. It makes a transition to a lower energy level either spontaneously or upon being de-excited by some external disturbance. The energy difference is not lost, of course. It is emitted in the form of a photon whose frequency (colour) is proportional to its energy. Photons from the stars, therefore, can come in a whole range of frequencies, depending on the physical processes that produced them, or modified them, en route to us.

To the naked eye, one star looks much like another — some brighter than others. Colour differences, though noticeable, are almost imperceptible. But when the light from each star is passed through a prism (as Newton did with the Sun's light), its individuality becomes obvious. The light is dispersed into a band of various component frequencies known as the *stellar spectrum*. Further measurements on this spectrum tell us in what

amounts the photons are received (the 'intensity') and in what colours. And each type of star has its own signature of photons. The instrument used for this is known as a spectrograph — which is but a sophisticated descendant of Newton's primitive prism and screen.

More about spectra

The spectrum of a typical star appears as a continuous band of colours, known as the *continuous spectrum*, on which are superimposed dark lines (see Fig. 6). The systems of dark lines were first studied by the German physicist Fraunhofer in 1814-15, and are known as the *absorption spectrum* of the star. Let us see how these two components of the spectrum occur.

The continuous spectrum is produced when an ion 'de-ionises'. In the hot interior of the star, atoms are excited to such a degree that many lose one or more electrons to form ions. Now, when an excited atom de-excites, its electrons jump into configurations of lower energy and a photon is emitted. Similarly, the capture of a passing electron by an ion is also accompanied by the emission of a photon. These photons come in a whole range of frequencies which are so closely spaced that they cannot be resolved into lines by the spectrograph and hence appear as a continuous spectrum.

As this stream of photons from the interior passes through the photosphere, certain photons are removed from the mainstream. These are just those that are absorbed by the atoms present in the photosphere. Their frequencies correspond precisely to the differences in the energy levels of these atoms. Of course, they are re-emitted when the atoms de-excite, but generally in a different direction (Fig. 4). The mainstream is thus depleted of photons of these frequencies. In a spectrograph this depletion shows up as relatively dark lines and

superimposed on the brighter continuous spectrum. Hence the name 'absorption spectrum'.

In the spectrum of some stars, galaxies, quasars and emission nebulae, there also appear a series of bright lines. These form the *emission spectrum*. These lines are a little more complicated to explain. In gaseous nebulae for example, it is believed that the lines are due to emissions from atoms which have been excited by the energy released in gravitational contraction.

It has become known comparatively recently that stars emit in all regions of the electromagnetic spectrum. Much information about their structure can be had by studying the gamma rays, X-rays, ultraviolet and infrared radiation and radio waves coming from them. We will, however, not go into these topics, and study only the message contained in the *visual radiation* from the stars.

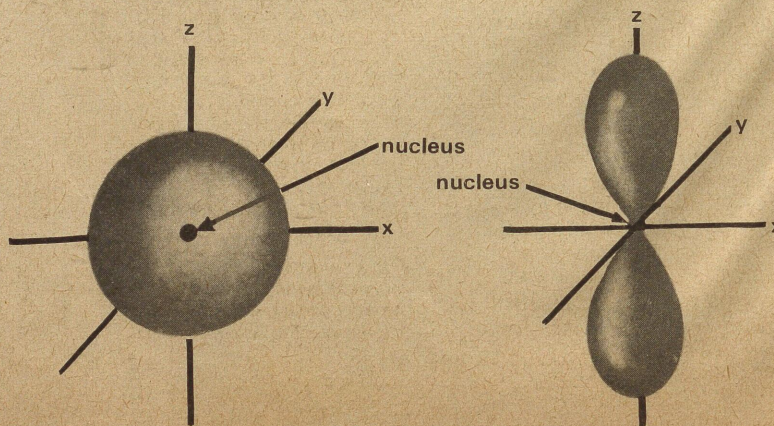
What would we like to know about stars? There is no limit to the greed of the curious: what are they made of (their composition)? How far are they from us (their distance)? How did they come to be (their origin and history)? What's happening inside them? Are they moving? Rotating? How big are they (size and mass)? Do they have planets? Is there a biochemistry taking place on the stars? Biology? Any question that we ask about the solar system and its planets is a valid scientific question about stars.

Our present knowledge, however, is in a primitive stage, and we can only answer the first few of these queries, that too only tentatively, approximately.

What are stars made of ?

We have seen that the atoms of a given element, when in gaseous form, produce a characteristic pattern of absorption and emission lines. The presence of lines characteristic of a

Fig. 3 Atoms can exist only in certain states with well-defined energies. When an atom makes a transition from one state to another, its shape changes. The shapes that the hydrogen atom takes in its lowest two energy states are shown here. The shaded areas are the regions (known as orbitals) to which the orbiting electron is restricted. Axes are drawn to emphasise the three-dimensionality of each shape



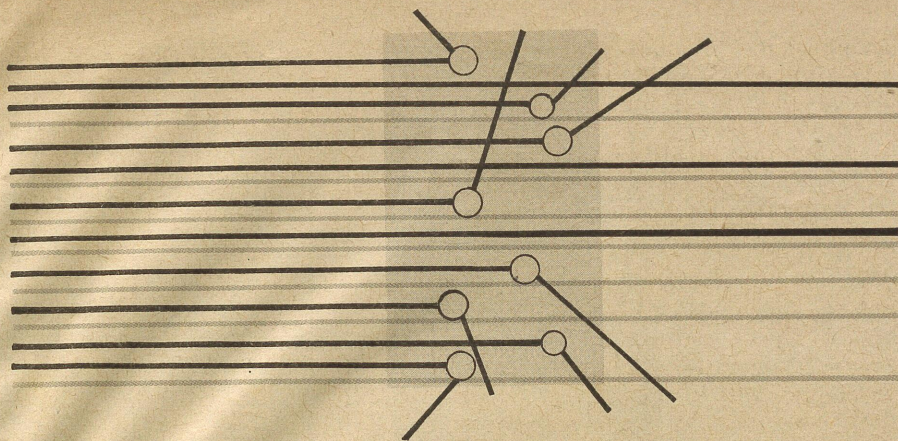


Fig. 4 An incoming beam of light of two different frequencies is shown impinging on a layer of atoms. The atoms can absorb photons of one frequency (indicated by full dark lines). This energy is subsequently re-emitted — but in all directions. The beam itself in crossing the layer is depleted of this frequency. Such a phenomenon occurs when light traverses the star's photospheric layer, and causes the dark lines in the absorption spectrum

certain element in the spectrum of a beam of light means that atoms of the element are present somewhere along the path taken by the light. The study of the absorption and emission spectra of a star can, therefore, lead to the identification of the elements present in its outer layer.

The detailed nature of the spectrum also depends upon physical conditions like the temperature and pressure prevailing in the photosphere. For example, hydrogen, which is by far the most abundant element in all the stars, can produce absorption lines only in the atmosphere of the cooler stars, where it is present in the atomic state. In the atmospheres of very hot stars, however, it is completely ionised and can produce only a continuous spectrum.

Atoms emit photons: more atoms will emit more photons. Therefore, by measuring the *relative strength* of absorption lines in the spectrum of a star, after making due allowance for the conditions prevailing in the photosphere, we can infer the *relative abundances* of the various chemical elements whose lines appear.

It is found that in a typical star, hydrogen comprises between 50 to 80 per cent of its mass. Hydrogen and helium together constitute 96 to 99 per cent of the mass. (The element helium was first discovered in the Sun, even before it was known on the Earth, by the presence of absorption lines in the solar spectrum which did not match those due to any known element on Earth.) Among the 4 per cent or less of heavy elements, neon, oxygen, nitrogen, carbon, magnesium, argon, silicon, sulphur, iron and chlorine are amongst the most abundant in the photosphere.

Does life exist around stars? Note that the existence of elements like carbon, hydrogen, oxygen, nitrogen

in stars means that some of the basic components of organic chemistry are present there. Complex organic molecules have recently been identified in the interstellar dust. However, the probability of life existing outside the solar system is still an open question. To answer it, it would be necessary to establish that sufficient conditions for life are present elsewhere in the universe. Research here on earth is well along the way of identifying just what these 'sufficient conditions' are. It will probably be much more difficult to confirm that a full set of such conditions is present around some star.

How hot are the stars?

All hot bodies emit a certain kind of radiation known as 'black body'

radiation. Readers should not be misled by the name, since this radiation is the cause of the 'red-hot' colour of a heated metal rod, and the 'white-hot' colour of an electric bulb when it is turned on. Black body radiation is really a combination of frequencies (colours), with each frequency carrying a characteristic amount of energy. The distribution of energy over each frequency depends only on the overall temperature of the emitter. In fact, the temperature of the emitter can be measured by finding out what frequency carries the maximum energy. This 'peak frequency' is just proportional to the temperature—a fact which was discovered by Wien.

Now, it is known that light in the continuous spectrum of stars approximately resembles the radiation coming from a black body. The resemblance is not complete, however, for, different layers of the stars are at different temperatures whereas a black body is supposed to be at the same temperature throughout its volume. Moreover, as the stellar radiation passes through the outer layers of the star, different wavelengths are absorbed in different amounts and the spectrum is distorted. In spite of these limitations, it is usually a satisfactory approximation to assume that the radiation emitted by a typical star is equivalent to radiation from a black body with temperature equal to that of the star's photospheric layers.

When starlight is analysed through a spectrograph, and the peak frequency

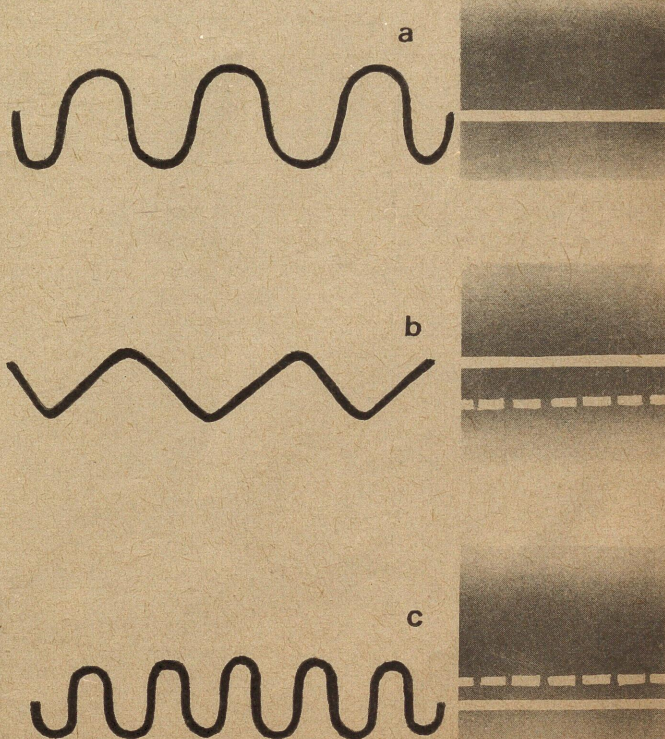


Fig. 5 When a light source is moving towards or away from an observer, there is a change in the colour of the light received from it. This shift, due to the motion of the source, is termed 'Doppler shift'.

In (a) we schematically depict the light wave train, and spectral line, from a stationary star. In (b) the star is moving away from us. The wavelength of the waves increases, and the colours in the spectrum get shifted towards the red (long wavelength) end. If the source is approaching us, Fig. (c), the wavelength is decreased, and the light is shifted towards the violet end of the spectrum.

The amount of shift is directly proportional to the speed of the star, and can thus be used to measure this speed

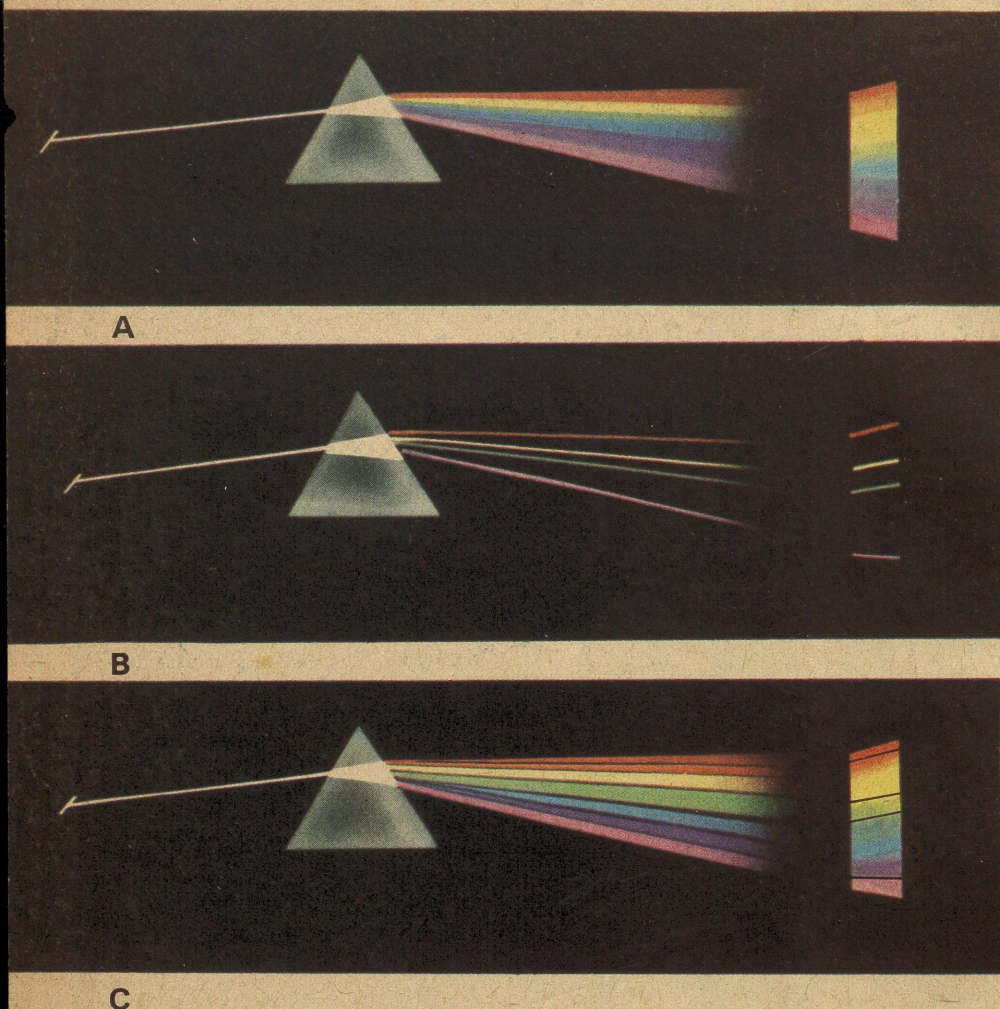


Fig. 6 The continuous spectrum (A) is produced when ions recapture their escaped electrons, simultaneously emitting photons. This takes place in one of the interior layers of the star. Before reaching us, these photons have to pass through the cooler outer layer, the photosphere, where certain frequencies are absorbed by the atoms there leading to the appearance of dark lines in the 'absorption spectrum' shown in (C).

The 'emission spectrum' in (B) is produced by light emissions from a gas of atoms which is hot enough to excite the latter but not so hot as to ionise them

is measured, the temperature of the star can immediately be obtained from Wien's law. For the Sun, the maximum emission occurs in the blue to blue-green region which corresponds to about 6000°K . This value is, of course, indicative of the temperature of the surface layers of the Sun. The temperature at the centre of the Sun, which has to be established using other methods, is expected to be about 13 million degrees Kelvin.

How do stars move?

The reader is no doubt familiar with the change in the pitch of a car horn as it speeds past him. While it is approaching him, the horn blast sounds higher. As the car recedes, the sound is lower. A stationary car will present a pitch somewhere in between.

This change in frequency due to the movement of the source is common to all wave phenomena and is known as the 'Doppler shift' (after Christian Doppler, 1803-1853). Since light is a wave phenomenon, Doppler shifting

is also to be expected when the light source is moving. When the velocity V of the source relative to the observer is small compared to the speed C of light, the change in frequency compared is proportional to V/C .

As in the case of sound, the frequency of light is decreased ('redshifted', that is, shifted towards the red end of the spectrum) when the source recedes. If the source is approaching, the light is 'blueshifted' (See Fig. 5).

Once the elements present in a star have been identified by studying the relative positions of the lines in the stellar spectrum, and the structure of these lines, the redshift (blueshift) can then be measured and the velocity relative to us (the observer) of the star can be directly obtained. In this way, the radial velocities of many stars with respect to us have been obtained. The star Sirius, which is the brightest star in the night sky, for example, is found to be moving towards us at the rate of 8 km/sec.

The transverse motion of a star, that is, its motion perpendicular to the line of sight, cannot be obtained using the Doppler effect. A so-called "transverse Doppler effect" does exist but it is small unless V is an appreciable fraction of C . For stars, this is not the case.

Do stars rotate?

It was discovered by Galileo, by observing the apparent motion of sun-spots, that the Sun rotates on its axis from west to east. The Sun goes round once every 24 days and 16 hours at its equator. It is not possible to determine the rate of rotation of distant stars by observing some fiducial marks on them because they present point images even in the biggest telescopes. It is once again necessary to invoke the Doppler effect in order to detect any rotation. If a star is rotating, and the axis of rotation is not directed exactly towards us, one part of its surface will be moving away from us and the diametrically opposite part will be moving towards us. Because of the Doppler effect, the light coming from the former will be redshifted and that coming from the latter will be blueshifted. In a point-like image, it is not possible to distinguish between light coming from different portions of the stellar surface, but the effect of rotation is to broaden every spectral line. The amount of line broadening can be measured and the rate of rotation of the star can be estimated.

How far to a star?

Much information about the properties of a star can be had by measuring the amount of light received from it on the Earth, and studying its variation with time. The apparent brightness of a star cannot, of course, tell us anything directly. A star can appear relatively bright in spite of being a medium- or small-sized star, simply because it is relatively close to us. In order to get an idea of how bright a star really is, it is necessary to know how far it is from us. Distances to a few nearby stars can be measured directly using trigonometric methods. This data can then be matched with inferences from the variation of light from stars to measure distances to stars even in other galaxies.

The distances to the nearest stars can be measured directly using the "method of parallax". As the Earth moves round its orbit, the place from which we view a star is continuously changing. Because of this, the positions of the comparatively nearby stars (projected against the more remote ones) are also continuously changing. A nearby star will be seen

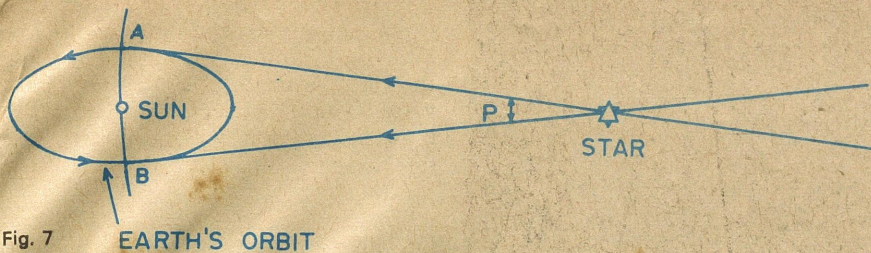


Fig. 7 EARTH'S ORBIT

to shift back and forth against the more distant stars as it is viewed from different points along the Earth's orbit (see Fig. 7). If p is the angle subtended from opposite ends of a diameter of the Earth's orbit (p is known as the stellar parallax), it can be deduced using elementary geometry that the distance r is given by

$$r = \frac{360^\circ}{2\pi} \frac{AB}{p^\circ}$$

(see SCIENCE TODAY, August 1976, p. 61). The angle p is too small to be accurately measured except for the nearest stars. The star nearest to the Sun, Proxima Centauri, which is at a distance of 4.2 light years, has a parallax of only two-ten thousandths of a degree. Distances of the order of a hundred light years can be measured using the method of stellar parallax. About 700 stars are close enough for this method to be applicable.

Statistical analysis of the motion of stars which move in clusters can lead to distances up to several hundred light years. These methods are less accurate than the method of parallax, but they form an indispensable rung in the cosmic distance ladder.

There are about ten thousand catalogued stars whose apparent brightness is observed to vary more or less regularly with time. Such stars are known as pulsating variables. We shall consider here only one type of pulsating stars, the *cepheid variables*. The cepheid variables are yellow supergiant stars, named after the prototype and first known star of the class, Delta Cephei. The magnitude of Delta Cephei varies between 4.1 and 5.2 in a period of 5.2 days. This corresponds to a two-fold change in

brightness. Most cepheids have periods in the range of 1 to 50 days. The Pole Star is a cepheid variable that varies between magnitudes 2.5 and 2.6 in a period of just under four days.

Study of the spectra of these variable stars shows that variations in light intensity are accompanied by variation in temperature of the radiating surface. There is also a fluctuation in the size of the star, the changes in light output being associated with a periodic rise and fall of the stellar surface. In the case of Delta Cephei, it is found that the photosphere pulsates up and down over a distance of 2.5 million km, which is about 8 per cent of its radius of 40 million km.

The importance of the cepheid variables lies in the fact that a relation exists between the periods of pulsation of the stars and their absolute magnitudes. The relation was discovered in 1913 by Henrietta Leavitt of the Harvard College Observatory. If a plot is made of the absolute magnitude against the period of pulsation, Fig. 9 is obtained. Now, if the nature of the light variation of a star at an unknown distance shows that it is a cepheid variable, the period of pulsation leads to its absolute magnitude. The apparent magnitude can be measured in the laboratory, and the relation between the two magnitudes immediately leads to the distance of the star from us. The cepheids are bright enough at maximum light to be used up to distances of the order of 12 million light years. This is far enough to reach some galaxies outside our own local group of galaxies.

It is a very difficult problem observationally to obtain the calibration curve shown in Fig. 9. For this to be

done, it is necessary to know the distances to some cepheid variables by some independent method. Unfortunately, no cepheid is close enough for its distance to be determined by the method of stellar parallax, and statistical methods involving the proper motion of the stars must be used. Corrections have also to be made to allow for the dimming due to the presence of interstellar gas. It was realised in the early 1950s by W. Baade that the cepheids were nearly four times brighter than they were believed to be earlier. Since the distances to the other galaxies are primarily based on the apparent brightness of cepheid variables in the nearest of them, Baade's correction meant that all extragalactic distances were suddenly doubled!

How massive is a star?

The mass of a star has to be inferred from its gravitational interaction with

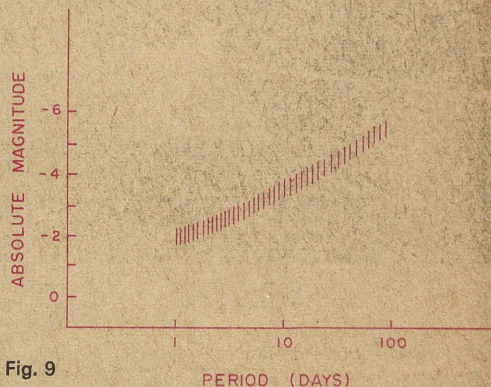
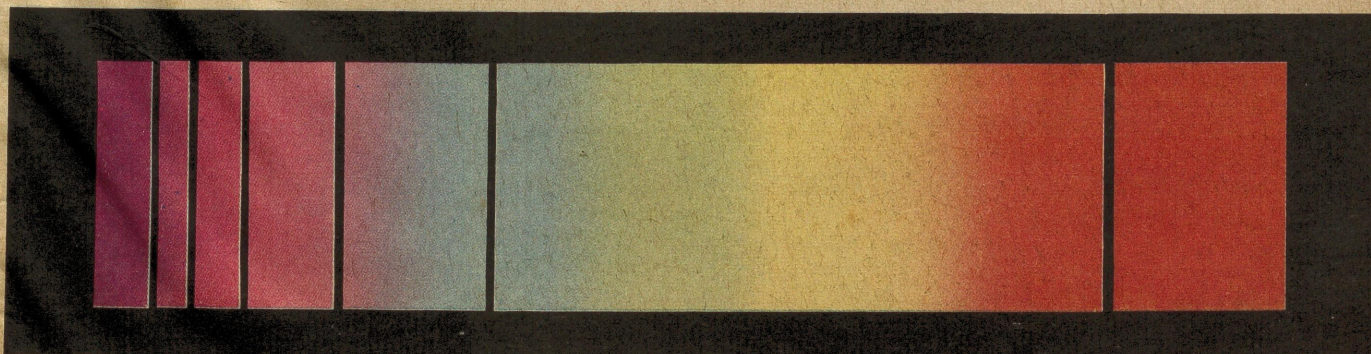


Fig. 9

other bodies. The mass of the Sun can be determined in this way by studying the orbits of the planets around it. Other stars, however, are too far for us to study the planets around them (if at all present), and we have to depend upon gravitationally interacting systems of two or more stars.

In the stellar neighbourhood of the Sun, somewhere between one-half and two-thirds of all stars are members of binary or multiple star systems. A binary star is a pair of stars in orbit around their common centre of mass. Some stars are visual binaries, that is,

Fig. 8 Spectrum of Sirius showing the dark lines whose positions identify the star's spectral type



they can be optically identified as two separate stars. The binary nature of other stars, however, has to be inferred indirectly. If the orbit of the binary system is turned nearly edge on to us, the stars eclipse each other during their motion. The light received from the system when one star is in the shadow of another is less than when light is being received from both stars. There is therefore a periodic fluctuation in the amount of light received from the system, and even though the components cannot be separately observed, it can be suspected that eclipsing stars are present. It is, of course, necessary to study the nature of the spectrum to ensure that what is being observed is not an intrinsically variable star.

The two stars of a binary revolve round their common centre of mass, which in turn moves in a straight line among the neighbouring stars. It is convenient for astronomers to observe the motion of one star about the other, and to determine its apparent orbit, from which the true orbit can be derived. Kinematic analysis of the true orbit leads to the sum of the masses $m_1 + m_2$ of the two components of the binary. Investigation of the individual motion of the stars about the centre of mass then reveals what share of the total mass belongs to each star. The periods of mutual revolution of binaries range from a few years to a few thousand years. A lengthy series of observations covering a number of decades is thus necessary to obtain useful data about binaries with long periods.

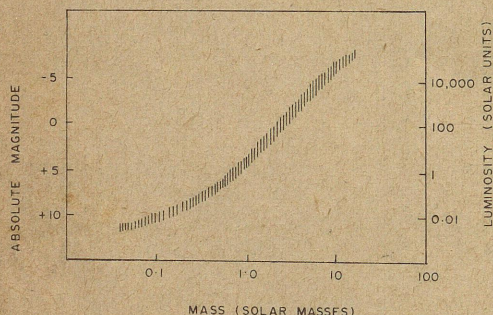


Fig. 10

Studies of binary stars have provided fairly accurate knowledge of the masses of a few dozen stars. When the masses and absolute luminosities of these stars are compared, it is found that in general the more massive stars are also the more luminous. This relation, known as the mass-luminosity relation, is shown as a plot in Fig. 10. It is estimated that 90 per cent of all stars obey the mass-luminosity relation. It does not apply to stars which are being formed or to those which are at a very late stage of their evolu-

tion. Sir Arthur Eddington first obtained an explanation of the mass-luminosity relation in 1926. The relation is a reflection of the principle that the structure of a star is completely determined by its total mass and by the distribution of chemical elements throughout its interior. The mass-luminosity relationship provides a useful method of estimating the masses of stars of known luminosity that do not happen to be members of binary systems.

Deeper inside a star

We have been seeing how astronomers combine the principles of physics with observations of the light from the stars to gain knowledge about their characteristics. These observations tell us only about the conditions prevailing in the outer layers of the star. It is the aim of the astrophysicist to combine this surface data with general physical principles like hydrostatic and thermal equilibrium, equations of state, the modes of energy transport, the opacity of gases and the rate of energy generation due to nuclear reactions, to determine the internal structure of the stars. The physical ideas are formulated into a set of differential equations which are solved to determine the march of thermodynamic variables like temperature, pressure and density throughout the stellar interior. The set of solutions obtained, based on a specific set of assumptions, is called a stellar model. The complete model ought to explain how a star is born, how it functions in its prime, and its final state after the nuclear fuel in it is exhausted. Progress is being made in this direction as greater insight is being obtained about the physical processes taking place in stars. The development of high-speed computers is invaluable in this study as much of the work involved in solving the mathematical equations is numerical in nature.

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Recommends reading: 1. Abell, G. 1964. *Exploration of the Universe*. Holt, Reinhart and Winston. 2. Novotny, Eva. 1973. *Introduction to Stellar Atmospheres and Interiors*. Oxford University Press. 3. Hoyle, Fred. 1975. *Astronomy and Cosmology: A Modern Course*. Freeman & Co.

IN LIGHTER MOMENTS

MOSELEY, who worked with Lord Rutherford, and who developed the concept of atomic number as well as an X-ray technique to locate all the "holes" represented by still undiscovered elements in the Periodic Table, had cordial relations with everybody. Notwithstanding his helping hand, he sometimes felt annoyed with others for borrowing his matches regularly. Finally, he came up with a solution. He purchased a gross of match-boxes costing 1 sh 6 d, and put them in an open packing case at the corner of his table. On the case he hung a card-board label which read: "Please take one of these boxes and leave my matches alone."

* * *

WHENEVER anybody—more particularly a research worker under him—referred to some aspect of his work, Prof. Philipp Eduard Anton Lenard (1862-1917), head of the physics department at the University of Heidelberg, interrupted him: "And who did that first?"

"Herr Geheimrat, you did that first," was the speaker's pet reply. And in approving rejoinder came the Chair's remark, "Yes, I did that first."

Lenard had shown that the electrical effects produced by light falling upon certain metals were the result of the emission by those metals of electrons. While speaking about this, a scholar, as usual, said, "Herr Geheimrat, you did that first." Poor Lenard had to tell him, "No, J. J. Thomson did that first. He really did that first."

* * *

IT was only a few days after he had discovered the basic principles of the electrical transformer and the dynamo that Michael Faraday was explaining them to a group of very distinguished persons, which included the British Prime Minister, Gladstone. Before he could finish, Gladstone interrupted to say, "But, after all, what use is it?" The great experimentalist scratched his head and simply said, "Why, sir, there is every probability that you will soon be able to tax it."

* * *

ROBERT Brown (1773-1858), a London doctor and botanist, who was the first to observe in 1831 that the nucleus was a regular feature of plant cells, had often been visited by Charles Darwin before the latter's *Beagle* voyage. Darwin has recalled him thus: "He was rather given to sneering at anyone who wrote about what he did not fully understand. I remember praising Whewell's *History of the Inductive Sciences* to him, and he answered, 'Yes, I suppose that he has read the prefaces of very many books.'"

S. N. MUNSHI

The BBS

*It's part of the information explosion in the US.
Now it's happening in India.
Atul Chitnis on Bulletin Board Services.*

It Happened One Night

It's late at night. I'm sitting at my desk at home, my daughter is finally asleep, my wife is grumbling something about computer widows, Eric Clapton sings the blues on the Walkman, and my computer hums along quietly.

All of a sudden, I have this terrific urge to reach out and communicate.

Now, unless you know of more night owls like me, calling someone up at 2 am is likely to make you enormously unpopular in no time.

But if you have access to a phone line and a modem, then there are places that will not only welcome you, they are eagerly waiting for you to call.

That's your local—or not so local—BBS. The bulletin board service.

Instead of trying to describe a BBS, let me take you through a brief tour of my local BBS, and I am sure you'll get the idea.

A BBS Tour

Using my modem, I dial the BBS phone number. A few squeals later, the modem connects, and I am greeted by a sign-on screen that welcomes me and prompts me: Log In.

I type in my User ID and password, and seconds later, the world opens up to me.

A flashing sign tells me that my electronic mailbox has new messages for me. Bulletins tell me what's new on the system, and a scan of the system tells me that there are dozens of new messages and files in the various forums.

First of all, I go and read my mail. I

make the appropriate selection from the menu that appears, and find myself in the *E-Mail* area of the BBS.

I read the messages waiting for me. There is one from Raju, saying that he'll be coming in late tomorrow since he has some work lined up for the morning. And there is a message from Kishore in Delhi—he's hopping mad because I haven't sent him the promised upgrade.

Okay, enough of my mail—let's see what's happening in the forums.

I exit from the e-mail area, and enter the *PCQ forum*.

Over at the *Virus forum* I find that user Bhargava has uploaded the latest versions of McAfee's shareware anti-virus programs. A few minutes later I have transferred them to my computer.

Suddenly I remember that I need to find out who sells UPSs in Bangalore. A trip to the Electronic Yellow Pages database soon gives me all the info I need, complete with addresses and phone numbers.

Right, enough of this tour. After a quick trip to the *News room*, where I pick up the latest computer industry news file, I disconnect from the BBS, and "surface" to find myself back in my room at home again.

A couple of years ago, all this would have been possible only if I was in the US. Today, India is getting its fair share of BBSing. A new BBS seems to spring up every day in Bangalore, Bombay, Delhi, Madras and even smaller towns. Some of them are strictly private, meant for use of company staff. Some, like the one I just described, are open to the public—either completely free, or semi-commercial (to cover run-

ning costs).

And a good thing it is, too. BBSs have been, to a great extent, responsible for the information explosion in the USA. Now the same thing is beginning to happen in India.

Let's rewind a bit, and see what a BBS is and how it works.

What's A BBS?

For those of you who have been using modems to communicate with another

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CyberNet Communications Host Version 2.60-B (808080808080)
Copyright (c) 1990, 1991 A.N.B. Constellation Pvt. Ltd.

Online Local at Node 1 on 04-MAR-93 11:58:45

Welcome to CIX, running at A.N.B. Constellation, Bangalore, India !

If your modem does not support MNP or V.42, please call at 1200 bps to
avoid interference due to line noise.

If you have an account on this system, enter your User ID and password,
else you may register by entering "NEW". The registration procedure is
free of charge.

User-ID : SYSOP
Password : *****
```

A bunch of new messages, including one from Mahi: He suggests that I should upload the utilities mentioned in my articles into the forum library for others to download. "Good idea" I respond in a message of my own, and proceed to upload the utilities.

I also leave a message for all members, asking them if they know of any way by which one could make PKR from PCQuest get a modem and join the BBS.

Being the SysOp of my own BBS, I will refrain from commenting on its character—you'll have to log in and judge for yourself.

Getting Connected

Enough of drooling; let's get you connected. First of all, find out the number of your nearest BBS. Set your communication parameters to 2400-N-8-1, and dial the number. If you hear a modem answering, you're getting there warm.

Some BBSs (like my own) use a device that detects a voice or modem call and routes the call accordingly. It does this by saying "Hello". If a human voice responds, it rings the phone, else it'll ring the modem. If you don't get connected to a modem, don't dial again repeatedly, for some BBSs run only during certain hours of the day. Call by phone (voice) and check with people at the other end.

Once the modem has connected, you will be prompted for a User ID and password. Most BBSs allow you to register online by entering "New" as the User ID, after which it will take you through a short registration procedure. Be honest and complete while answering the questions that will be asked—don't enter a fictitious name or address. Most BBS SysOps will check the details and may even call back on the supplied phone number to verify them before granting access to the BBS. The real name and address of the member are rarely made public unless the member specifically requests it.

If a BBS charges a small amount for the access, it usually gives you some

free time to explore the system before you decide whether you wish to pay. The amount payable is normally very small: just enough to help cover the costs of running the BBS. Many BBSs are completely free.

A BBS rarely assumes any special equipment or software at your end. Any computer with a modem and some sort of communication program, such as ProComm, Telix or CrossTalk, will do.

And that's another bonus: the people calling into the BBS need not be using PCs at all.

For example, I've used my PC and modem to communicate with Niyam in Delhi, who uses a Macintosh (and *hates* PCs). But I can send him a graphics file that I have created on my PC, and he can view that file on his Macintosh, which is not so easy with floppies. I upload the file into the BBS, and he downloads it from there.

Looking Around

Working with a BBS online isn't any more difficult than using most PC software today. Usually, the entire works is menu driven, meaning that you only have to pick the right selection to have something done. Many BBSs use ANSI

FILE LIST FOR LIBRARY PCQ - Atal's PC Quest Response Forum

1	CHECKINQ.EXE	16k	SYSOP	TurboPower's Comm.INQ Identifier util
	18-JAN-93 20:06:34		28-FEB-93	Est.Del.Time=00:00:11
2	UNRTID.EXE	19k	SYSOP	TurboPower's comm.chip identifier util
	27-FEB-93 15:25:04		28-FEB-93	Est.Del.Time=00:00:12

*** End of Listing. Press (Enter) to continue :

SY-OP ATUL CHITNIS BANGALORE 25 19.00 100 00:27:16

and you can "chat" via your keyboards and screens.

Don't hesitate to say something in a forum or conference. The sooner you do, the faster you are likely to feel the real power of BBSing.

While many BBSs will have large selections of files available for downloading, don't call the BBS just for that. Try interacting with other members, and upload files yourself. Just make sure that the stuff you are sending is not virus infected or pirated—either event could cause your user account to go down the bit-bucket very quickly.

Winding Up

Out of space again... Before quitting for the day, here's some info for you. Many readers have written or called me, asking me questions about this column, and also where they can get the utilities that I sometimes refer to. For this, I maintain the PCQ forum on my BBS. You can pop your questions and comments there, as well as download the programs. You can also send me e-mail on the system: address your messages to SysOp.

Next month, I continue this thread by telling you how to call long distance without wrecking the budget.

ATUL CHITNIS,
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and managing director of ARB constellation,
Bangalore, can be contacted via e-mail at
70620.563@COMPUSERVE.COM
or via his BBS at 0812-341137.
This column is exclusive to PCQ.

```
Msg#: 2
Date: 27-FEB-93 (14:49)
Ref#: (None)
To : Atal's PC Quest Response Forum
From: MAHI (Mahidhar Reddy)
Subj: About your column...

HI Atal,

In you articles, you have mentioned some utilities (such as UNRTID).
How about making them available here in this forum ?

Mahi

*** READ : (Next), (View), (Reply), (Erase), eODit :
SY-OP ATUL CHITNIS BANGALORE 25 19.00 100 00:27:16
```

terminal sequences to generate bright and colorful screens and menus, pleasant (and sometimes amusing) to look at and easy to use.

Once you're online, feel free to explore. If you need help, use the help function or leave mail for the SysOp. Some BBSs have a chat facility, so you can page the SysOp. If he's around, he may come online

Cheaper Datacom

Atul Chitnis shows you how to lower your phone bill when communicating long distance, with this controversial, and much-misunderstood, datacom service.

In the past few articles I have been writing about how to communicate using modems. While a lot of ground has been covered there, we have been assuming that you are calling from one place to another via a direct phone call.

This is okay when you're calling within the same city; it's just a local call. Once you start communicating with computers in another city, a new (and nasty) factor shows up: the long distance phone charges.

"Aaarrrrggghhh!!!"

This is heard in most offices at least every two months—when the phone bill arrives.

Phone bills are so high due to two factors: the totally unreasonable tariff that our phone company places on us, and our own incredible desire to talk/communicate for as long as possible once we make a connection.

The first factor is something we can do very little about (apart from praying daily for privatization in the telecom business). Unless all of us decide to shift office hours to after 10 pm at night (when phone rates are at their lowest, one-fourth of daytime rates), it is unlikely that we are going to see any lowering of the phone tariff.

The second factor is human nature, and I am no judge of mankind, so I won't try and discuss that here.

Instead, I'll introduce you to another way of extending your reach that doesn't cost as much as a STD/ISD call.

The Big Controversy

No aspect of Indian telecom has created so much controversy and misunderstanding as the fa-

cility introduced by the DoT in 1992, INET.

The controversy arose from the fact that no one, including the DoT itself, could clearly say what INET was all about. Was it a service? Was it a facility? What could you do with it? What did it cost—more than STD, or less?

The misunderstandings arose when the above questions were not clearly answered.

I am not the DoT, so I hope that by the time you finish reading this article, you'll understand and appreciate what INET can do.

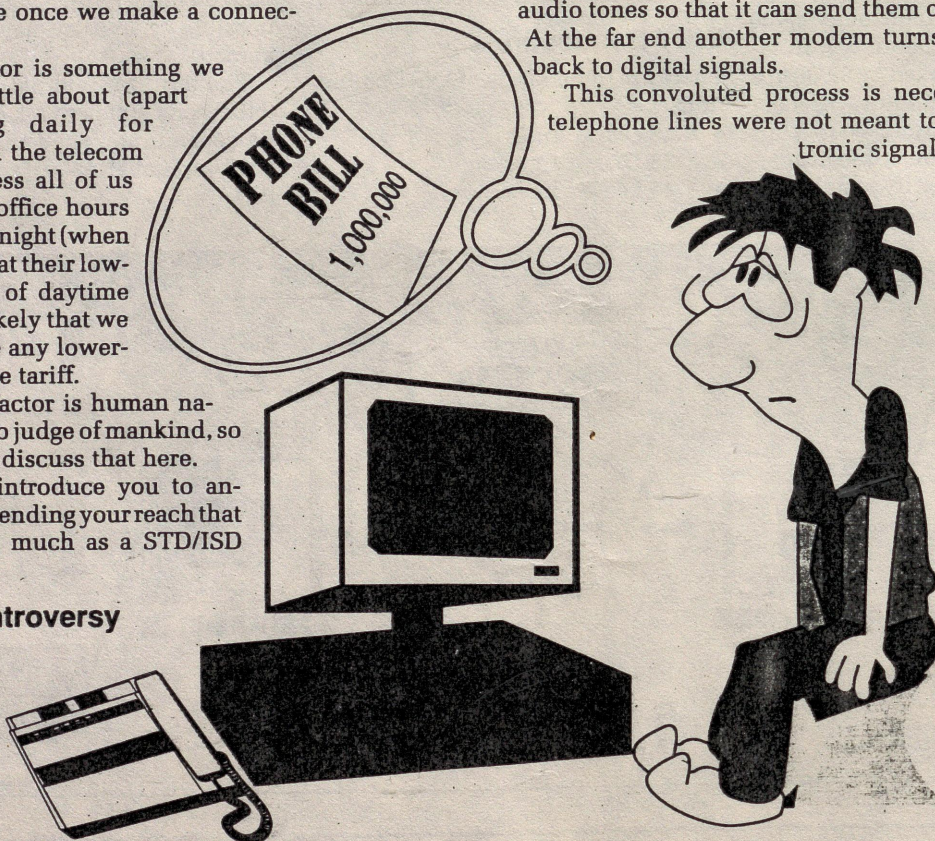
Understanding INET

To make things easier to understand, let's look back at how a modem works—it converts a computer's digital signals to audio tones so that it can send them over the phone line. At the far end another modem turns these audio tones back to digital signals.

This convoluted process is necessary because the telephone lines were not meant to carry digital electronic signals, but signals carrying audio tones.

But imagine if someone rigs up a bunch of phone lines across the country that can transfer digital signals (data) instead of voice. And, because this data is controlled by computers, it could maintain many connections over a single line. And, because of this "multiplexing", the rates could be much lower than a STD call.

Sounds like a dream? It isn't.



What I've just described is an X.25 carrier network. (As usual, X.25 is yet another CCITT label for some standard or the other, and in itself tells you nothing except that it is official.)

INET is an X.25 network.

X.25: Under The Hood

How does an X.25 network do all this?

It's quite simple. The network uses an X.25 Packet Assembler-Disassembler (PAD) to break the data it receives into little packets, each one carrying "address" information that can be used to guide it to its final destination.

Then the network throws these little packets into a big stream of data that flows throughout the country. The stream consists of thousands of data packets. As the stream of data flows through each city, the local PAD examines each packet's address information. If it is meant for that city, it diverts this packet to its final destination within the city, and lets the other packets continue on their journey.

This sounds complex and slow, but in reality it is fast, very fast, because the PAD-to-PAD links are pure digital lines that let the PADs talk to each other at upto 64,000 bits per second, almost 30 times the speed of your ordinary 2,400 bps modem! This is the theory. In India, INET PADs are linked by 9,600 bps lines as I am writing this, but at a recent INET meet, we were promised 64 kbps links between PADs sometime in summer. But they didn't clarify which year.

Anyway, this speed is divided over the users connected to the network, so that the net throughput is not much less than a direct modem connection. And, because the X.25 network is servicing many people at the same time, the line costs per user are much lower—physically, only one line is in use!

Sounds great. So shall we throw away our modems and use INET instead?

Not quite.

Connecting to INET

To connect to INET, you still need a modem.

INET PADs are spread across the country, in the four metros, and in a few non-metros such as Pune, Hyderabad, and Ahmedabad. Yes, there's one even in Bangalore (which is still classified as a non-metro—boo!).

So to get connected to your nearest INET PAD, you have to fire up your modem and call a local INET number. That's not too bad, because it's a local call.

OK, so once you are connected to INET, what do you do? Can you directly log into my BBS in Bangalore from Delhi?

Unfortunately, no. At least not yet.

INET Connections

There are three kinds of INET connections:

- X.28 Dialup lines
- X.28 Leased lines
- X.25 Leased lines

INET X.28 dialups let you originate calls, but not receive any.

X.28 leased lines do let you receive calls, but the provided X.28 leased lines are so terrible, under-featured and useless that they can actually be only used for calling out, by people who don't like making phone calls with their modems. If you have an X.28 leased line, you'll know what I am talking about. If you don't have one, count your blessings. X.28 leased lines are so useless that I will not sully my column any further with any reference to them.

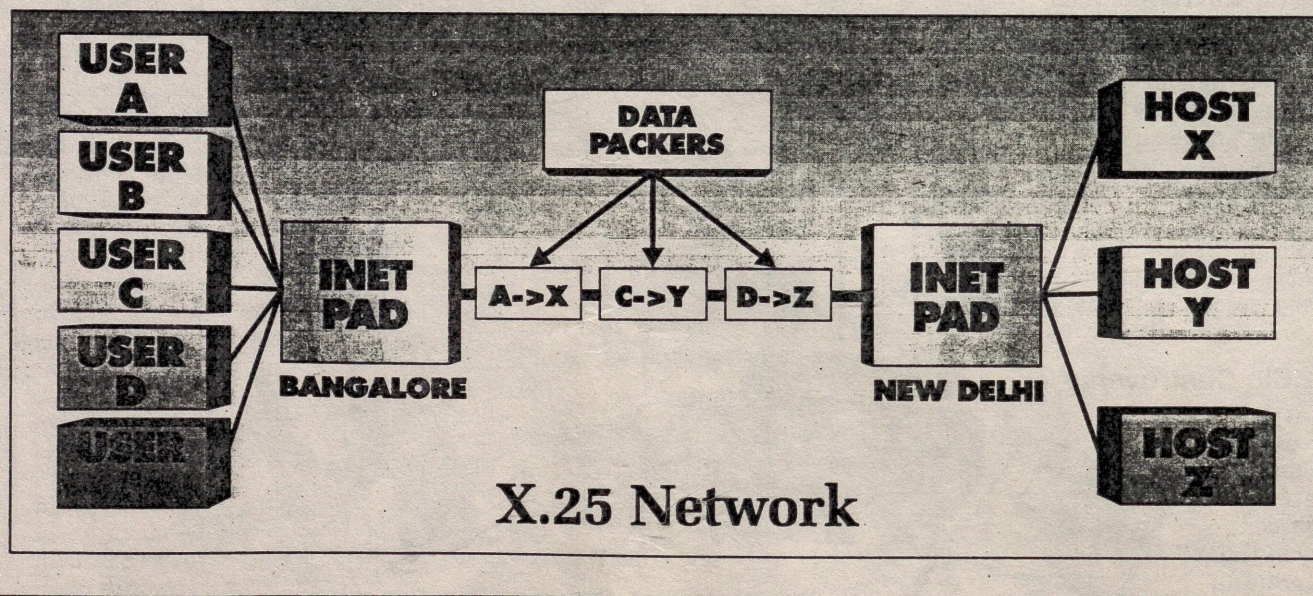
You have to have an X.25 leased line to be able to receive calls via INET.

X.25 leased lines are phenomenally expensive, and getting worse. I took a nap the other day, and when I woke up, INET had raised its tariff for X.25 leased lines. To top that, you need to buy expensive X.25 equipment. The whole exercise can cost you as much as Rs 200,000, not counting line rentals.

So what *can* you call using INET?

Well, to start with, you can connect to many international services such as CompuServe, MCI Mail, Bix and Dialog. Many of these require you to have a means of paying by a credit card valid outside India (which at this time is not possible unless you have benefactors abroad).

The tariff for international calls via INET is Rs 200 per 64 kB of data, plus Rs 4 per minute. The same 64 kB would cost you about Rs 350 if you were to call ISD.



Also, many companies in India are now setting up X.25 hosts accessible via INET. All but a few of them are completely private, meant for intra-company communications only. But some have recently thrown open their services to the public. At least three software companies I know of are planning to make their support BBS available on INET.

And finally, there is something new brewing.

INET "DialOut"

INET recently announced that they would allow "dial-out" from INET connections to non-INET subscribers. This would be something like dialling from Delhi to Bangalore on STD, but at the lower rates that are typical of INET.

For example, a call from Delhi to Bangalore would cost you Rs 50 per 64 kB of data. During daytime, such an exercise would cost you about Rs 160 on STD, so the savings are obvious.

Now that will really add a new twist.



You would be able to connect to any communication host in the country at a tariff much lower than STD, even if the host itself is not running on INET.

How will this work? You connect to INET in your city, provide the phone number in the remote city along with a special code, and the call is routed to the INET PAD nearest to the called number. From there, the PAD will use a modem to dial out to the requested number, and that's it.

At the time of writing, this facility is not yet available, but is under test in select locations in India, and is expected to be available to the rest of the country sometime this year. (To quote the king of computer journalists, Jerry Pournelle—"Real Soon Now").

Where do you go from here?

Well, to begin with, I'd suggest that you get yourself an INET X.28 dial-up account in your city. This will cost you about Rs 2,000 initially, and will take you up to three months, though INET is

known to spring surprises—a friend recently applied and got his account in a month's time.

If you plan to set up a host yourself, you've got the choice of blowing Rs 2 lakh on an X.25 connection, which will take you about a year to get.

Or you could wait for the INET DialOut facility, which we hope to see this year.

There are about 150 companies at this time who have X.25 leased line connections in India, and about 1,000 X.28 dialup subscribers. The latter is likely to increase five times over the next year, making it more and more difficult to get such connections, so better get cracking right away.

If you are in charge of the communications department of a largish corporation, earn brownie points by investigating the use of X.25 lines. You will need one X.25 leased line to your head office (or wherever you plan to install the host), and X.28 dialup accounts in the various cities where you have your offices. The total cost of setting up the host should be Rs 200,000...300,000,

plus about Rs 2,000 per each outstation office X.28 dialup account.

One bonus for corporations is that if you have an X.25 host running, you can accept "reverse charge" calls. This means that your remote office places the call and connects to your host, but the INET charges are debited to your central account! It is almost as if the central host has originated the call, so effective INET charges at the remote office end will be almost nil (apart from minimum charges).

INET Issues

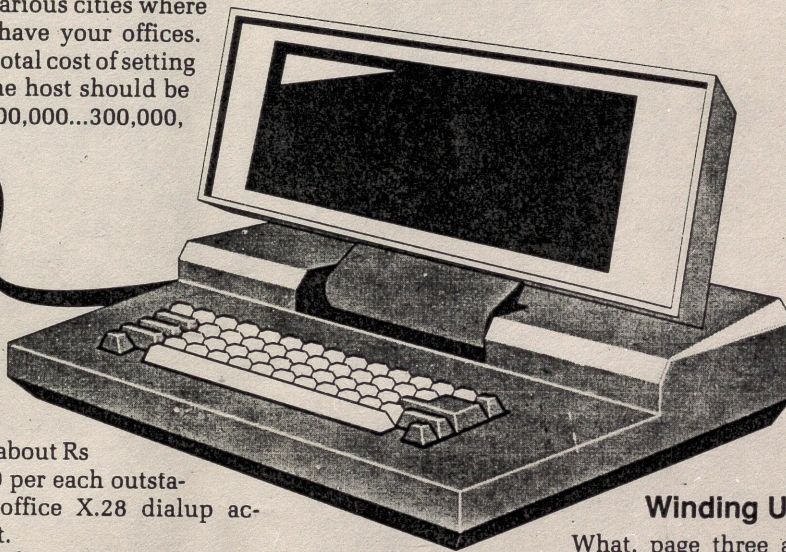
There are some issues that you should

be aware of when dealing with INET. INET is a "new kid on the block" and, though already active and useful, will show up with a few problems every now and then.

The biggest one you'll run into is network congestion, caused by the slow inter-PAD connections of INET. This should be resolved soon.

The second one concerns file transfers. INET X.25 operations are not as transparent as one would wish them to be, so you may have trouble transferring files using XMODEM or YMODEM. ZMODEM and KERMIT are fine, but still require some special setup. Work is afoot to resolve this, and I'll keep you informed through this column on its progress.

The third problem is that of confusion. The INET staff at times cannot help you because they themselves do not have sufficient information at hand. This problem, too, should be history once INET settles in properly.



Winding Up

What, page three already?

OK, time to wind up. Next month, I take a break from "monologing" and will provide answers to a whole bunch of questions that I have been receiving via my BBS, post and phone calls. After all, if PC Quest and I don't answer your questions, who will?

Beep, beep.

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Cyberspace From India

Wherever you are, information technology provides a global village of interaction with people with shared interests.

It all started with the US DARPA (Defense Advanced Research Projects Agency), now part of the Department of Defense in 1969 to group together research institutions across America. DARPANET became ARPA-Internet, and eventually evolved into a huge monster simply called Internet.

Internet is not just one network. The *real* Internet links American Universities, research institutions, organizations and project groups. It has over 60,000 nodes, and thousands of users. It is connected to a number of educational, commercial and private networks around the world. Since all of them offer similar features, particularly the ability to transmit e-mail across networks with common schemes of addressing, all these networks are often bunched together and called Internet, or UUCPNet (as the network is based on the ancient UUCP—UNIX to UNIX Copy-protocol).

Internet supports e-mail, news groups, file transfer, remote login, and wide area information services. Not every network offers these facilities all the time. We'll look at these one at a time, and see how to use them in India.

Electronic Mail

You can send e-mail from any location connected to any of these networks. These messages can be delivered to any other network through an e-mail address. These addresses are expressed in a few standard forms, the most common being domain addressing:

`username@domain`

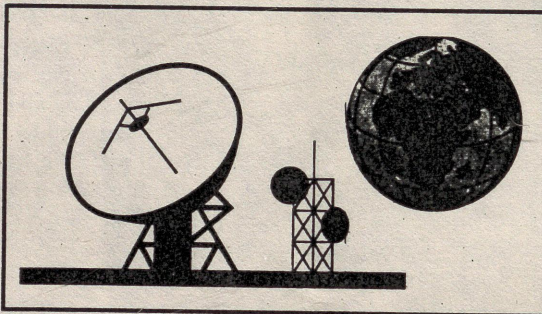
where domain may contain several sub-domains:

`department.department....organisation.type`

As with regular mail addresses, the

highest category comes last. While this is always the country in regular mail, the top-level domain in e-mail addresses may be an abbreviated country code (IN for India), a network name (BITNET, one of the smaller networks linked to Internet), or a type (EDU for most US educational institutions). The second-level category is usually an organization name. Lower levels may be departments or interest groups.

E-mail is of course much faster than regular mail—it takes no longer than a day to reach anywhere. Sometimes it may take only a few seconds. Unlike most BBSes, Internet e-mail cannot have binary files attached. However, you can mail programs, graphics and other



binaries by using utilities such as UUencode to convert the binary to ASCII text. This inflates the size of your files, and most networks refuse to carry messages greater than 50 kB to 100 kB. You may have to split your file. E-mail is available for all ERNET users (see next page).

News Groups

There are several thousand special interest news groups on Internet. Actually, they are on USENET, a mail and news network. No one runs USENET—it is created and kept alive by over 300,000 people around the world who use it. Anyone can start a news group.

There already exist news groups on the latest in Star Trek, second-hand bicycles, and more serious topics such as the new RISC microprocessor applications in graphics, and Tamil culture.

USENET users were informed about the blasts in Bombay long before Door-darshan. There are also a range of controversial "alternative" groups, discussing HIV, abortion and sighting Elvis. Nobody bothers to delete any of these strange groups.

News groups are usually batched. They are received by users in huge, compressed batches of data, rather than as soon as a new posting appears. Users may post messages to any news group.

File Transfers

The complete domain name that appears after the user name in an e-mail address is similar to, and often the same, as the name of the FTP (File Transfer Protocol) site. Not all network users have FTP sites; not all can receive files through FTP.

Receiving through FTP is similar to downloading a file from a BBS. Instead of the BBS's phone number, you have the FTP site name. Instead of a dial-up connection through the phone network, you have a TCP/IP connection on an X.25 leased line.

This works like a LAN. TCP/IP is the network protocol used by many WANs including Internet and ERNET in the same way as IPX is the protocol used by Novell Netware LANs. A leased line connects your site to the nearest ERNET host, just as an Ethernet cable connects your node to the server on a LAN. Soon things change—ERNET communicates with UUNET in Virginia, USA, through a 64 kbps satellite link. UUNET communicates through a combination of leased lines, satellite

links
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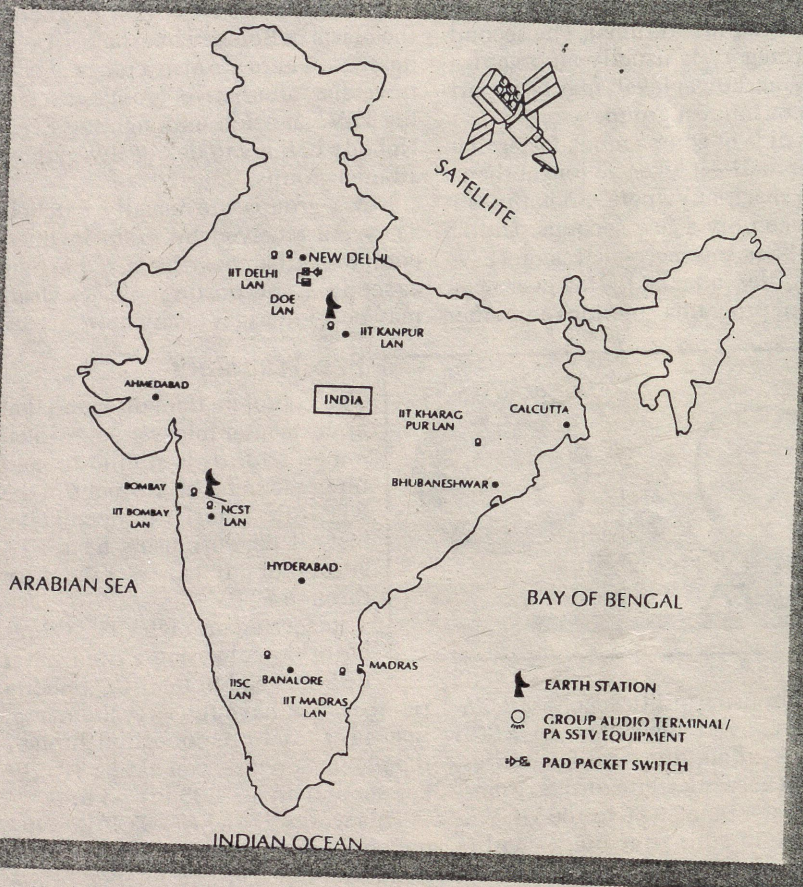
Project ERNET

In this project, Ethernet-based (802.3 10 base 5) campus LANS have been installed at eight project sites. Through these sites, nearly 45 educational institutes have dial-up access.

E-mail (X.400 implementation) on ERNET is available to restricted users. NCST at Bombay acts as a transitory node connected to the Virginia Centre of UUNET through a dedicated link at 19,200 baud which starts from Shakti, Air India Building. UUNET in turn has bridges to several

other international networks. The leased line network between the sites operate at 9,600 baud except for the DoE link which is at 2400 baud.

For information on how to join ERNET, contact: Project ERNET, Department of Electronics, Electronics Niketan, CGO Complex, Lodi Road, New Delhi, or NCST in Bombay. For information on leased lines, consult the local phone directory or contact your telephone office.



links and optical fibre links to the FTP site you are calling. As with a BBS, you have to log-in. Most FTP sites are anonymous—anyone may login. Then you select your files and download them to your site—at the speed of your leased line.

Due to the technical requirement of a TCP/IP link, FTP file transfers are only available to users connected to ERNET

through a leased line.

Remote Login

As a TCP/IP node on ERNET, you can log-in to any IP site in the world through Telnet. The procedure is exactly similar to FTP connections. However, Telnet sites usually require that you have a user account at that site—no anonymous log-ins. Unlike FTP connections,

where you can only transfer files, a remote log-in lets you work at the host system as if you were sitting there. You can use Telnet to log-in to MIT, and run programs on the MIT computers. As with FTP, only ERNET users with leased lines can log-in through Telnet.

Wide Area Information Services

Your TCP/IP node will usually have a number of database search programs. Using Wide Area Information Services (WAIS), these can search a number of databases around the world simultaneously. This is done by broadcasting the search request to a number of sites, which search their own databases independently. The results are then combined and made available to you in a very short time. You could search a database of several gigabytes spread across hundreds of computers in a few minutes. WAIS is available to ERNET users, subject to the same limitations as FTP and Telnet.

ERNET

ERNET (The Educational and Research Network), is a result of the joint DoE-UNDP Project. In 1989, it was connected to the world through UUNET for e-mail services. As one of the few networks connected directly to UUNET, ERNET offers e-mail, USENET news groups, FTP file transfers, Telnet remote log-in and WAIS.

Originally intended only for universities and research institutions, ERNET is now available to any organization for an annual fee of Rs 1 lakh. There is no additional charge for any of the services offered. The only further cost is that of the link to the nearest ERNET site. For those who wish to use the telephone network for dial-up access to e-mail and news groups, this is the cost of phone calls to the ERNET site. Those looking for FTP, Telnet and WAIS need to pay installation and rental charges for a leased line. This can be quite expensive (see "User Direct", PCQ May 1993).

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BBS at 011-6845520 (2400,n,8,1,MNP-5).*

Online To CompuServe

Atul Chitnis introduces you to the world's most popular online information service.

In my past articles, you must have found references to CompuServe. I've been bombarded with questions from readers on how to access CompuServe, what you can find there, how much it costs.

Finally, *PC Quest* said I had teased my readers long enough, and that it was time to come up with the goods. So, instead of the promised question and answer session this month, I'll tell you about the world's biggest, best known and most popular online information service—CompuServe.

A Little Background

Most of my readers won't really be interested in CompuServe's history, but let me quickly run through it.

CompuServe Information Service (CIS) began as a large, computer time-sharing setup that made computer time available to people who otherwise had no computing resources.

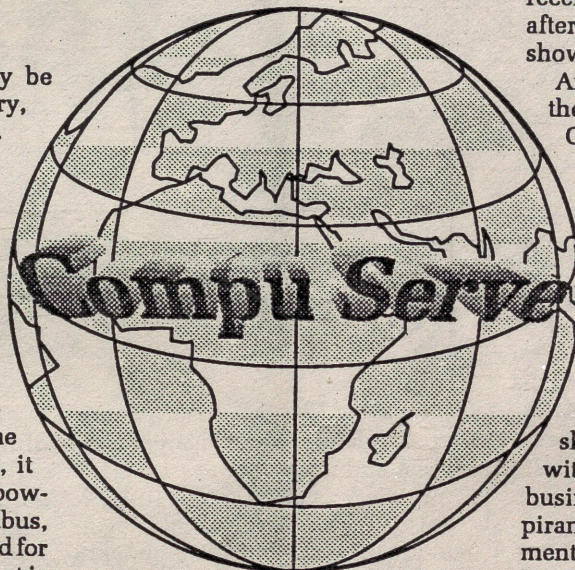
It gradually grew into an information service that today acts as a host to almost a million users worldwide. Initially using computer time on various mainframe computers during off-time hours, it now runs in the US on a bank of powerful mainframes located in Columbus, Ohio. CompuServe has been around for almost a decade now, something that is easily recognizable from its name—Compu is a prefix that was being used to death during the 1980s in the US, and even today in India.

What makes CompuServe so popular is the mind-boggling array of subjects that are covered by hundreds and hundreds of forums and special service areas, including electronic mail, online shopping malls, airline guides and, of course, computing support forums.

Please Login

CompuServe works more or less like your local BBS—you call it with your modem, log in using a User ID and a password, and then use the menus to navigate around. To access CompuServe, you'll need to have a terminal of sorts (PC, Mac, Unix terminal with CU, etc), a modem and a credit card.

You will also need a phone line to either call US direct (rattle, rattle, more cash down the bit-bucket) or an account on INET or GPSS.



Assuming that you have all these, all you need to do is connect to CompuServe, and register. One of the easiest ways to register is through the ZiffNet gateway.

To do this, set your modem to 2400/1200 bps, space parity, seven databits and one stopbit, connect to INET or GPSS, enter your password and account number followed by the CompuServe NUA. On INET, this means entering *Npppppp,uuuuuu-03132*,

where *pppppp* is your INET password, and *uuuuuu* is your account number. On GPSS, enter *Npppppp-3132*.

When the connection to CompuServe is established, enter *CIS* at the HOST prompt, *177000,5000* as User ID and *PC*MAGNET* at the password prompt. When asked for the agreement number, enter *Z11D9200*. Enter the information that will be asked of you, and have your credit card ready (VISA or MasterCard). You will be registered and given a User ID, and about a week later you will receive an access password by post, after which you can get on with the show.

Another way is to ask someone in the US to pick up and send you a CompuServe starter pack (about \$25), which gives you a direct CompuServe account without having to go through the ZiffNet gateway.

CompuServe steadfastly refuses to offer pre-paid accounts. So unless you have a credit card valid in US (or have access to a card of an obliging friend or relative in US or Europe), you can skip the rest of this article and get on with reading the ads. This credit card business rules out virtually every aspirant in India, thanks to our government's rigid foreign exchange policy. Boooo!

The Bill, Please

CompuServe has two billing methods—the standard and the alternate billing plan. Under the former, you pay a one-time membership fee and a fixed charge of \$8 a month for the use of certain basic items, such as electronic mail (up to 60 messages a month), some reference areas and areas included under the standard plan. Provided you utilize only these services, your CompuServe bill

will be \$8 a month. If you stray outside these areas (as you will, believe me—all the interesting forums are outside the standard plan), you pay \$8 per hour while you are in these areas.

The alternate plan has no fixed charges per month, but you pay \$12.80 per hour online. Unless you specify otherwise, you will be billed under the standard plan when you join and there should be little reason for you to change that.

If you are accessing via the ZiffNet gateway, you pay an additional \$2.50 per month under either plan. Some areas on CompuServe are *premium services* that carry an additional charge. For example, you pay \$1.50 per magazine article that you request from the magazine database.

Finally, if your credit card is not issued by a bank in US (for instance, if it's issued by a bank in Europe), an additional \$10 per month will appear on your bill to cover international transaction charges.

These are CompuServe's *usage charges*. They don't cover your communications charges: your phone bill, if you call direct ISD (Rs 1.10 per second), or your INET/GPSS bill (Rs 200 per 64 kB, plus Rs 4 per minute). And these charges are the ones that are really going to drive you bankrupt. The recent hike in Indian telecom tariff doesn't help, either.

You're On

Assuming that you now have a CompuServe account of your own, let's see what we can find there. Before you go online, a word of caution—time is money. Turn on your communication software's capture facility (Alt-F1 in Procomm, Alt-L in Telix, Escape/CA ON in Crosstalk). Don't spend your time reading online, let it all flow into the capture file, then log off and read it at leisure. A good way of keeping your bills down, even if

you are calling a BBS.

Like I said earlier, CompuServe works more or less like your local BBS. But this BBS is much more than a single line host running in someone's home or office. At any time, you'll find hundreds and thousands of users from across the planet online with you.

Make the mistake of asking for a list of available forums (specific interest areas), and you'll be treated to a list of hundreds of such areas, ranging from Apple Computer support through human sexuality down to Zen and the art of motorbike maintenance. (An updated list is available on my BBS. Call in and pick up CISAREAS.ZIP from the PCQ or COM forum libraries). In the list, you'll find virtually every computer oriented organization worth its

simulator allows you 40 channels that you can access to talk live with thousands of people on as many subjects.

One of the most interesting areas for first-time CIS users is an area called IBMFF (or MACFF if you are a Mac user). This area catalogs thousands of files that are available in the CIS forums. Search on a keyword for something that is of interest of you, and you are bound to come up with at least a couple of choices. Try the keyword *shareware* and you'll be flooded—most of the files available on CIS are either free or shareware.

Foraging In Forums

When I first joined CompuServe, it was primarily for the use of its e-mail services, but soon I was seduced into hopping outside the scope of my standard plan's basic services and go scouting around in the forums.

Being a software developer, the first forums that caught my attention were the

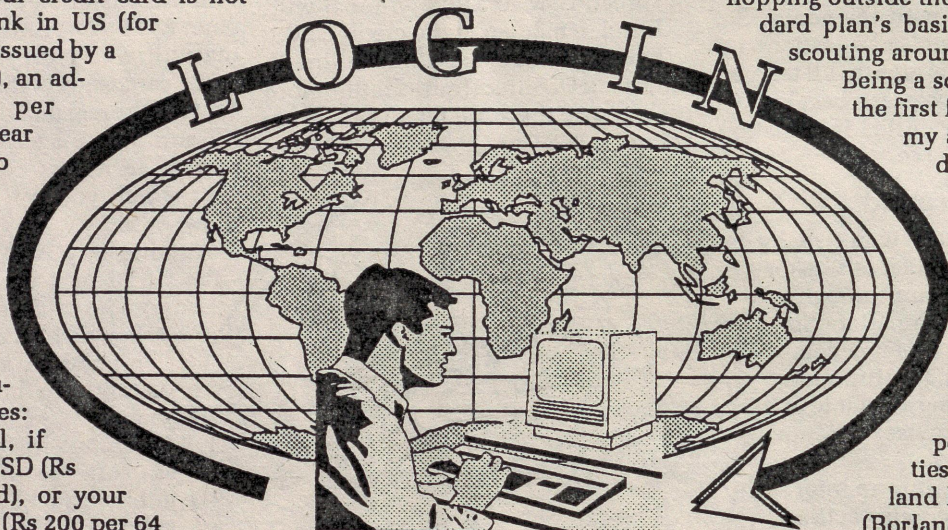
developer support forums of Borland, IBM and Microsoft.

Each of these companies maintain five to ten forums on CompuServe to service various aspects of their activities. For example, Borland has the BPASCAL

(Borland Pascal), BCPP-DOS (Borland C++ under DOS), BORAPP (Borland Applications) and dBASE forums, amongst others.

Each forum is divided into sections, with each section dealing with sub-topics. For example, the BPASCAL forum has from Borland, TurboVision, Windows Programming, Vintage Pascal, etc. Each section, in turn, has a message and a library section.

The libraries are the ones that are going to catch your attention when you first come in through the door—thousands of vendor and user supplied files! If you are human, you are probably going to try and download every item in sight, and this will probably continue until you get your first CIS and phone/GPSS/INET bill, at which point



salt, including IBM, Microsoft, Lotus, Novell, Borland, Apple, NeXT, TurboPower, and many more.

CompuServe's electronic mail facility is also very powerful, allowing you to send mail to not only CompuServe users, but also to other networks, such as most Internet sites, MCI Mail, many X.400 services such as AT&T Mail, and more. You can also send fax and telex messages worldwide.

Massive databases are at your disposal, including the Official Airlines Guide (OAG), online encyclopedias, magazine databases that contain virtually every article published in the past 10 years, and many more. An online *chat* area called the CB (Citizen's Band)

you will spend a lot of time trying to pay the latter, foregoing less important things like food, water and shelter.

After you've got past your initial download frenzy, turn your attention to the messages posted in forums because this is where the true value of CompuServe lies.

The Soul Of CompuServe

"How do I...," "What is...," "Where can I find..."

Each such question on CompuServe is likely to get a dozen answers, from vendors, users or bystanders, almost immediately.

Yes, this is really where CompuServe shines—the forum message sections. This is where you go when you have a problem. Post your question, and you're likely to be inundated with answers. Try getting the same effect by calling your local vendor for support. What a contrast!

The soul of CompuServe is its users, and the fact that they are always ready to help out, no matter how arcane, complex or silly your problem may be. People spend their time and money helping you, a person they have never met before, a complete stranger. No "Indian Crabs" syndrome here.

One of my first attempts at getting help on CompuServe was when I ran into a problem with TurboPascal 6.0—one of my libraries simply stopped functioning when I switched from TP 5.5 to 6.0. I posted my problem in the Pascal forum, and went home. When I logged in later that day, I had dozens of replies, complete with explanations, sample code and pointers to further references, all supplied by users from across planet Earth. If I had tried to solve the matter myself, I would have spent days, if not weeks or months. But *via* CompuServe, the first replies had started pouring in within minutes of my posting the question!

This phenomenon is not unique. On CompuServe, every user logging in is a potential support person. It may be that the user had faced a problem before and got an answer, and now he or she, in turn, does his good deed for the day by helping you out when you face the same problem. The willingness of CompuServe users to help is incredible.

Lord Baden Powell (of Boy Scouts movement fame) would have approved, and would have definitely been a CompuServe user.

Getting The Most Out Of CompuServe

CompuServe (and INET/GPSS/P&T) make their money out of your presence online—the longer you stay on, the more you pay.

In my first few months on CompuServe, I used to regularly rack up around \$200 to \$300 a month, because I was going around doing things manually.

Today, my average CompuServe charge per month is about \$40 to \$70, yet I'm doing more online than ever before. How do I achieve this? Simple—I use an automated program to do all the scanning, downloading, posting and reading for me.

This program is another pointer at the attitude of CompuServe users. OzCIS (as the program is called) is a gift from Steve Sneed, a TurboPower pro-

On CompuServe, every user logging in is a potential support person.

grammer, to CompuServe users—a comprehensive and easy to use program that does almost everything for you automatically, spending the least possible time online. And it is completely free. Yes, not even shareware—it is free!

OzCIS works by accepting all message and file requests from you before you call, goes online, does all the work, then logs off and lets you savour the results. It is very reliable, and is the navigator of choice by thousands of CompuServe users.

On CompuServe, it bypasses menus and works in command mode, directly using options available on CompuServe. As no menus are used, less characters flow down the line, further lowering your bill. (OzCIS is also available on my BBS. Go to the COM forum and download OZCIS1.ZIP, OZCIS2.ZIP, OZCIS3.ZIP, OZCIS4.ZIP and

OZTOOLS.ZIP. The last file contains some utilities and scripts written by me for Indian OzCIS users to make it work properly with INET and GPSS. Like OzCIS, they are also completely free).

CompuServe itself offers a program called CIM (CompuServe Information Manager), but it's slow and favors CompuServe—it tries to keep you online as long as possible. Though quite easy to use, I wouldn't recommend it to Indian users. CIM is a commercial product available from CompuServe, and costs about \$50. A Windows version has also been recently made available.

Yet another CompuServe navigator is TAPCIS, the first of such programs. Though essentially similar to OzCIS in operation, it has a pretty outdated interface and can be quite beastly at times. Besides, it doesn't work with GPSS or INET. It is shareware, and costs \$79 on registration.

All the above programs are for DOS and require a hard disk and DOS 3.3 or later, with 640 kB RAM except OzCIS, which works only on 80286/386/486 based machines with 1 MB RAM. All of them are supported online on CompuServe in their own forums. Similar programs are also available for the Macintosh, so Niyam and Ajay (and PKR, of late [grin]...) get your hackles down.

Logging Off

OK, I know I'm out of space again. But before I log off, I would like to say that if you can manage to get access to CompuServe, you'll never regret it. If you ever run into a problem, send me e-mail (my CompuServe ID is down below) and I'll try and help.

Next month, I will cover a few more online services, including BIX (The Byte Information Exchange), British Telecom Gold and MCI Mail. Oh, and before I forget, here is the command for disconnecting from CompuServe:

Bye.

ATUL CHITNIS

is a communications software developer and managing director of ARB constellation, Bangalore. He can be contacted via PC Quest, or e-mail at 70620.563@COMPUSERVE.COM or through his BBS at 080-341137. This column is exclusive to PCQ.

E-Mail For The Nineties

Atul Chitnis introduces you to the world of electronic mail.

Login

My apologies for last month's "disappearance" from PCQ. I got hit by a virus (of the human kind) that kept me non-productive for quite a while.

It looks like my readers aren't going to let me keep my promises on what I'm going to cover the next time... In June I talked about CompuServe, and briefly touched upon electronic mail (as I have done in previous articles). Promptly my mailboxes are full again, this time with requests for more details on e-mail.

OK, so let's talk about e-mail.

Making History

One of the most mundane and irritating duties of my secretary is taking messages for me. A call comes in, it is for me, and I'm not there. So she takes a message, which asks me to call back. I get back, return the call, and find that this time that person isn't available. So I leave a message...

In Corporatese, this is "telephone tag". In future generations, it will be clubbed in historical essays with AIDS and taxes as a factor that led to the downfall of modern civilization.

Many times, my secretary tells the caller to "leave an e-mail message if it is urgent", to which (at least for now), the caller more often than not replies "uuuhhh—e-mail??"

Changing Norms

In this age of computers, the very least you'd expect is that computers will be smart enough to take a message, keep it private, forward it to me wherever I may be in the world, and carry back a reply.

There *is* such a way of communication, and it is called electronic mail or E-Mail. It works in an incredibly simple fashion—you use your PC and modem to connect to the e-mail service, leave a message in my account, and quit. I call in three to four times a day to check for mail, find your message, read it and reply in the same fashion.

The great thing about all this is that neither party needs to know where in the world the other one is. And, because only I can read the messages sent to my account, messages remain completely private.

This definitely beats the fax and telex (or even phone messages) which re-

ed. This completely and permanently kills the dreaded telephone tag syndrome that is bogging down Indian business.

Second, it is much more private than a fax message, as only the intended recipient has access to the message.

Third (and probably of most importance) is the fact that e-mail, if properly used, is likely to be much faster and convenient than postal mail or even a fax. This is because the rerouting of a verbal, written or fax message in itself will take time to reach the addressee, while an e-mail message remains in a fixed place, and the recipient knows that any message meant for him will be available at this location, so there is only one place to check.

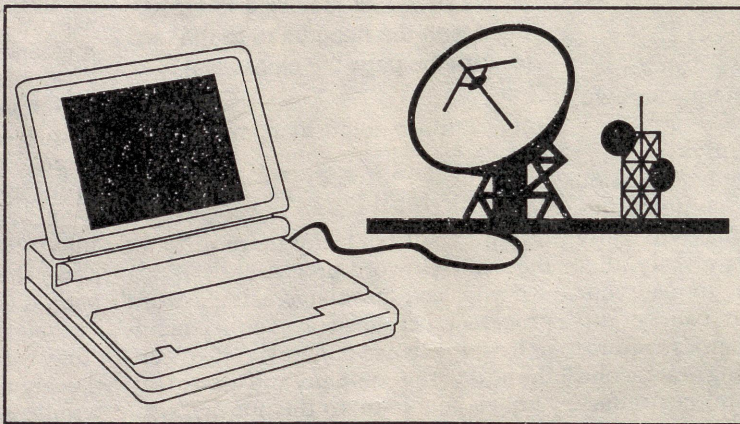
Getting Into E-Mail

There are primarily two ways by which you can get into e-mail—subscribe to a commercial service (such as MCI Mail or CompuServe) or set up your own.

The first option is probably the most convenient, as you are likely to achieve the widest reach. A service such as

CompuServe is used by hundreds and thousands of people, so it is very likely that your intended correspondent already has an account there. Also, most commercial e-mail services have gateways to other mail services. For example, from CompuServe, I can send mail to MCI Mail, InterNet, AT&T Mail, etc. and can also receive mail from these services.

The disadvantage is that unless you have access to a dollar account, it is going to be difficult getting onto one of these services. Though one or two e-

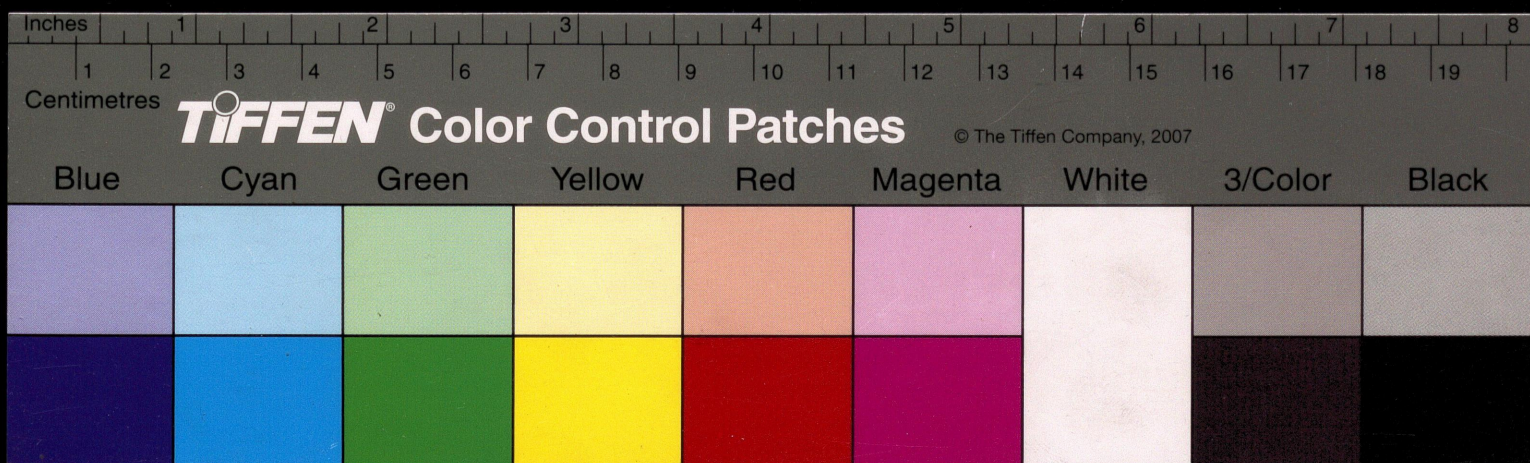


quire you to know my exact location, and which will not keep the message private.

It is hardly surprising then that American business took to e-mail like fish to water. And now, in a more leisurely fashion, Indian business too is getting in on the game.

The Advantages

As I have mentioned, one of the biggest advantages of e-mail is the fact that neither the sender nor the recipient needs to know where the other is locat-



mail services in India are just beginning to get active, it is going to take a long time before any of these come up to scratch. The ones that I know of here are more or less just electronic courier services, and are not very convenient to use. But I suppose things will improve. If they don't, then I guess I'll have to do something about it...

A cheaper way of getting access to e-mail services is using the InterNet—a massive, international network of computers linked to each other that are theoretically supposed to service educational institutions, but are also “mis”-used by non-educational entities (like me, for example). To access InterNet e-mail services, you have to get an account with one of the many educational institutes that have InterNet access. Once you do, e-mail is essentially free, but getting an account like this is extremely difficult.

PCQ covered the InterNet in an article in the June 1993 issue (*CyberSpace...*, by Rishab Ghosh), which has more details. You can also pick up the file INTERZEN.ZIP from my BBS—it contains the text article “Zen and the Art of InterNet”.

Rolling Your Own

The other option is to set up your own, private e-mail service.

This is probably the only way to fly if you are part of a large organization and have a lot of intra-office messaging. The advantage is that things will really remain private (it is unlikely that the Government is going to read your mail), convenient (you can set up things to suit your company's requirements rather than adapting to someone else's idea of e-mail), and cost effective.

There are several schemes you can use to set up your own mail service—all of them involve modems. There are BBS-like solutions that have a central host (which have the advantage of being location and operating system independent), and there are point-to-point solutions (which have the disadvantage of having to know where the recipient is located).

One thing is clear, setting up your own e-mail network is not a black art anymore—in most cases, all it involves is calling the vendor and asking him to install the thing for you. (It does in-

Emoticon	Emoticon/Message
:-)	Humor
:)	Smile
:)	Frown
:)	Not funny
:)	Wink
P-)	Pirate
:)	Wink II
:)	Pursing lips
:)	Bleahhhh (sucking tongue out)
:)	Smirk
<-O	Eeek!
-	Oops! (covering mouth with hand)
x	I'm not talking
-T	Keeping a straight face (tight-lipped)
:D	Said with a smile
-	Count Dracula
-#	Censored
.	Kiss
-:	Unhappy
-c	Really unhappy
-C	Unbelieving (jaw dropped)
-	Disgusted
-	Cry
-D	Laugh
%-)	Confuse
-o-	A burning candle
-o	"Oh, nooooo!"
!-:	Late night messages
!-:	Very sad
@->	A rose

EMOTICON SAMPLES: Emoticons are figures created with the keyboard symbols only, to convey the spirit in which an e-mail message is typed. Read with the head tilted to the left (or turn the page 90° clockwise).

volve a minor detail like paying for it, though.)

Using E-Mail

Using e-mail isn't any more difficult than using a word processor.

If you have problems using a word processor, perhaps you should consider learning to use one—even if you are the boss of the company and tend to say “I have people to do this for me”. Remember that the “people who do this for you” then also read your private mail, so no one will send you any.

You get online using your modem and communication package, supply your user ID and password, put in your

The great thing about e-mail is that neither party needs to know where in the world the other one is.

message and the user ID of the intended recipient, and get off.

There are a few tips; though, that will make the use of e-mail easier.

● **DON'T TYPE YOUR MESSAGE ONLINE:** Many people tend to do this, and it is stupid. The editing facilities available on most e-mail services tend to be awkward: why fight them? Use your text editor (like Norton Editor or WordStar in non-doc mode) to prepare your message beforehand. Take your time to make the message worth reading. Then, when you are satisfied with it, save it, call the e-mail service and, when asked to type in your message, simply use your communication software's ASCII upload feature to send the prepared message (in Procomm, press PgUp, then select ASCII). Much faster, much more convenient.

● **DON'T READ MESSAGES ONLINE:** Another weird habit. Just because you're online doesn't mean that you should do everything online. It wastes connect time. Instead, open a capture file before calling the service (in Procomm, press Alt-F1). Everything that appears on your screen will be saved in that file. Now ask the e-mail service to display all messages to you non-stop. Things will flow past you faster than you can read, which is fine. After all messages have been shown, log off, then read the captured text file at leisure without having “your meter down”.

● **DELETE MESSAGES AFTER RECEIVING THEM:** People tend to be packrats—they never throw anything away. Similarly, people tend to keep all their messages in their Electronic Mailboxes because “they want to refer to them later”. While the argument is fine, the method is wrong. Most e-mail boxes have finite limits to storage capacity (for example, on CompuServe, you can have no more than a 100 messages pending). Instead of keeping all the messages online, capture them in a text file (as shown above), then delete them from the mailbox.

● **KEEP USING IT:** I know of many people who have e-mail accounts, but never use them, or at most use them very rarely. This has the negative effect of discouraging your correspondents from using e-mail to contact you. Make sure you check your mail at least once a day, and to reply promptly, even if it is just to say that you will be replying in

greater detail soon. If people know that you use your e-mail account regularly, they will use it to contact you, thereby giving you all the benefits that e-mail has to offer.

● **KISS—KEEP IT SHORT AND SIMPLE:** The guiding rule that governs effective e-mail. When you send a message, be concise and to the point. Don't repeat yourself. If you are replying to a message, make it a point to quote from the original message (easy to do with cut/paste) in your message before making your reply—this way the reader will be able to keep track of the context without having to refer back to his own message, which may have been sent some time earlier.

Suppose you're replying to a message that extolls the merits of e-mail. Your reply would look something like this:

> I think that e-mail is a very effective medium of communication. What do you think ?

I agree completely. Without e-mail, things would be very difficult...

In the above example, lines beginning with ">" are lines quoted from the original message. Lines without this sign are your comments on the quoted material. This convention is very commonly used and you too should employ it.

● **EMOTE:** It is sometimes very difficult to get across the actual meaning of a sentence using e-mail. For example, if I say "PKR is too miserly to buy a modem" it will probably cause a rift in my relationship with him, but if I say "PKR is too miserly to buy a modem :-)", he will know that I am saying this tongue-in-cheek. [:/] —Ed

In case you haven't understood this—look at the ":-)" sideways—it's a smiling face. This is called a "smiley" or "emoticon", and there are thousands of them available that can give your messages the right flavor. For example, here is the emoticon for a bespectacled man smoking a cigarette, whose hair stood up on seeing his latest phone bill:

=B-Q

(Pick up the file EMOTICON.TXT from the PCQ forum on my BBS for more samples). Using of emoticons will avoid unintended insults or hurt feelings.

Getting The Word Out

Email is catching on all over the world and is today the preferred way of communication. But how do you let people know that you have an e-mail address?

Actually, that is simplicity in itself. Display it prominently on your letterheads and visiting cards (and even fax messages). Most mail services can be addressed in the InterNet fashion. For example, my CompuServe ID is 70620.563. To send me mail via InterNet from any other service (such as MCI, America Online, ERNET, etc), just send the message to 70620.563@COMPUSERVE.COM. This address appears on my visiting cards and correspondence, and you will be amazed if you would see how many people prefer to communicate with me this way!

Logout

OK, out of space again. But before I sign off...

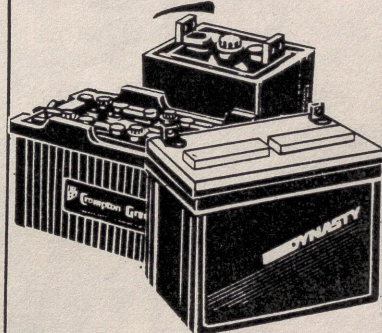
In my June article on CompuServe I had mentioned the program OzCIS, and that it is available on my BBS. Steve Sneed (the author of OzCIS) has informed me that he is releasing a new version on or before July 15. Because of this I have temporarily taken OzCIS off the board to prevent you from blowing money downloading a soon-to-be-outdated program. The new version will be available by August.

The "recommended" shareware of the month is FONEBOOK, a phone-book-cum-dialer written by Varun Arora of Bombay. Neat. Keeps track of names and addresses, and dials the phone number if you have a modem attached. Can be found on most BBSs around the country (including mine).

Finally—this month I will *not* tell you what I am going to write about next month! Make sure you get your PCQ issue as it hits the stands if you want to find out! (Take this seriously—I have had to STEAL a copy for the past few months because they are sold out within a day of appearing on the stands!)
Ciao for now!

ATUL CHITNIS is a communications software developer and managing director of ARB constellation, Bangalore. He can be contacted via PC Quest, or by e-mail at 70620.563@COMPUSERVE.COM or through his BBS at 080-341137. This column is exclusive to PCQ.

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High-Speed Modems

*The times have changed.
2,400 bps modems are on their way out.*

Hi, there. You still with me? Amazing.

Even more amazing is the fact that you're probably still using a 2,400 bps modem.

Picture this: You just logged onto your favorite online host (possibly a BBS, CompuServe or your company's mainframe) from across the country. There is this massive file you just have to download. The remote host graciously informs you how long it is going to take: just over an hour.

Hmm, let me see—60 minutes multiplied by 60 seconds divided by 2, the pulse rate from Bangalore to Delhi. That is 1,800 bucks! Wow.

Who's going to pay for this? Your company? Ok, then.

What? You mean *you* are paying for this? Are you out of your mind?

Stop mumbling about 2,400 bits per second being the fastest you can go here. That was in January this year (when you read my first column in PC Quest).

Times have changed: high speed modems have arrived.

Improvements All Around

1993 is probably going to be the year when low speed modems finally get to be consigned to the museum here in India.

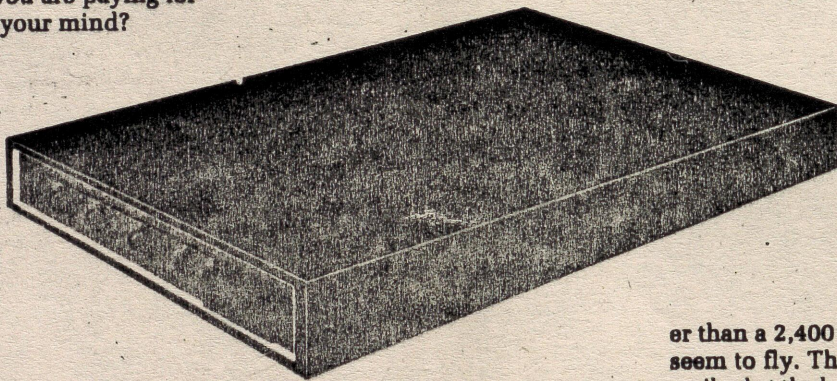
Earlier this year, modem manufacturers introduced reliable 14,400 bps modems in this country. I was a bit skeptical—how were these speed demons going to perform on our miserable phone lines?

Actually, they perform quite well—amazingly well, as a matter of fact.

You see, not only have new modems brought in new and improved technology that is better equipped to handle our lines, the Indian telephone system itself has seen quite a number of improvements.

For example, most telephone exchanges in the metros (and Bangalore, the metro-that-the-powers-refuse-to-call-a-metro) have gone electronic. The clicking, popping, crackling crossbar exchanges that were once the bane of Indian datacom are historical relics in many of these cities.

Also, the P&T seems to have woken up to the fact that phone lines have a



finite life, and need to be replaced at least once in a century.

Finally, with more exchanges in the circuit, the infamous "last mile" has been reduced considerably, thereby reducing the pickup of noise along the way. The quality of long-distance lines has improved noticeably. Today, a call from Bangalore to Delhi is usually clearer than a call to an office across town.

The Fast Lane

So what's the current definition of "high speed" according to resident expert Atul?

The simple answer is—anything faster than 9,600 bps. That's 14,400 bps or better. With V.42 *bis* compression, that can be almost 57,600 bps or over 5 kB per second!

One nice thing about modems faster than 9,600 bps is that many (if not all of them) are compatible with each other. When 9,600 bps modems first arrived here, there were a lot of problems, with different makes of modems refusing to talk to each other. No such problem at 14,400 bps—all of them use the V.32 *bis*

standard for transmission, all of them have V.42 error correction and all of them use V.42 *bis* compression. There are no non-error-correcting 14,400 bps modems.

Three cheers for standards:

Communicating at 14,400 bps is a nice feeling. Six times faster

than a 2,400 bps connection, things seem to fly. The one hour transfer described at the beginning of this column drops down to 10 minutes, or about Rs 300 in STD charges—six times cheaper. We're talking V.42 *bis* compression here, so things could be even faster than this, and even ZIP files (a nightmare to transfer using MNP5 when the protocol tries to compress something Phil Katz's PKZIP 2.04G couldn't compress any further) trundle along at a respectable rate.

Here is the good news...

Modems in India tend to be expensive, but it's always been a "you get what you pay for" situation—the more expensive modems tend to perform much better than the cheapos.

Until recently, a decent 2,400 bps modem cost around Rs 20,000, with a few low-cost guys robbing you for around Rs 15,000. Today, a decent 14,400 bps modem will cost you about Rs 34,000 (and dropping). That's six times the speed at about 1.5 times the price! Not a bad deal, what?

If you consider the savings in transmission time, you don't have to be Shakuntala Devi to realize that you make up the cost of the modem in a very short time.

Resistance To Change

Sad, but true. Many large corporates still follow the beaten path of being penny wise, pound foolish. Recently, a megacorp I know went and bought a stack of 2,400 bps MNP modems, thinking that they saved a lot of money in the bargain.

Well, really? Look at these figures.

20 modems at Rs 20,000, each is Rs 400,000.

Assume 100 kB of data sent per day per modem (typical for big corporations). That's $20 \times (100 \times 1,024 / 240) = 8,533$ seconds a day, or about Rs 4,266 per day at 2-second pulse rates. (2,400 bps is 240 bytes per second)

If only they had bought 14,400 bps modems instead...

20 modems at Rs 34,000 each is Rs 680,000.

With these 20 high speed modems, here are the figures:

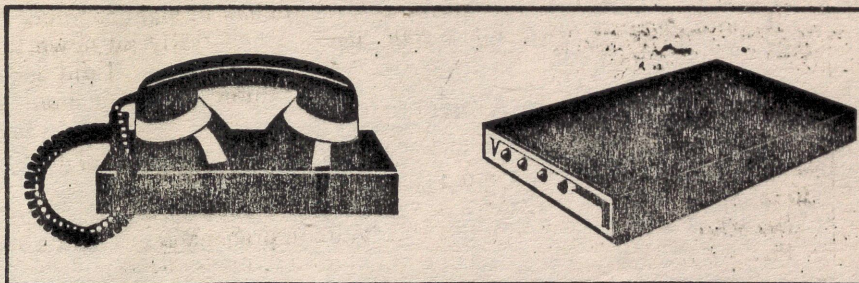
$20 \times (100 \times 1024 / 1440) = 1,422$ seconds a day, or about Rs 711 per day at 2-second pulse rates.

Over a year (200 working days)...

Rs 853,200 is your bill with the lower-speed modems. Rs 142,200 is the figure for the fast modems.

So the sum total for the 2,400 bps *wallas* is Rs 12.5 lakh in the first year, while the 14,400 bps *wallas* pay only Rs 8.22 lakh. In the first year alone, you recover your costs!

Also, consider that the 2,400 bps modems may seem state-of-the-art to your finance department, but a year down the line, they will feel the way 4.77 MHz 8088-based single-drive CGA PCs do today. The 14,400 bps modems



Slow Modems

2,400 bps

Slow

Rs 20,000

Fast handshaking
(a few seconds)

Better for small files and data
100/1405

Expensive in the long run for
long distance work

Fast Modems

14,400 bps

Six times faster

Rs 34,000

Takes longer to connect
(up to 15 seconds)

Better suited for large files
traffic

Six times cheaper
in the long run

will continue to hold their own over a couple of years. 19,200 bps and faster modems are already available in the US. And 28,800 bps will be here before mid-1994. That will relegate 14,400 bps to entry-level status very soon.

Consider, too, that most of the new 14,400 bps modems also incorporate fax capabilities, some at 14,400 bps itself—much faster than current stand-

Not I. Not today.

I can virtually guarantee sustained performance between metros and within the city, but if your trunk line goes through a couple of lousy crossbar exchanges, then things are likely to slow down. To maybe 12,000 bps, 9,600 bps or even 4,800 bps. But even in a worst-case scenario, that's twice as fast as the 2,400 bps relics you're about to buy! And many 14.4 kbps modems have a feature that allows the modem to fall back when the line goes bad, and fall forward again when conditions improve.

I can guarantee that with improvement in line conditions (as it is happening almost daily), it will be more than likely that you will be able to transfer at maximum speed.

One factor that must be considered, though, is handshake time. High speed modems tend to take a much longer time to establish a connection initially, typically from 5 to 15 seconds as opposed to 1 to 5 seconds for 2,400 bps modems. So all that high speed may not really pay off if you are only transferring a kilobyte or two of data per day, since the total of handshaking plus actual transfer in a 14,400 bps modem may be longer than the handshake and transfer of a 2,400 bps modem. But then, any 14,400 bps modem can be

The 2,400 bps modems may seem state-of-the-art to your finance department, but a year down the line, they will feel the way 4.77 MHz 8088-based single-drive CGA PCs do today.

alone fax machines. The savings add up, especially when a good fax machine alone costs almost 50 percent more than a 14,400 bps fax/modem.

The Downside

"OK, Mr Chitnis, so 14,400 modems are faster, but who guarantees that they'll work consistently at that speed?"

forced down to 2,400 bps if needed, and will perform better than any 2,400-only modem can.

Cheapos, Foreign Returns Dept

"Phoren is besht!" is the accepted credo in most circles.

Sez who?

Pick up that incredibly cheap modem in the US, and you'll soon understand why it was so cheap. Cheap performance, cheap components and no after-sales support all add up to disaster. Also remember that 99 percent of cheap American modems are made in Taiwan or Korea, so the "Made in USA" tag is no guarantee of performance.

And don't forget the P&T watch dogs who are just waiting to hear that 14,400 carrier tone on your line before slamming you for using a non-TEC cleared modem. Foreign modems are NOT cleared by the P&T, so this is not a game of roulette you should play.

If I am beginning to sound like a salesman for a modem company, forgive me, but I am stating facts that I gathered from experience.

So before you ask your friend/relative/associate/well-wisher in the USA to pick up a modem for you, think twice. You are likely to end up paying twice as much as it would cost you here.

Remember—there is nothing like a free lunch.

Fast Modems Need Fast PCs

A critical issue in high speed modem usage is the speed of your machine. You can't use a 14,400 bps modem on an XT with an 8250B UART, a 20 MB ST225 hard disk and a 3-wire serial cable. Period.

A 80286 or better machine is necessary, and preferably a 16550AFNUART (serial communications) chip. And the serial cable must have all nine critical connections wired up to allow hardware flow control.

Anything less, and you are asking for trouble.

Which Modem

On an average, I am asked this question about 50 times a day, via e-mail, snail mail and telephone calls.

I have used high speed modems made

by a number of manufacturers, but to date haven't really sat down to do a complete evaluation. I did ask some manufacturers for evaluation pieces, but all of them seemed to think that modem evaluation is a 30 minute job. No way.

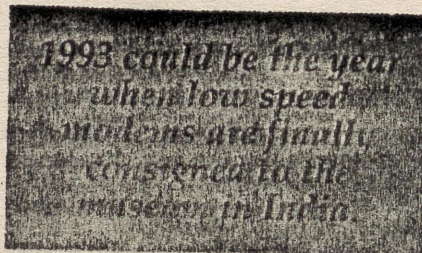
Anyway, as soon as I have done a fair and comprehensive evaluation of some of the 14,400 modems available in India, we'll sit down to do a "modem special" that tells you of our findings.

Until then, I can only say, no comment.

Saving Money With CIS

One of the objectives of my articles is to help you save money. If you are a reasonably heavy CompuServe user, then a high speed modem is likely to help you save.

The trick is—call the CompuServe node at Hong Kong (00852-3041332). This is a 9,600 bps node with V.42 error



correction (as in all carrier networks, it does not support compression, so make sure you disable it with AT%CO or AT&E14 before calling).

If you have a fairly long CompuServe session ahead of you, calling Hong Kong is much cheaper than using INET, which charges you Rs 200 per 64 kB. The call to Hong Kong is charged at 1.2 seconds per pulse (at least something good about being a SAARC country), and you will get an effective throughput of about 750 chars per second as opposed to about 170 chars per second via INET.

A 1 MB file transferred from CompuServe will cost you about Rs 1,200 via Hong Kong, and about Rs 3,200 via INET. It will also take a lot less time via Hong Kong.

For MTNL Subscribers

Subscribers to MTNL-run exchanges in Delhi and Bombay have come across a loud and irritating beep every now and then. That's MTNL's 'innovative' way

of telling you that you have crossed the 5 minute limit for a local call.

Unfortunately, the powers-that-be don't seem to use modems. A beep like that immediately breaks any modem connection. A gigantic booo is called for, and is herewith given.

Until the people at MTNL come to their senses, you can avoid the cutoff by setting your modem's S10 register to a value of 25 or higher. The default value of 14 stands for 1.4 seconds, which is too short to handle the MTNL folly. Setting it to a higher value will keep the connection alive in spite of the beep. You may have to experiment a bit to get the right value.

By the way, from the appearance of things, the telecom guys at Bangalore DO use modems—no beeps here. Makes you want to move, doesn't it?

Gimme A Break

I'll say it again. Writing for PCQ is one thing—answering personal letters and queries via e-mail and phone calls is another.

Please do not flood me with letters and calls asking me questions. I am bombarded with queries ranging from modems to networks, from DOS to games and from programming issues to requests for pirated software!

I'm not all that mercenary, but my company does professional consulting—if you're willing to pay for the information we provide, by all means call. If not, please write to me c/o The Editor, PC Quest, New Delhi. If you do write directly to me, I would be able to reply only through the pages of PCQ.

Or, even better, make sure you have a PCQ subscription—most of your questions are likely to be answered in future columns. At Rs 144 a year, that's a steal...

As for bouquets and brickbats, I'm open to them. Fire away to The Editor, and PKR will soon set me right [:-)].

This time, I'll say bye in the MTNL way.

BEEEEEEP
<click>
NO CARRIER

ATUL CHITNIS is MD, ARB Constellation, Bangalore, and can be reached via e-mail at 70620.563 @ COM-PUSERVE.COM, via his BBS at 080-341137, or c/o The Editor, PCQ. He regrets that he cannot answer queries personally. This column is exclusive to PC Quest.

The Wired World

Need help on Netware? Or Vedic studies, or cancer research? It's all online. For anyone who wonders if the PC can change the world, there's news: with a little help from the modem, it already has. Here's how infotech has wired the globe.

Every night, Brian Smith takes a break from sheep farming, in his remote New Zealand village. He's an unlikely political debator, but his views on Clinton, Major and others are strong enough to get him into heated arguments with people in Munich, Ottawa and Redwood City, California. He's never met them, though. They're just names on his PC screen.

Smith belongs to a growing clan that is over 20 million strong, worldwide—sharing information, debating, asking for help, or just chatting. He's online.

The Networks

Electronic networks are, very clearly, a communication marvel that has nearly passed India by. They work in an almost anarchic fashion, and their wide reach has baffled politicians and lawyers who are still trying to figure out whether to govern it or police it. They cross cultural and continental barriers, to bring people together through information exchange—a doctor from Cambodia gets to know the latest on AIDS, cricket fans analyze their team's prospects in the coming season, parents exchange tips on how to raise children.

Internet, dominating the technological hierarchy, is a huge international network of computers. Most of these are in universities and government research centers that use the same connecting software, so that they can talk to each other electronically. The cost of the participating institution can be as low as \$1,000 a month for an unlimited number of users.

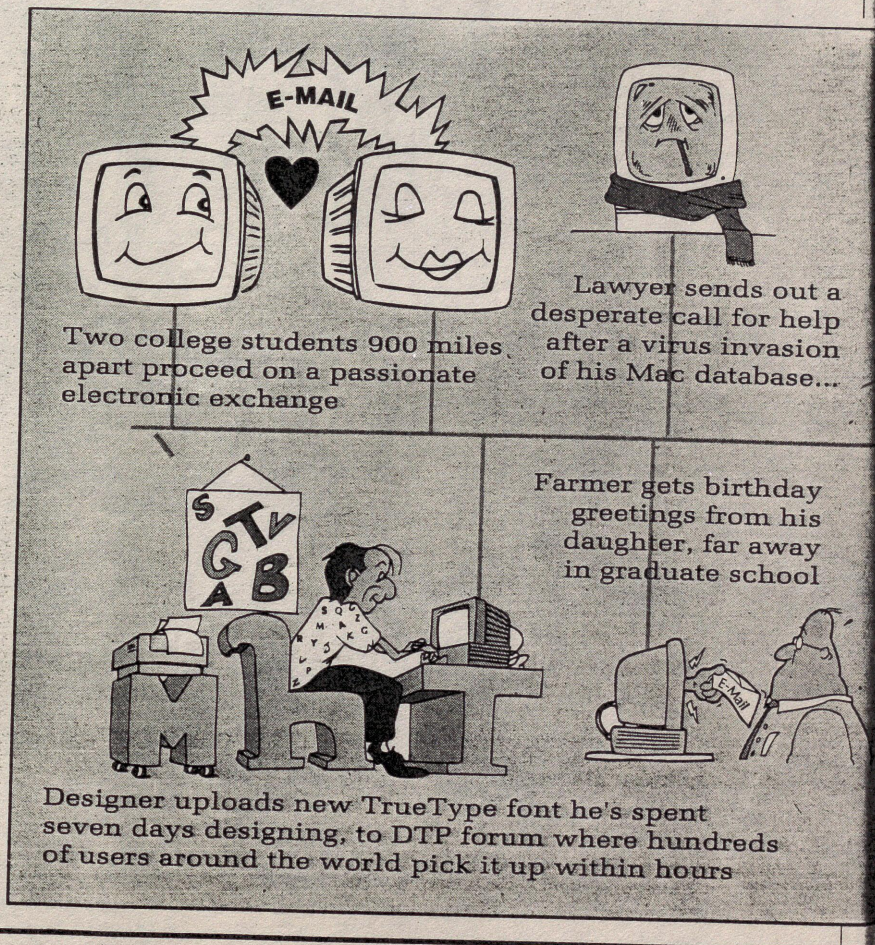
Commercial services like CompuServe and America Online are backed by big corporations, and are the easiest to access. But they also charge stiffer fees. The users are charged on the basis of their log-in time, and there are extra charges for specific services. The subject matter on these services are struc-

tured for specific audiences.

Public access services like the WELL (Whole Earth 'Electronic Link) have members all over the world. They normally charge a nominal fee for use of their electronic bulletin boards and sometimes to Internet. There are other such online services like SF Net that has been started with the aim of providing access to as many people as possible.

As it happens, you don't even need a PC to use this network. There are terminals available at various cafes where regulars pay 25 cents for four minutes. The services offered range from online forums that anyone can join to private groups for self-selected users.

Besides these regular services, there's a rapidly growing bulletin-board industry that serves thousands daily. Some are geared to specific groups such as teachers, farmers, students, etc. One of the main reasons behind the growth of such local bulletin-boards is the fact



that they can be started with a fairly modest investment.

OnLine Options

To get connected to an electronic network one requires a modest computer, a modem and a software that links computers over phone lines. The software is the key that opens electronic doors for the user where he can do his piece of cyberchat with the outside world. Besides that, you also have a wide range of options to choose from. A brief look into these services.

E-MAIL: The most popular online application and service. The sender or receiver doesn't need to know where the other person is physically located. E-mail delivery time is fast: a few seconds, from the US to India.

USERNETS: A huge electronic filing cabinet that contains the widest range of information that can be accessed by the user through this service. Users can ask questions, have long chats and send articles. There may be various user

forums relating to specific issues where even a novice can feel free to ask questions. CompuServe has many such forums, such as the Novell Netware forum (see box).

PERSONAL SERVICES: Various banks, airlines, shopping centers offer online services. There are services which even let the user pay bills on-line.

Besides the standard services offered by various networks, there are also various developer support forums of Borland, IBM and Microsoft that are further subdivided into sub-forums to deal with specific user related problems.

Users have formed various support groups that are fast gaining popularity because of technical expertise, privacy and convenience.

On-line forums devoted to the weirdest of topics are also commonplace. They usually start with "alt" for alternative and can deal with subjects like "alt.stupidity", "alt.life.sucks".

Network Impact

Nobody can predict the social and cultural impact of these on-line services on the society with their growing popularity in the day-to-day lives of millions of people.

But its supporters definitely outnumber its critics.

Networks help people in getting employment through various on-line classified job ads. They serve as all-purpose libraries for research. They help people build companies, establish businesses, and support their products—from motor cars to software. There are forums devoted to diseases which are looked up by people for their technical expertise.

The networks have also been used as an effective political tool. During the 1991 coup in the former Soviet Union, users all over Europe passed the news of world outrage, which further strengthened the rebels to reverse the coup. The world knew of the assassination of Rajiv Gandhi minutes after the news broke out in India.

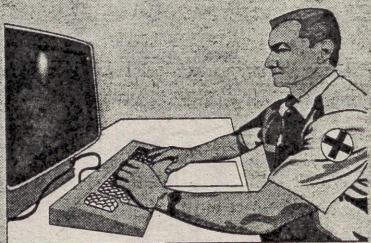
Help on a social front is also not far behind. There are forums supporting the sad and lonely. The network often provides an "emotional lifeline" connecting people from far off places to the rest of the world.

There are also all kinds of users. They can be in the form of obnoxious correspondents. Callers can get fixated on certain users and start harassing them. There are also hundreds of sexually-oriented bulletin-boards specializing in soft-porn and 'computer graffiti'—and most of those logging in and downloading .PCX and .GIF files of nudes are teenagers.

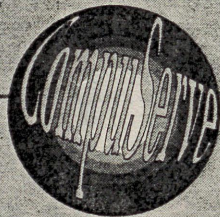
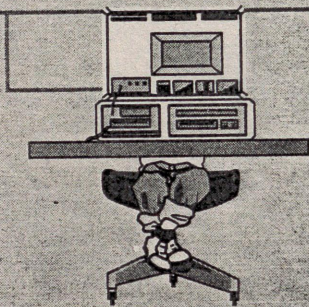
Open forums attract all kinds of opinions. Some of them may be technically misleading. Networks also provide routes for teenage vandals who break into computers.

These are minor aberrations on this high-power twentieth century forum, and the power of going online overshadows them. With the power these networks hold to influence the day-to-day lives of their users, they can effectively be used as a medium to hold together global values and act as a powerful force for social cohesion, neutralizing trivialities like political boundaries. ■

Halfway across the world, a doctor logs in at midnight (his time) for an urgent search for data on the Factor 8 dose for a hemophiliac patient...



...a programmer who had logged in to look for Pascal graphics libraries helps him out



Teenager, tired of peeking into Pentagon computers, downloads "nude GIFs" from adult picture library

PCX

India Online

Where you can connect to, and what you'll find there.

This issue is full of modems and communications. One of the nicest things about communications is that you can get virtually anything you want through a phone call.

Once you're online, where do you visit? There's a range of places to choose from, beginning with (of course) CompuServe...

CompuServe

Not everyone has a CompuServe account, but those that do should check out these places.

To connect to CompuServe, use INET. The NUA is 03132.

ZNT:SUPPORT This is where you can get the latest PC Magazine utilities absolutely free of CompuServe Charges (though telephone call charges still apply!) To get there, enter GO ZNT:SUPPORT, and check out library #7.

ZNT:DOWPCW This area lets you download the latest issue of PC Week. It comes as a ZIP file containing the full text of ALL the articles that appear in PC Week every week.

ZNT:PBSARCADE The international godown of all the very best games that the shareware computing world has to

offer. You'll find all the latest DOS and Windows based games here, including games from Apogee, Epic and others. **CIS:PCVENC** Section 11 in this area is the official PKware support area, and you will find the latest versions of PKZIP/PKUNZIP here.

CIS:IBMCOM, CIS:IBMBBS The ultimate area to be in if you are interested in computer communications. The various sections here deal with file transfers, modems, faxing and also hosts the official support areas of OzCIS, ATO

ed stuff and discussions.

CIS:IBMSYS, CIS:IBMPROG If you are a programmer, then these areas will be heaven for you. You will find the libraries chockfull with source code, examples, applications, tips, and much more. **CIS:BPASCAL, CIS:BCPPDOS, CIS:BCPPWIN** The Borland Developer forums for Pascal and C/C++ programmers. Blow your mind when you see what the libraries in these areas hold! If anything can be done with Borland's languages, then you'll find examples of it here in the

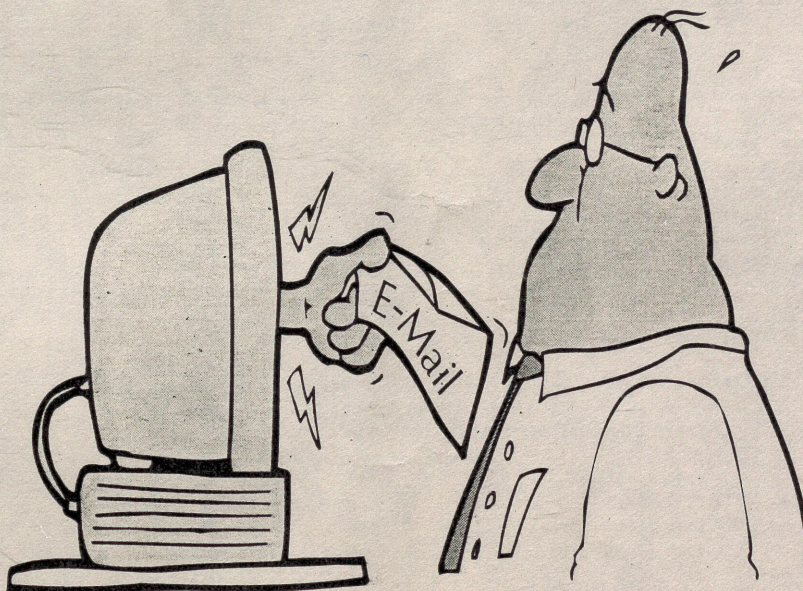
form of source code and ready-to-run binaries.

BBS Sites

There aren't too many BBSs in India, but some of the more noteworthy ones are:

ETCNET, DELHI A fun place to be. Uses CyberNet as host software. Call 011-6845520 with settings 2400/1200-N-8-1. The libraries contain megabytes of shareware, and there are several conference areas. Several PCQ writers, including Divya Mahajan, Rishab Ghosh, Anindo

Ghosh and myself can be found here. Until PCQ gets its own BBS, this will remain a de facto PCQ contributors'



Logging In

A BBS session (log-in from PCQ, Delhi into CIX, Bangalore).

atdt080341137
CONNECT 9600

CyberNet Communications Host Version 2.63-8 (#000000000)
Copyright (c) 1990, 1991 A.R.B. Constellation Pvt. Ltd.

Online 2400 V42 at Node 1 on 10-Sep-93 18:37:56

Welcome to CIX, running at A.R.B.Constellation (P) Limited I

Please login with your User ID and Password, or enter
NEW : to register yourself as a new user.
GUEST : to leave a message to the Sysop.
INFO : for information about CIX.

User-ID : PKR
Password :

Please wait, checking for ANSI/VT100 terminal...
ANSI Terminal Detected.

Choose ANSI Graphics Mode: &W, <C>olour or <N>one : B

The Constellation Information Exchange
10-Sep-93 at 18:38:15 UTC+5.5

Last Access: 10-Sep-93 at 18:35:48

CyberNet Version 2.63
Copyright (c) 1993
A.R.B.Constellation (P) Limited

You have Electronic Mail waiting.

CIX System Bulletins

1. 08-Sep-93 - System Change - please bear with us...
2. 14-Aug-93 - PCWeek News for August 16th now online I
3. 07-Aug-93 - You can now Fax us!
4. 30-Jul-93 - Feel like a laugh? (more of the same!)
5. 03-Jul-93 - New Forum - DOS Tips, Tricks & Traps
6. 29-Jun-93 - Massive new stuff online!
7. 08-May-93 - New comm. prog available with MNP & Zmodem
8. 17-Apr-93 - New PKZIP 2.04g online !! IMPORTANT !!
9. 27-Feb-93 - New Forum: Atul's PC Quest Response Forum

Read which Bulletin? (1-9 or <E>Mail, <Q>uit, <M>ain menu)

```
[M]: E          CIX Electronic Mail
|
| L - List Messages      C - Check User Mail Status |
| R - Read Messages     ? - Help |
| P - Post Message      X - Exit from Area |
| S - Post Message to Sysop * - Utilities |
| E - Erase Messages    G - Goto another Area |
| M - Transfer Mailbox  Q - Quit (Goodbye) |
|-----|
```

Time Online = 00:01:11 Time Left = 00:28:49

Total Messages = 1 (Please ERASE messages after reading)
New Messages = 1

Select: M

Mailbox Transfer: <U>pload or <D>ownload: D

* Download a CyberMail Mailbox *

Enter a filename to download your mail as: PKR

Creating Mailbox PKR.IN...

Mailbox PKR.IN created (2826)

* Select Transfer Protocol *

M - Xmodem	O - Xmodem1K	E - Xmodem1K-G
Y - Ymodem Batch	G - Ymodem-G Batch	K - Kermit
S - SuperKermit	Z - Zmodem	A - ASCII (Text)
D - DSZmodem (Forsberg)	P - Puma	J - Jmodem
X - None		

Select Transfer Protocol (?=Help, Blank=None/Cancel): Z - Zmodem

File: PKR.IN Size: 2826 bytes Blocks: 3 Blocksize: 1024
Time: 00:12 (approx) at 2400 baud
Please start your ZMODEM download procedure.
(Press Ctrl-X to cancel)

Transfer successful. (00:22).

Mailbox transferred. Please erase your mail here. Press <Enter> to continue :

Time Online = 00:01:53 Time Left = 00:28:07

Select :

CIX Main Menu

```
| I - Info about this System      T - Teleconferences |
| B - System Bulletins           M - New Items Scan |
| E - Electronic Mail            P - User Profile Settings |
| F - Forums (Files & Messages)  ? - Help |
| A - Text Articles              * - Utilities |
| D - Online Databases           O - Quit (Goodbye) |
|-----|
```

Time Online = 00:01:58 Time Left = 00:28:02

Select : Q

** PKR, you are about to quit from CIX I
** Do you really wish to quit (Y/N) or <R>elogin? Y

Logging out User PKR...

Login : 10-Sep-93 18:35:49
Logout : 10-Sep-93 18:37:53
Online : 2 minutes 04 seconds
Credits : 72 credits used in this sess

NO CARRIER
at
OK

contact place. And check the area called Noticeboard. Originally a sort of announcement area, this place now holds hundreds of free-for-all messages that range from discussions to insults, advertisements to tips and tricks, and more. (For more on ECTC, see the next feature on Delhi BBSes.)

LIVEWIRE BBS, BOMBAY Suchit Nanda's BBS. Uses Maximus-CBCS as host software. Call 022-5787812 with settings 14400/9600/2400/1200-N-8-1. The BBS is online 24 hours a day except during some times of the day.

Suchit is an active member of the Microcomputer Users Group in Bombay, and also writes for Express Computer.

Downloading news from PC Week Online (ZiffNet).

go pcweek

You have left basic services

Entering ZiffNet +

One moment please...

ZiffNet ZNT:PCWEEK

One moment please...

Welcome to the PC Week Corporate Buyers' Forum.

This service is operated by PC Week as a service to our readers as well as members of the CompuServe user community as a way to communicate information about our volatile industry.

There is no cost to join the forum but your participation as a Visitor is limited until you join. Simply select "B" from the forum menu to begin participating in the PC Week Corporate Buyers' Forum. You will be prompted to leave your full name (no "handles," please) and then you will have full access to the discussion sections of the forum.

Personal attacks (commonly called "flames") on members of the forum will NOT be tolerated! If you persist in attacking members of the forum after a warning from the Sysop, your access to the forum will be denied.

This forum is organized into 10 discussion sections: General Information about the forum and CompuServe, Hardware Issues, Software Issues, Connectivity/Networking Issues, Application Development Issues, Management Issues, Operating Systems, News, Performance Testing, and Sidebar for wandering threads. Each week, PC Week technical analysts take part in many of the discussions on the forum seeking input about upcoming product reviews and what our readers think about issues.

Should you have any additional questions before you join, you may leave a message addressed to sysop.

Once you have joined, we urge you to read the Membership Announcement as well as the General Announcement for more details about how to best utilize your membership here on the PC Week Corporate Buyers' Forum.

Primary Sysop: - Joe Salemi [72631,23]
Assistant Sysop: - Becky J Campbell [72241,433]

Press <CR> I

His BBS has some interesting personalities online.

Being a FIDO site, LiveWire BBS has feeds of conference messages from other BBSs around the world (though mainly from Hong Kong, Singapore and nearby areas).

Lots of shareware files are available online, and there is a provision for international mail (though slightly expensive).

WIPRONET, BANGALORE WiproNet is the communication system of Wipro Systems Ltd. Another CyberNet site, it can, at the moment, be reached only via INET at NUA 38120203501.

WiproNet is basically for Wipro Communications, but V Senthil Kumar, the drive behind WiproNet, has told me that it will shortly be opened up to Wipro customers, too. Check with your nearest Wipro office for details.

An Online Session

Welcome to PC Week Forum+, V. 3A(131)

Forum messages: 54089 to 55439

News Flash:

ANNOUNCEMENTS (08/28/93):

LOTUS/BORLAND OPINION: Judge Keeton has issued his opinion on the "macros" portion of the Lotus/Borland lawsuit. You can download the opinion text as LOTUS8.ZIP from Library 10/Hot News!

ADOBE ACROBAT READER EVENTS: ZiffNet is proud to announce a series of special events regarding the new Adobe Acrobat Reader. Check out Message # 54829 in Section 1/General Info for more details.

QUOTE OF THE WEEK: from the pages of PC Week... "It's close to bait and switch. I called about a Blue Lightning PC, but they wanted me to take a [486DX2-based system] that is \$300 more." - Don Chapman, a PC manager for a major insurance company, referring to shipping delays on products from IBM's Ambra subsidiary

THIS WEEK'S TOP STORIES IN PC WEEK!

- 1 First Look: Ambra Speed Disappoints (Reviews/Labs)
- 2 Borland Ships Quattro Pro 5.0 (Software)
- 3 Chicago Nears Beta Testing (Software & Tools)
- 4 IBM Prepares New 486 Microcode for PowerPC (Business)
- 5 CompuServe Allows Users to Tap Global Messaging (Databases)
- 6 Ambra Buyers Bugged Down by Backlog Blues (Hardware)
- 7 First Look: Symantec Utility Shows Promise (Reviews/Labs)
- 8 System 7 Upgrade to Integrate AOCE and More (Software & Tools)
- 9 Novell Reorganizes, Reports Q3 Loss (Business)
- 10 OBEX Workgroup Engine Drives Quattro Pro, Paradox (Databases)
- 11 Beta Sight: MS-DOS 6.2 (Reviews/Labs)
- 12 Lotus Readies Phone and Video Access for Notes (Databases)
- 13 PowerPCs Head for Developers (Hardware)
- 14 Symantec Bolsters Q&A Database (Software)
- 15 MS Missive Brings Tears to Spencer's Eyes (Rumor Central)
- 16 IBM Looks to Shiva for Remote Links (Networking)
- 17 Symantec on Prowl Again (Software)
- 18 Intel Spec Boosts Digital Video (Hardware)
- 19 VESA Plan Combines Graphics and Video (Hardware)
- 20 Borland Still Has to Make Tough Choices (This PC Week)
- 21 MS Plan for Cross-Platform Tools Gets Wings (Software & Tools)
- 22 The Week in Review (News)
- 23 Microsoft To Lift Curtain on Workgroup Templates (Software)
- 24 ATM Leads Internetworking Binge at Interop (Networking)

A WORD ABOUT PRESS RELEASES: Unless you want to leave a press release specifically for the PC Week editors and writers, please post on

Online support is available for all Wipro and Borland products.

CIX, BANGALORE My own BBS. An unwritten rule between PCQ and me stops me from hawking my own wares through my columns, but this time PKR asked for it :-).

CiX (The Constellation Information Exchange) is the home of CyberNet, India's first BBS software, and it is also the first BBS to come up in India (we have users and messages dating back to 1989!) It can be reached at 080-341137, and also uses the same kind of voice/data detector as ECTCnet, and is online 24 hours a day.

With more than 250 users having accounts on CiX, it is also by far the largest of its kind in India.

Dozens of forums and libraries hold more than 40 mega-

bytes of shareware programs, and hundreds of messages in the various aspects of computing and non-computing topics. There is even a HAM Radio forum!

The PC Week news are online every Saturday, so you don't have to call CompuServe for them.

Many companies can be contacted on CiX, including KnoxWare, NashSoft, A.R.B. Constellation, WireTalk, MultiTech and others.

And before you ask you *cannot* find the latest Atul Chitnis article online. For this, you *have* to buy the latest PCQ.

ATUL CHITNIS is MD, ARB Constellation, Bangalore, and can be reached via e-mail at 70620-563 @ COM-PUSERVE.COM, via his BBS at 080-341137, or C/o The Editor, PCQ.

On CompuServe

upload all press release to the News Desk section of the ZiffNet EXECUTIVE forum (GO ZNT:EXEC). Thanks!

SUBSCRIPTION QUESTIONS OR PROBLEMS?: Call our circulation department at (609) 461-2100. (Sorry, but that's where all subscription issues are best resolved.)

Sysops: Joe Salemi [72631,23] (Primary)
Becky Campbell [72241,433]

PC Week Forum+ Menu

- 1 INSTRUCTIONS
- 2 MESSAGES
- 3 LIBRARIES (Files)
- 4 CONFERENCING (0 participating)
- 5 ANNOUNCEMENTS from sysop
- 6 MEMBER directory
- 7 OPTIONS for this forum
- 8 JOIN this forum

Enter choice 13
Non-members cannot access this feature.
Do you wish to join (Y or N)? y

Please enter your name: PCQ

PCQ
Is this correct (Y or N)? y
Inserting name and ID...

Thank You For Joining PC Week Forum!

Press <CR>!

PC Week Forum+ Libraries Menu

- 1 General Help
- 2 Benchmark/Perform
- 3 Spencer's Attic
- 4 Buyer's Guides
- 5 Shoot-outs
- 8 Management
- 10 Hot News
- 13 SCADA

Enter choice 110

One moment please...

PC News, Reference ZNT:PCW-1

- 1 Newsbytes - Updated Daily
- 2 This Week's Top Stories (FREE)
- 3 This Week from PC Week (FREE)
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- 6 Kermit
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NO CARRIER

The Capital's Bulletin Boards

Like Bombay and Bangalore, Delhi, too is seeing its share of BBSes crop up.

After various features on the subject, especially Atul Chitnis' *Conversations*, PCQ was inundated with requests for information on bulletin board systems (BBSes), how to access them, what they offer, how to set one up, how to make it fly. Here, then, is the dope. I'll take a look at the three most popular BBSes in Delhi, and give some info on how to set up your own BBS.

DelhiCom (6872392)

This is the most software and people oriented BBS here. It's run by Dana Smith and Ron Prough, two elusive figures few of us regular BBSers have had a chance to meet face to face. But what they lack in visibility they make up for by their devotion of time and effort to the BBS. DelhiCom has the largest and most interesting file library of all the BBSes in Delhi, the most convenient BBS program, the best phone line, the most helpful sysops, the highest uptime, and, strangely enough, it runs on the least sophisticated hardware, a 286 at last login.

DelhiCom is the first with the latest versions of McAfee Scan, the first with the neat shareware games like *Wolfstein 3-D*, it's full of interesting windows programs and simply *hundreds* of icons for the avid windows user. Dana Smith claims to have 1 GB of shareware available to BBSers, and though most of it is offline, BBSers need only ask for something to be hunted out from the tapes and disks and put

on the board. More often than not, it'll be up soon after the request is made.

The board has file exchange areas for games, utilities, music and windows, besides a 'free-trade zone' for shareware swapping, a stock-exchange area where a BBS member regularly posts useful tips and general info about stock trends, a gaming area for online games, an advertisement area, and a UNIX forum.

There's also private e-mail between

users and a lively discussion area full of discussions about everything from TrailBlazer modems and QEMM to the bulls and bears of the stock market watchers. Although an air of American management skills pervades the board, what with Dana's effusive welcome messages to new users and tips on the best discotheques and eating places in Delhi, and the overly oriental welcome screen (yes, with elephant heads), one user was skeptical about the sysops'

DELHICOM BBS

Dana E. Smith, SysOp
Ron Prough, Co-SysOp

300/1200/2400 baud
MNP and V.42 support
24 hrs, 7 days/week
Settings: 8,N,1 ANSI

Checking for new mail addressed to you...
No new mail addressed to you found.

The most software and people oriented BBS in Delhi; DelhiCom tops in its file library, BBS program convenience, helpful sysops, and uptime.

Your Own BBS

The first thing to do when considering setting up your own BBS is reconsider. Then consider once again. In addition to the three BBSes I've talked about here, there are at least two more in Delhi that cater to special audiences. One has tender and stock information, and the other, run by Divya Mahajan, has tools and information for programmers. In addition there's a radio-BBS that you access using packet radio. And this in Delhi alone. Numerous BBSes prosper in other cities. Time was, there were as many BBSes as BBSers in Delhi.

So first consider if your BBS is needed. Sure it might sound like a glamorous affair, but a BBS sysop's job is a thankless one. He must be prepared to sacrifice part of his machine, lots of hard-disk space, and use of his telephone line for at least part of the day.

Now that I've warned you, let's get down to the nitty-gritty. The essential ingredients are a PC, a modem, a phone line, hard disk space, some interesting files to start with, and a BBS program. Consider using at least a 386 class machine for the BBS so you can use the machine at the same time as the BBS is running (by running the BBS under Windows). Get a modem with built-in error correction and compression (MNP-5 or V.42bis) because nobody is going to log in to a BBS that doesn't provide these protocols. Spring for a high-

speed modem if at all possible.

If you plan to use the same phone line for voice-calls also, get a fax-phone switch, or a modem that has one built-in. BBS lines should be clear and if yours is known to have a problem, install a noise filter on it and pester the phone company to do something about the line quality. Finally set aside a goodish amount of hard disk space for BBS use (at least 40 MB, for mail messages, forum postings, and file libraries), and dig out all the files you think would be of interest to others and transfer them there.

One very good reason to start a BBS would be if you had lots of information on a particular topic that you would like to share. This information is probably already on your disk, so it takes little extra disk space to make it part of the BBS. This is why Divya started his BBS—he has so much programmers' information on his hard disk, he figured he might as well make it available to others too.

Now comes the hard part, choosing a BBS program. Let's assume you want to stick to shareware. The easiest and most practical thing to do would be to pick up a copy of Quick BBS (which is what DelhiCom and Divya's BBS work on) and set it up in a jiffy. QBBS is shareware, provides neat features like type-ahead and doors, is easy to set up, and takes very little disk space. Another quick and easy option, though slightly dirtier, is to simply use the 'host-

mode' capability of Procomm-Plus or a shareware comm program like Telix to serve as a BBS. This is very convenient, and a great idea for small, specific bbses, though it lacks the flexibility needed in a full BBS.

Another tiny BBS program is Mini-Host which will run on an XT, but requires the external utility, DSZ, for its file transfer protocols. TBBS is another very neat BBS program that can be used over multiple lines without an external multitasker like Windows or DesqView.

For corporate applications, there's Cybernet, which is full featured and has built-in Zmodem support, as well as CompuServe-style navigation commands. For other special needs, such as connecting a BBS to fidonet, look for a fidonet-compatible BBS, or for the original fido BBS program, which used to be shareware but is now a commercial product. For those who need to use UUCP on a DOS machine, there's a shareware BBS program called Waffle.

If you need added sophistication, pick up a review of BBSes from the Internet, or a copy of BoardWatch magazine, which has in-depth reviews of current offerings. And talk to people on the BBSes in your local area, you'll be surprised by how much free consultancy you can get, and amazed at the friendliness and technical savvy of the BBSer community!

AG

identities, which recently led to a bit of a discussion in BBSer circles.

And so it went. We also seem to have a pretty perennial discussion about organizing a BBS users get-together, though DelhiCom is such a friendly place that BBSers appear to have more fun online than they could possibly have over cocktails and dinner!

ECTC Net (11-6845520)

Call ECTC during BBS hours and you'll hear the sickly sweet voice of some vocalist greet you with a polite 'Hello' that regular BBSers have grown to simultaneously loathe and love. Don't

hang up, though, that's just the fax-phone switch. If you call outside BBS hours, however, you're liable to get a slightly irritated Kishore Bhargava (the sysop) or his wife, Jyoti, who'll tell you that BBS hours are 10 am to 6 pm, and then 10 pm to 2 pm. On most days they're friendly enough, however, and will chat nicely with all these strangers who keep calling them :-).

ECTC Net runs an Indian package called Cybernet, written by Atul Chitnis and ARB Constellation. Atul, a PCQ columnist, hosts his own Cybernet-based BBS in Bangalore (80-341137), which also includes a PCQ forum. The

ECTC BBS is known for the regular semi-serious wars they inadvertently host. First it was Windows vs the Mac. The full contents of that series is now available for download on ECTC, and some of us are pestering the sysop to release them on CD-ROM! Excerpt: **MAC-HATER:** "Think of the completely brain-dead docs one gets with Macs and other Apple products, obsessively dumbed down to the point where only a wimp could bear to read 'em. For example, this is an actual quote from Apple's LaserWriter manual: *Do not expose your LaserWriter to open fire or flame!*"

"You know what they say about Mac users? Left to their own devices they would be /dev/null."

PC-HATER: "IBM: Inferior But Marketable; It's Better Manually; It's Been Malfunctioning; Incontinent Bowel Movement; Incredibly Bogus Machines."

MAC-HATER: "How many Mac users does it take to change a light bulb? Answer: You can't change the light bulb—you have to change the whole motherboard."

The above sample is simply tomfoolery, though much of that discussion was very technical and brought out some interesting points. ECTC users are bored with IBM-bashing and Apple-bashing now, and a new (only a few weeks old) battle rages between the UNIX weenies and the DOS babes. So far this discussion's been fairly technical:

DOSBABE: "[NT has the features needed in] operating systems of the future, like C2 security rating (the highest rating any Unix version got was B2)."

UNIX WEENIE: "B2 is higher security than C2."

DOSBABE: "The hardware independence of NT through its HAL layers makes it possible, in theory, to port NT to even supercomputers. Of course I wouldn't

bet on that happening."

UNIX WEENIE: "UNIX already is running on 8088s, 80286s, 80386s, Macs, VAXes, Cybers, SUNs, Amigas, TRS-80s, PDPs, Crays, Connection machines,

HPs, and everything in between."

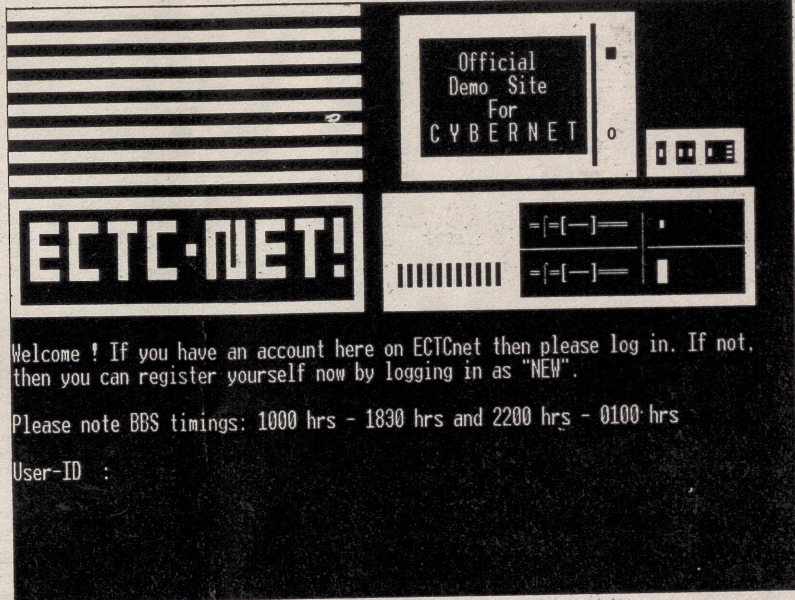
UNIX WEENIE: "So how do you say UNIX uses OT (old technology)? The GNU utilities are leading-edge technology (the GNU finger server has the capability to display a photograph of a person you finger!), the Mach microkernel is leading-edge technology, the QNX real-time OS is leading-edge technology, NeXTStep's Display PostScript is leading-edge technology. NeXTStep's OO Desktop is leading-edge technology. Remote procedure call is leading-technology."

"Don't talk to me about New Technology. Microsoft might have thought it was new when they started NT, but times have changed since then :-)."

ECTC also carries PC Week online news, though of late the sysop has been slacking off in this direction. The file libraries, though nowhere near as full as those of DelhiCom, do contain interesting files, and an article section has everything from ANSI graphics masterpieces to a detailed explanation of how to shoot yourself in the foot using various computer languages.

Skynet (7528036, 7527985)

While the DelhiCom and ECTC may sound like homely and comfortable



Running the Indian package Cybernet, the ECTC BBS hosts Mac-PC and other semi-serious wars, and has online news and various file libraries.

#	Name	Number	Speed
1	Skynet Gold (2400 bps)	7528036	2400
2	Skynet Gold (2400 bps)	7527985	2400

Info SetUp **Connect** Exit

Skynet runs on a dedicated UNIX 386—with a graphical interface that runs in client/server mode when you log in.

places, Skynet is sophistication itself. DelhiCom and ECTC run on DOS machines that are used for other tasks too. Skynet runs on a dedicated UNIX 386.

What's more, Skynet provides a graphical interface that runs in client/server mode when you log in. If this were a review I would say that DelhiCom and ECTC have no minimum system requirements, but that Skynet needs an EGA, VGA or hercules display for the GUI, but can be accessed in text mode too. Skynet is also the only BBS in Delhi with two phone lines, though one was out of order for ages. It's also the only BBS accessible via I-Net from other cities. This makes it practical for multiuser conferencing and real-time interactive gaming.

Skynet's discussion level matches its sophistication. You'll find a lot less aimless (though pleasant) banter here. Users at Skynet tend to ask technical questions about the Internet, CompuServe, and other online services, discuss industry happenings, and generally talk less than their counterparts

on other BBSes. This is quite amazing, considering that the same users patronize all three BBSes!

Skynet's GUI is a treat to eyes accustomed to the terrible ANSI graphics of most BBSes. You navigate with the mouse, you can use headlines in various fonts for mail, even send little smiley cartoons and music with mail and postings, and view PCX images online. Skynet is soon upgrading to a newer version of the software that will even let you view the photograph of any other user on the system. Skynet is the only one of the BBSes that offers multiuser chat areas, which are ideal for conferencing, and the sysop, Sanjay Jain, has made numerous attempts to set up multiuser gaming, which we may therefore look forward to in the near future.

Skynet can be rightly said to have its main attraction in features and not people. Already a UNIX-based GUI system with two lines and I-Net connectivity, it's also introducing Internet mail soon. Its file libraries are stuffed

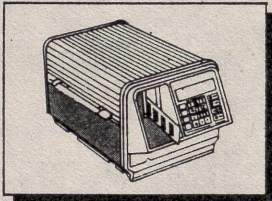
with programmers' tools, information, great graphics software, ports of UNIX utilities to DOS, and perhaps most importantly, the full distribution of the LINUX operating system, which is a freely distributable UNIX clone (see PCQ September). So Skynet is mentioned in the internationally distributed list of 'LINUX BBSes' available on the Internet. Skynet also provides PC-Week online news.

Hit DelhiCom and ECTC for fun, and login to Skynet when there's something serious afoot. All three BBSes I have talked about here are free, for the time being, though all the sysops are considering charging some nominal amount for upkeep and maintenance costs, especially as they begin to consider giving users mail, news or other such goodies.

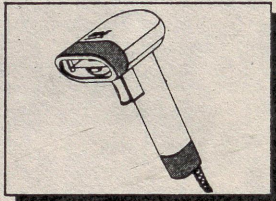
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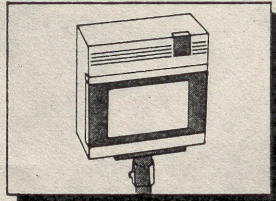
MONARCH THERMAL PRINTER 9402



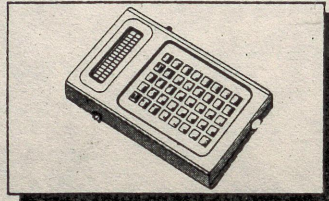
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INTERFACE/GE1/79/93



I got a call this morning. All the way from Bombay. The caller had an interesting query—what's CompuServe's Bombay phone number?

Oh, oh.

Many moons ago I wrote a full article on CompuServe. I never had so many responses to anything I wrote in my life before! Not even after that unfortunate incident I had with a cheque I once issued without checking my bank balance....

But the call gave me reason to think—CompuServe seems to be on the Indian PC user's mind. Am I to blame for that? Yes? What a nice feeling!

Anyway, I went back and dug up that issue (the one I'd had to steal from the PCQ guys around here, because I couldn't get a copy on the newsstands), and re-read what I wrote in those days.

It was woefully inadequate. Surprising that you dear people still read my column. Okay, let me make amends—here's the inside dope on how to get to CompuServe.

"YOU HAVE MAIL"

Every time I log into CompuServe, I have this warm feeling washing over me. It's like coming home. The sight of the "You have Electronic Mail waiting" notice is like seeing my dog sitting on the doorstep wagging its tail seeing me approach. And, on entering the various forums I frequent, being greeted by "11 messages waiting for you" feels like my daughter running down the garden path, arms outstretched, yelling "Papa!"

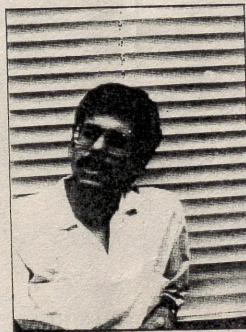
Not for nothing is CompuServe "the biggest communication service in the universe (unless proven otherwise)". With almost a million people frequenting it, it is the world's biggest meeting place. And it is just a phone call away.

It is surprising how easy it is to meet people on CompuServe. An innocent query in a forum, and you get responses from all over the world, from people who want to help you, who want to know you, who want to interact with you...

I have made it a habit of signing my name as "Atul Chitnis [India]" in forums. That country tag is almost certain to get me responses—simply because people can't be-

Getting Into CompuServe

Here's the real low-down on how to get a CompuServe account



Atul Chitnis is a communications software developer who heads ARB Constellation, Bangalore. You can write to him at 70620.563@compuserve.com or via his BBS (080-3341137).

lieve that I am calling from India (where people supposedly still live in caves and use smoke signals to communicate).

It also helps in business—especially since India's markets are opening up, and there are plenty of people out there who want to do business with our motherland, but were scared by the lack of communication facilities. The fact that I am able to communicate via CompuServe gives them hope.

Yes, CompuServe is a modemer's paradise.

GETTING TO COMPUSERVE

There are three steps you must take to get to CompuServe.

- You HAVE to have a modem, a phone line and a PC.
- You have to have a line of communication to CompuServe.
- You have to get a CompuServe account.

You'll need a PC (or Mac), a phone, and a **modem**. The first two are usually already in place (else you wouldn't bother reading this article).

The third part is important, because this is where most people goof up.

Buy a *good* modem (not a cheap Taiwanese "deal"). The better the modem, the better the returns. Make sure it has error correction (MNP/V.42), and make sure it is fast.

If you haven't bought a modem yet, but are about to do so, do not buy a 2,400 bps modem. Those old clunkers are outmoded and will be history in a year or so. Buy a 14,400 bps, V.32bis modem.

Don't buy an internal modem—they are cheaper, but much more trouble.

Do make sure that your PC's serial port has a 16550AF UART chip—without it, you cannot communicate at high speeds.

Do *not* buy/acquire/steal an imported modem—believe me, you'll be sorry (unless, of course, the modem is made by a very reputed manufacturer such as Hayes, MultiTech, Motorola, US Robotics, Supra or AT&T—but remember, the Indian P&T may not allow you to use an imported modem).

Don't judge the modem's quality by the fact that "it sends faxes just fine". Sending a

CONVERSATIONS: ATUL CHITNIS

fax is no test—it hardly strains the modem.

CONNECTING TO COMPUSERVE

There are a number of ways to connect. Some are expensive, some are more expensive, some are crazily expensive.

The cheapest way is retiring to the Himalayas and establishing contact via meditation. But that has been known to fail, so don't bank on this option.

A more reliable (but also more expensive) way is calling CompuServe directly with an ISD call to the USA. One of the 14,400 bps numbers is **001-614-7642917**. Remember that the tariff is one pulse a second, equal to one local call per second.

Cheaper than a call to the USA is calling the CompuServe node at Hong Kong. Since HK is a SAARC country, the tariff is one pulse every 1.2 seconds. The number is 00852-3041332. The number takes both 9,600 and 2,400 bps calls.

Cheapest (relatively) is INET (provided you use it wisely). To get an INET account, contact your local Telecom office. It costs Rs 1,820 for registration—what you need is a X.28 dial-up account. INET will not give you an account unless you are using a modem cleared for use in India by the DoT—another reason for buying from within India.

INET is now available in 89 cities in India. INET usage charges are Rs 200/64kb of data, plus Rs.4 per minute.

Once you have your INET account, connect to the local INET node using your PC and modem.

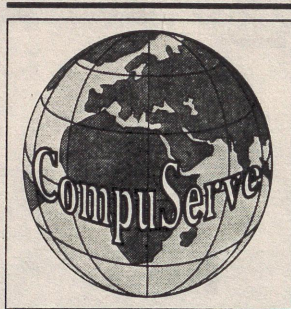
When you get to the "*" prompt, type "Npppppp,uuuuu-03132", where "pppppp" is your INET account's password, and "uuuuu" is your INET account number.

In a few seconds, you'll see the word COM on your screen, and a few seconds later you'll be prompted for a host name—enter "CIS". Next you will be asked for your CompuServe User ID and password—enter them and you are on.

But we're getting ahead of ourselves. Let's first of all get ourselves an account.

GETTING A COMPUSERVE ACCOUNT

Actually it is very easy getting a CompuServe account—you can register online. But there is a fatal hitch—CompuServe will only let you register if you have a credit card (VISA/MasterCard/AmericanExpress)



valid in the US. This rules out your local credit card—the RBI rules forbid it, except for rare exceptions (such as when you are a registered, \$\$\$-earning exporter).

So how do you get around this?

One way is to ask your contact abroad to open the account for you, based on his/her credit card, and give you the user ID and password. You'll have to come to some arrangement to pay back the money. If your contact abroad has difficulties getting an account, ask him to call CompuServe's service center (voice) at 1-800-8488990. Or you can call them from India at 001-614-4578650. The service center will give you all the help you need.

Another way is to ask someone abroad for the use of his/her credit card number. You'll also need the date of expiry and the bank on which it is drawn. This can work only if your contact trusts you completely (son/daughter studying/working abroad, relative, very good friend). Then you can use that credit card number to register online.

Connect to CompuServe using one of the ways mentioned above. When the connection to CompuServe is established, enter "177000,5000" as User ID and "PC*MAGNET" at the password prompt. When asked for the agreement number, enter "Z11D9200". (This may have changed, check a recent copy of PC Magazine). Enter the information that will be asked for (including the credit card number).

Once you have registered, you'll be issued a user ID, but not a password. The password will be sent to you by post after about 10 days, after CompuServe has verified the credit card information. Once you get your password, go online and change it immediately (GO PASSWORD).

At the end of all this, you will have a valid CompuServe account. Congratulations. Sit back and have a Thumbs Up (while it is still available). But don't call CompuServe. You aren't ready for it yet.

USING COMPUSERVE EFFECTIVELY

Before you call CompuServe, sit down and think. Communication of any form can be expensive, especially in India, unless you do it right. Standard CompuServe rates are \$12.80 per hour at 2,400 bps, \$24 at 9,600/14,400 bps. If you use only e-mail and some selected services, then these rates are \$8.95/\$16.00 per month, but it is easy to go outside these selected areas.

Go out, get your hands on all the 1993 PCQ issues you can find. Read my past articles. I have spent a good part of the year

I know consultants with "extensive CompuServe experience" who have just about seen an acquaintance log in once

CONVERSATIONS: ATUL CHITNIS

writing about effective communication methods, so hone up on them. While you are at it, get a PCQ subscription so that you don't miss out on anything in the future.

Get a copy of OzCIS 2.x. It's the world's best CompuServe automation program. OzCIS 2.x is shareware, but you can download it only from CompuServe (GO CIS:OZCIS) or get it from a friend. BBSs (including mine) cannot offer OzCIS 2.0 or later because the author, Steve Sneed, does not permit it.

OzCIS saves me thousands of dollars a year, because it accepts all input from me before calling CompuServe, then goes online and rips through all requested actions and logs off, allowing me to peruse the results offline. You'll need a special script to use it with INET—you can pick it up from my BBS in the PCQ forum (filename OZINET2.ZIP).

GETTING HELP

Once online to CompuServe, the best place to ask questions about CompuServe is in the Practice forum (GO CIS:PRACTICE). This area is free of CompuServe charges (but you will still be paying for communication costs).

Ask your questions, and you are sure to get answers. Just remember the following golden rules when posting a message:

- Do not send a message that is ALL CAPITAL LETTERS. This is considered rude and may get you banned off the area.
- Be brief and to the point. State your question in a couple of sentences. Long messages are frowned upon.
- Don't send unsolicited messages to anyone using e-mail. You usually will make friends with people in the forums, then can carry on your relationship with them using e-mail if they indicate that this is desirable.

There are various other modes of help.

The best way to learn about CompuServe is to pick the brains of a friend who has a CompuServe account.

There are also consultants who can help you (yup, guys like me), but as it is their profession, they'll charge you for it. Depending on how good the guy is, a consultant can quickly get you up to speed. Make sure that he has a CompuServe account himself and verify this on CompuServe by checking the membership directory (GO CIS:DIRECTORY) for his name. I know a number of comen who say that they have "extensive CompuServe experience" after having seen a distant acquaintance log in once, and who'll gladly take you for a ride at your expense.

And never divulge your INET or

OzCIS saves me thousands of dollars a year. It accepts all input from me before calling CompuServe, then goes online and rips through all requested actions and logs off

CompuServe passwords to anyone, even your friends. Always type them in yourself when needed. A "shady" friend/consultant will show his true nature when he asks you for the password instead of asking you to type in the passwords yourself.

As a CompuServe member, you will also receive a free subscription of the CompuServe Magazine, an invaluable resource.

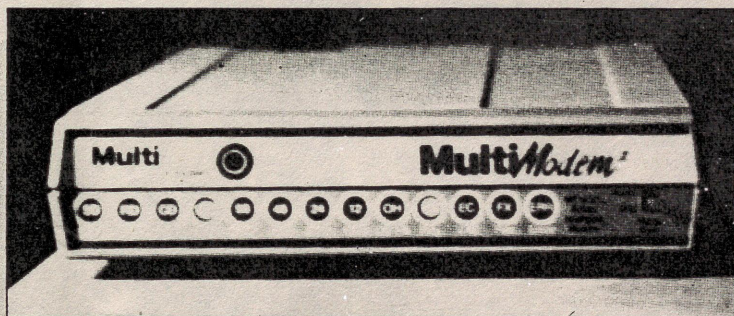
Become a member of a BBS near you. Many CompuServe members also frequent BBSs, and you could ask them.

And finally, explore CompuServe online (carefully). Make sure that you have your capture/log file open, so that you can read everything that happened later when you are offline. Do not spend time online reading what appears on the screen.

LOGOUT

This article completes one year of my writing for *PC Quest*. I hope that, in a small way, I have helped my readers get into computer communications. Later this year, I will be changing the scope of this column a bit to address a number of specific issues that have come up during the past year.

To all my readers, a very happy new year. See you on the other side. ▣



Buying A New Modem?

DON'T

- buy a 2,400 bps modem. It's nearly history, and will prove expensive for you in phone bills.
- buy an internal card modem, or a modem without error correction.
- import, unless the modem maker is very reputed (Hayes, et al).
- judge its quality by testing out its fax capability. That's no test.

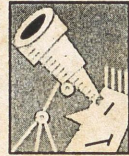
DO

- buy a 9,600/14,400 (V.32bis) modem.
- make sure it is an external modem with MNP/V.42 error-correction.
- make sure your modem (especially if you're importing) is TEC type-approved.
- test it out when sending files at its maximum speed on phone lines, not on the internal lines at the dealer's showroom.

COMMUNICATION WATCH

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Communication watch



Between dreams and reality

by Professor David Sless

In December 1993 the Federal Government set up a Broadband Services Expert Group to 'examine the technical, economic and commercial preconditions for the widespread delivery of broadband services to homes, businesses and schools in Australia'. Put simply, the government wants advice on what, if anything, it should do about the so-called information superhighway. All the people appointed to the Expert Group (see list at the end), with the possible exception of Dr Patricia Gillard, have a strong vested interest in the sale and control of information technology. It is not clear why the government should have appointed so many obviously partisan members to an Expert Group.

The Group have produced an interim report and asked for public comment. This review is an open commentary on the report in the form of a letter to the Group.

Many of the arguments in this letter are based on studies conducted by our Institute over the last ten years. I give a brief bibliography at the end.

Dear Expert Group,

Although your terms of reference are predominantly concerned with technical and economic issues, there is a refreshing emphasis in your report on the social and cultural issues. This is welcome and partially compensates for the absence of detailed economic evidence in your report. In fact, your report is remarkably free of evidence or knowledge of the research and history of the field. But what you lack in evidence or knowledge, you make up for in enthusiasm for technology and for the creative potential of our society. This latter enthusiasm is particularly important and I will say more about it later. But I would like to temper your enthusiasm for technology with some realism and a few facts.

I want to contrast the technophilia in your report with the technofailure of its delivery. There is such a wide gap between, on the one hand your enthusiastic canvassing

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Mentioning such soul luminaries as Booker T. Jones and blues send-uppers Rolling Stones and Down Under dope New York City's Surgery sutures together psycho R&B in the same manner with which I'm sure they empty a bong into a hell of a lot of racks.

Mechanical engineer/guitarist Scott Kleber Sean McDonnell (vocals/guitar), John LaChapelle (bass) and Surgery in Syracuse in 1987. They released some surf then Amphetamine Reptile before their recent signing to Shimmer, their latest full-length and Atlantic bow. Considering signing us, and we really wanted to do an album. Explains: "We wanted to do an album that was a little bit more of a hit—but that's not what we wanted. Released in April, Shimmer's instruments with the same relentless slow tempo slide-guitar rambblings and bare bones rap title cut. While At

which McDonnell points out will follow the example of Hendrix as a gatefold and will therefore be great for

"I was sort of wary of signing, you know," McDonnell just made the same record we would've done on any other or indie. The Atlantic people were really mellow; they like a record' and left us alone. We figured they must've ice they'd put out AC/DC and Zeppelin, and they'd disfigure the Rolling Stones and Stax/Volt stuff. Plus, the vice president sounded like the Allman Brothers on speed."

Touring down through the Midwest from NYC to warm up" at South By Southwest, will lead Surgery in tour this summer, beginning with a festival McDonnell brought 'Let's Get A Bunch Of Tired Old Bands To Play The Big Good Bands Play The Small One.' "We'd really like to do it," he says, "so we're trying to get hooked up with them. I might just go out with this really cool rap band called

"I'm for Tonya, man just because she's total trailer trash. I would've been into Tonya winning the office, set into a little drug habit and ending up on the street."

off the Tonya trailer trash ending up ethics and Kerrigan. for the al loud: "Dr. We're h



continued from page 1

of a potential information future based on new untried technology and, on the other hand your incapacity to deliver information with the old technology of print, that I cannot resist pointing out the difference between your future dreams and present realities.

Access to your information

Because of my interest in social and policy research in communication, I knew your report was coming. I wonder though how many others in Australia knew, or cared? I also knew it was coming because someone from the Department had rung me and asked if our Institute would edit the report and turn it into 'plain English'. We declined because we have an interest in the subject matter, but the irony of the request coming from an 'expert' group in communications did not escape us.

Getting hold of a copy of your report was a challenge—an example of the difficulties of accessing information in today's information society.

The day after its release, I read press reports covering the Minister's launch. Most of them simply quoted the press release of the Minister's speech. None told me where I could get a copy. Being in Sydney, I made a special trip to the Government Bookshop in Kent Street. After stumbling over the title ("something to do with broadband, information superhighways?") the man behind the counter—obviously not dealing with the first inquiry of the day on this subject—told me that they didn't have it. "But it's a government report and

this is the government bookshop", I protested. "Can't you get a copy for me?". No. I would have to get it from the Department of Communication and Arts in Canberra. He thumbed a well-worn book and wrote down on a scrap of paper a Canberra phone number. Luckily I was back in Canberra next day so I could make a local call. The person who answered was quite surprised and dismissive of the fact that I should have even thought of going to the Government Bookshop to get this report. After further words, he took my address and a copy arrived by post the next day.

I am telling you this story so that you have an understanding of what it means to access government information today. If you don't know where to look, you don't find things. This is a fundamental principle behind any access system. I would therefore question your claim that:

Many government and community services can be more effectively and cost-effectively delivered through [Broadband] communication services. (p23)

The broadband system may be cheaper (though you offer no data to support this claim) but I doubt that it will be more effective from the point of view of an inquiring citizen. Moreover, the only area of saving I can see is that the job of the person-behind-the-counter will go. And remember, it was a person-behind-the-counter who navigated me towards the information. The problem is not technology, but the potholes and hazards along our present information dirt track created by bureaucratic

insensitivity to the needs of citizens, which is unlikely to be improved by technology.

How can I believe in your future visions of distribution and access to government information using new technology along a superhighway when you cannot effectively manage my access with today's? How much effort is it going to cost me to travel along the superhighway to find the government report I want, without an essential person-behind-the-counter to help me?

Your information interface metaphor

Reading your report was a challenge and only made sense when I began to treat the design of the book as a metaphor for the content.

Why did you print it on glossy paper? As I sit at my desk writing this review whole areas of each page are invisible under my desk light. Like the future you talk about, your report is glossy but hard to read.

Why do you so often disrupt the flow of text? For example, the bottom of page 19 continues on page 21 without warning or reason. Page 20 is a self-contained section. This is no doubt a mono-medium foretaste of a multi-media experience.

Why did you use such long line lengths for the text, with over 100 characters per line? One has to concentrate very hard to keep going along such long lines of text. Perhaps this is because the future is long on lines but short on content.

Why are the list of submissions in a seeming random order? I could

discern no meaningful order, and my attempts to find out whether certain bodies had made submissions took a lot longer than it would have if you had listed them alphabetically. This is no doubt a foretaste of the fractal postmodern chaos awaiting us in cyberspace.

And why is there no index? I use an index to find my way to interesting places in a document. I was denied this pleasure. Perhaps this is what it will be like to navigate on the super-highway.

My general point is a simple one. In a relatively straightforward government report, you are unable to effectively control and use an information technology which is over 500 years old. Moreover, even though many techniques and conventions of good print design are known they are still flouted, in this document as in so many others, particularly when constraints of time and budget intervene. (In this case, with glossy two colour printing, budget was obviously not a constraint.)

However, you are proposing a future in which badly designed text will be augmented by video, sound, and heaven knows what, for which many of the techniques and conventions of good design are undeveloped, and are anyway much more time-consuming and expensive to apply. And yet you are asking me to believe that this will be an improvement? It could only be as good as or better than existing technology if the information design methods used were appropriate. But as you seem unaware of the need for these methods in your present work, how confident can I be that

you will take account of them in your proposals for our future?

PR pastiche

Your report reads like a pastiche of public relations clippings emanating from the IT industry. Even the general public—saturated with the breathless enthusiasm of TV Technophilia of programs such as *Hot Chips* or *Towards 2000*—will probably find nothing new in this report. This is worrying.

However, far more worrying is your failure to use the history and research in the field. For example, you cite a Canadian study (p18) which identified 'Canadian sovereignty and cultural identity' as an objective, as if this were something new. Cultural identity has been a feature of all Canadian communication policy debates for the last 50 years, at least. Such remarks do little justice to the depth of Canadian thinking, research and public debate on this issue. Canada has not only produced the intellectual icons of Innis, McLuhan, Smythe and Wilden, who have informed much of our thinking on communication for decades, but has also developed a significant level of public debate and understanding through numerous government studies and enquiries. Why have you drawn so little on this rich material?

Your view of education is similarly uninformed by the research in the field. You claim that:

Broadband networks will enable educational institutions to support a more diverse range of curricula activity. Teachers and students would have access to a greatly

expanded range of educational material on the network, using high quality video and real time interactivity. (p23)

Richard Lowe, an Australian expert in multimedia research, has a different view.

...the manner in which the technology is being promoted often seems to imply that this [using it effectively] will not be a problem because multimedia of itself somehow overcomes the need for such [information design] expertise. Nothing could be further from the truth. Far from making it easier to develop effective communication, multimedia raise a vast array of previously unknown factors that must be taken into account in designing information for people...Unless an informed and critical approach is taken to these developments, what is currently being heralded as a communication solution will in time turn out to be a communication problem. (Lowe, 1992, pp 107-108)

Yet even when you comment on local initiatives and specialised services in such area as medicine, the gap between your PR-style gloss and the reality is worrying. I showed your glowing account of telemedicine in Whyalla to Michael Patkin, a senior surgeon at the Whyalla hospital, and a distinguished researcher and expert in ergonomics and information. He described your account as 'naive and misleading' among other things. The technology is not in Whyalla to bring specialist medicine from Adelaide to the out-back; the specialist services have been at Whyalla for 20 years and



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the specialists now use the technology to share their specialisations with other centers.

You cannot reduce the rich tapestry of life to a thin veneer of your own chosen colour. Your lack of attention to detailed histories, and to other critical issues informed by knowledge and research in the field, weakens your credibility as an Expert Group, and undermines the value of your report.

Creative infrastructure of understanding

The missing component which would lend some credibility to your enthusiasm might be found in your emphasis on the creative infrastructure—the environment conducive to the creation of content. This is a useful starting point. However, you will have a much more powerful analytic tool, encompassing many of the issues you neglect, if you place the creative infrastructure within a larger framework—what I have called our ‘infrastructure of understanding’ (Sless, 1985, 1986 & 1988a):

One of the most important discoveries of communication research is the centrality of understanding and the various ways in which we create and develop understanding. The principle tools we use in creating understanding are the varieties of languages that we have at our disposal. Language here is used in a wide sense to include all the varieties of ways in which we represent our world; this includes written and spoken languages, mathematics, drawing, film, music and so on. I have

referred elsewhere to this collective repertoire as our infrastructure of understanding (Sless, 1985 & 1986a). Without this infrastructure, the signals transported by our electronic infrastructure are a mass of useless pulsating gibberish. Moreover, our ability to turn the electronic gibberish into something of value depends crucially on our infrastructure of understanding.

The real national resource in the information age is not the machines of signal transportation but the communities of human understanding. Once we get beyond the point where our society is infatuated with the technology, once the various standards of data transfer are in place, once the mechanical functions previously done manually and tediously are done by machines, and once the technology itself becomes as commonplace and invisible as plumbing, then we will still be left with the same problems of human understanding. Greater signal carrying capacity will not of itself lead to better communication, only faster and bigger misunderstandings.

The society best able to cope will be the one that can draw on a wide range of resources for understanding. We are not talking about the dim distant future, we are talking about a time within the next ten years—a span well within the effective range of current policies in culture, education, the arts and sciences. If we weaken or do not strengthen our present resources, we will be very vulnerable when diversity of understanding becomes

the basis of social and economic prosperity. (Sless, 1988a)

The infrastructure of understanding, rather than the narrower creative infrastructure, would allow you to integrate the broad social, cultural and economic resources that you need to mobilise to turn your enthusiastic dream into a tangible reality. For creative writers to flourish with the information technology of print there had to be a community of literate readers. If you focus too much on the creative supply side (to use the economists term), you may miss the need to create the all-important community of users on the demand side.

You have identified one part of the infrastructure—one feature on the landscape. You need to think in terms of the entire environment—what James Carey has aptly named the social and symbolic ecology of the information society (Carey, 1993, p4).

Supply without demand

In our Institute’s last newsletter I bleakly speculated on what might happen to our fragile infrastructure of understanding if there was insufficient demand for broadband services (Sless, 1994). Your report does nothing to assure me that my speculations were wrong. If anything, I am more concerned. My speculations were based on ignorance. You are an Expert Group, yet you say:

One of the fundamental questions facing the Group is ‘what is the potential demand for broadband services in Australia?’.

...The Group has commissioned a study to look at the potential demand for broadband services...(p20)

How can you justify your present optimism in the face of a total absence of evidence? At the very least you should balance your enthusiasm with a full range of pessimistic scenarios and the consequent dangers.

You describe your report as:

a 'brief' to the community on the opportunities and challenges that lie ahead. Its purpose is to stimulate debate. (p1)

But how can we have a debate when you present us one side only?

In recent years, we have gone through a period in which economic ideology has held sway over government policy. Ten years ago, with Telecom still a 'natural' monopoly, the issue of supply and demand would have been tempered by community needs. But in our present climate, with total deregulation of the market looming in 1997, the laws of the market place—supply and demand—are the main variables in the equation. We have created a policy climate in which competition rather than government action is supposed to lead to public good.

Let us just suppose that your study and the one currently in progress at the Bureau of Transport and Communication Economics show that there is not sufficient evidence of future demand to pay for the necessary investment in building the superhighway. What then? Would you advocate renationalising

telecommunications so that the benefits you expect from the superhighway can happen anyway but subsidised by taxpayers?

You make a point throughout your report of advocating that government should be a 'leading edge user'. You rightly identify government as a significant user and provider of information. But you mistakenly see this as an instrumental function of government rather than a basic structural feature of government.

Government is the controlled exchange of information between citizen and state. If you move the site of this exchange and the control of the means of transmission, you move the site of government. For example, if we had electronic voting, who administers the process: government or telecommunications company? Who is running the voting system? Extend this into service delivery and other government functions and the boundary between government and telecommunications company becomes increasingly blurred.

In ten years' time the owners of the superhighway could well be the *de facto* governments of our society. Government may not be so much a leading edge user as a falling-over-the-edge victim. As the government is paying for your expertise, you might care to warn them of this possibility.

Markets distort information

One of the least acknowledged features of a market economy is that it has a particular distorting or shaping effect on information. The common economic wisdom is that a market

depends on the free availability of information. But markets shape information to their own ends.

Pyramid selling is a perfect example of the way in which false information about market expectations is used to create the appearance of a market. This information is used to recruit new people and their money where no market exists. Such practices are rife in the computer and multi-media software development market and give an impression of a large software developer community and hence a large user community. Look carefully: signs of economic activity are not always real.

Pornography is another example but of the opposite kind. Every new medium gains some of its initial penetration into the market (as it were) through pornography. Novels, photography, video, minitel and 0055 lines are all examples. Yet information on this trade is sometimes difficult to see and even more difficult to get hold of. What may look like the healthy start of a trade in 'information products' may turn out to be something else. The school children of the future may well go to the superhighway school on the back of the pornographer.

Be careful about the sources of information you use to judge the potential market. If you were running an inquiry into drug use, you would be very sceptical of advice coming from addicts, pushers and drug barons. If a drug addict told you there should be a ready supply piped into every home, you would at least be sceptical. Yet many submissions made to you have



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come from information junkies, their pushers and barons: people who are, in one way or another, addicted to information and trading in it. Not everyone shares this addiction or need. Consumers and citizens do not walk around with holes in their lives waiting for broadband services to arrive. Many today work far more hours than their parents did and develop ways of avoiding extra information services, not acquiring new ones. As our scrap paper mountains attest, there is a large trade in information disposal. The case for more is not clear.

This is not communication

The saddest thing about your report from my point of view is that it is all about communication, yet you have no sophisticated understanding of communication processes. You cite with some enthusiasm and agreement a remark made by someone in one of your workshops:

Interactive, communicative services are necessary to build a clever country. Being satisfied with one-way or distributive services is a recipe for the stupid country. (p9)

and you define interactive services as:

Services which allow the user to reply to and sometimes control the information source. (p95)

You must do better than this if you want to be taken seriously. Extrapolating from your view, reading a book, a newspaper, or your report is a stupid activity, yet shopping from home on impulse without looking at the goods is clever. Even if we take what is said

to be the most obviously passive medium, TV, against which this charge of 'stupidity' is implicitly levelled, what does the Expert Group make of the last twenty years of research which shows that TV watchers are an active and lively audience?

Your definition of interactivity seems to offer me nothing that I don't already have. I can pick up the phone, write a letter and sometimes get things changed, such as writing this letter to change your final report. I can also sit down at my ever-so-sophisticated interactive computer and play mindless games.

Your report misses the point. Communication is something that goes on between people whether mediated through technology or face-to-face; it is the process by which we generate meaning and make sense of the world. Whether we do so cleverly or stupidly is dependent on a complex of factors that have little to do with technology *per se*. This is not to deny a role for technology. But technology is no substitute for human communicative activity. You cannot use technology to pump meaning and sense into human beings. Moreover, there is no compelling evidence showing that new information technology substitutes for human communication, let alone with greater intelligence. None-the-less, as we observed following a review of the relevant research literature:

...despite the wealth of studies that raise serious doubts about substituting technology for aspects of human communication, the belief [in the substitution

hypothesis] continues to the present time. (Shulman, 1989 p160)

To conclude

There is a long path between here and Utopia, and as we head towards the superhighway we have to negotiate the potholes and hazards of the road immediately in front of us. If you cannot even see today's potholes and hazards and deal with them, how confident should we be about your ability to foresee the data-holes and mega-hazards in the highway ahead?

Your report is full of well-meaning enthusiasm. You seem to believe that technology can give us a better world. But this view is curiously unrepresentative of the spectrum of expert views in the field. Perhaps the group process that you used did not allow other voices to be heard. I hope that in your final report we will see more evidence both of the range and nature of your expertise.

You could perhaps start with an awakening thought. As you try to dream about a better world for the networking of Australia's future, think about those of us researching the contemporary reality. We have no map of today's communicative network or the people within it. As James Carey recently pointed out:

...no one has attempted to describe in precise empirical detail the symbolic ecology of this new information society. (Carey, 1993, p4.)

How are we to know if your dream of the future symbolic ecology will be better than the reality of today? ■

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Members of the Expert Group

- Mr Brian Johns AO (Chair), Chairman, Australian Broadcasting Authority
- Mr Duncan Black, Managing Director, GE Information Services
- Dr Dennis Cooper, Chief, CSIRO Division of Radiophysics
- Mr Alf Forster, National President, Communication Workers' Union
- Associate Professor Patricia Gillard, Research Director, Telecommunications Needs Research Group, Department of Communication Studies, RMIT
- Mr Bruce Gyngell, Executive Chairman, Nine Network Australia Limited
- Mr Alan Horsley, Managing Director, Vistel Limited
- Dr Laurie Mackechnie, Group General Manager, AWA Limited
- Mr Gerry Moriarty, Managing Director, Network Products, Telecom Australia
- Mr Ross Ramsay, Manager, Government Liaison, Optus Communications
- Dr Ian Reinecke, Chairman, Information Policy Board, Department of Premier Economic and Trade Development, Queensland
- Mr Trevor Wisemantel, Chief Manager, Voucher Processing Technology Operations Department, Westpac Banking Corporation



Editorial

In this issue we take a closer look at information technology, the reality, the hype, the concerns, the challenges and the paradoxes of our information society.

David Sless addresses the members of the Expert Group commissioned by the Federal Government to examine the potential and economic feasibility of the so-called information super-highway in Australia. In an insightful and hard-hitting review, David questions the technical and economic focus of the interim report on Broadband services, raising numerous social issues.

In our feature article, Maureen MacKenzie looks at the effect digital technology is having on our visual environment, and discusses the challenges facing information designers and communicators in this fast-changing digital age. She points out the need for urgent research to better understand visual understanding.

In two helpful design notes, Simon Flynn questions the efficacy of computerised hyphenation, and Rob Wiseman advises that those 'armless little words are better not left out.'

There's also an announcement about our annual communication conference to be held in November.

As always, we hope you find the news informative, and the articles stimulating. Write and let us know.

Dear Niranjana,

For your reading pleasure -

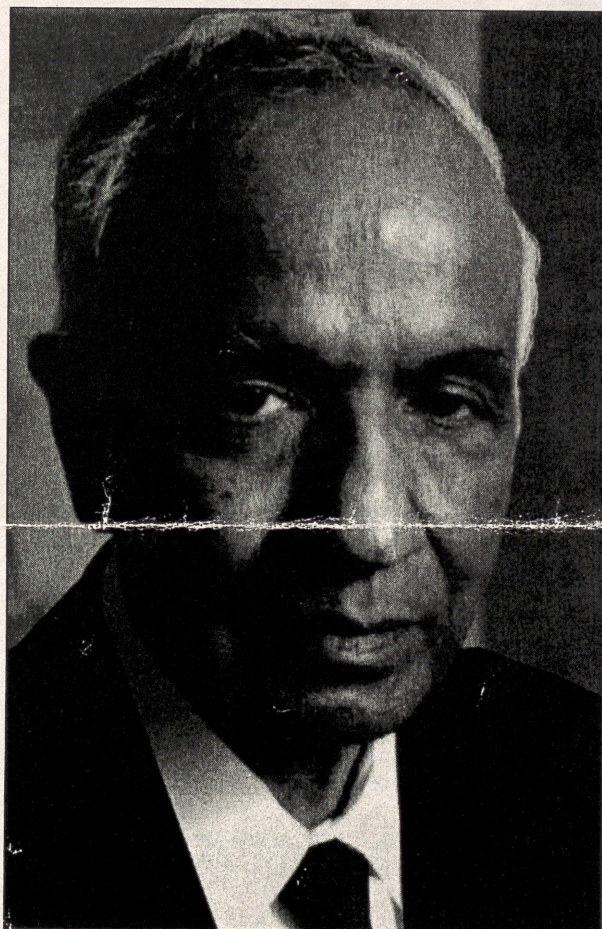
For some 'Dharma' is the Holy Grail.

Regards & Best wishes.
Roma Rao

OBITUARY

Subrahmanyan Chandrasekhar

Subrahmanyan Chandrasekhar, astrophysicist and winner of a Nobel prize for his work on the fate of stars, died in Chicago on August 21st at the age of 84



AS A young man, Subrahmanyan Chandrasekhar—all but universally known as Chandra—experienced the best and the worst that the scientific life has to offer. He had an insight into the universe that no one else had had—and he had that insight mocked and denounced by the grand old man of his field. The insight, however, was correct.

At the age of 19, aboard the ship that took him from his native India to a scholarship at Cambridge, he saw that ordinary matter could not stand the squeezing to which it would be subjected in the hearts of old, massive stars. Combining insights from the then new theories of quantum mechanics and relativity—because of the huge pressures involved, the electrons in the atoms that made up the stars would move at almost the speed of light, thus falling prey to relativistic effects—he showed that under such pressures matter itself must collapse; into what, he knew not.

The idea, received with some indifference in Cambridge, was published with little fuss in the University of Chicago's *Astrophysical Journal*—a then unremarkable forum which, decades later, Chandra would come to edit and which, through dedication, he turned into the field's leading journal. Three years after the publication, having become a fellow of Trinity College, Chandra took up the idea again, developing it much more fully and defining the mass above which an old, dense star will collapse into something other than normal matter—the mass that became known as the Chandrasekhar limit.

However, when he presented the results, he found himself ambushed by Arthur Eddington, Britain's leading astrophysicist. Eddington rejected Chandra's conclusion, bolstering his prejudice against it with criticisms of the way Chandra had evoked relativity in his analysis. Eddington's reasoning was ill-informed, but his prestige was enormous. The ensuing years of argument were hard on the young Chandra, who returned to India and then set out for America with his bride, Lalitha. The University of Chicago became their home for 50 years.

It is a common belief that scientists, especially mathematical ones, peak early. In an essay on the links between science and art that he wrote when in his 70s, Chandra himself drew attention to the fact, and his early experience with Eddington showed both the brilliance the young are capable of and the harmful conservatism that can trap the old. However, turning away from stellar

structure after the Eddington affair, Chandra continued to do brilliant work for almost half a century. He just did it in less known areas of scholarship. He regularly rejuvenated himself by moving to a fresh field; when he left it, perhaps a decade later, it would be well ploughed and newly fruitful.

The link Chandra saw between science and art was aesthetic: both aim for beauty. His own most profound brush with beauty did not come until quite late. He "shuddered before the beautiful" when he saw how perfectly the mathematics of the theory of relativity described black holes, odd constructs bracketed off from the rest of the universe, which can be formed by the collapse of a star with a mass above the Chandrasekhar limit. Yet a sense of duty drove Chandra as much as his aesthetic sense did. An austere man who never wholly lost the remoteness of a 1930s Cambridge don, he worked steadily and diligently through whole fields, saved from doggedness by his mathematical grace.

Duty informed other aspects of his life, as well. It lay behind the sacrifices of time, effort and personal contact with colleagues that made him such a successful, if somewhat autocratic, editor of the *Astrophysical Journal* at a time when observations made with radio telescopes and satellites were opening the field up in all sorts of exciting new ways. It was at this time that objects which had collapsed beyond the Chandrasekhar limit were first discovered. Pulsars are stars in which the atoms themselves have collapsed into solid balls of neutrons, as dense as atomic nuclei—a sun's worth of matter in a city's worth of volume. Quasars, impossibly bright and distant, appear to be the light produced when huge black holes swallow suns in their entirety.

Throughout this editorship, he kept up his own work, and fulfilled his obligations to the University of Chicago. One year he drove each week more than 100 kilometres from Yerkes Observatory to the university to teach exactly two students. It was a sacrifice repaid when the entire class, Tsung-Dao Lee and Chen-Ning Yang, won the Nobel prize in 1957. His own Nobel prize was a more mixed pleasure. It was awarded in 1983, when the pulsars teetering on the edge of black-holedom had shown the Chandrasekhar limit to be real. He worried that a prize for one youthful insight might distract attention from his lifelong work. It was, he said, posterity, not prizes, that counted. Perhaps it was to posterity that he felt he owed the duty which drove him.