This is really not...

COOKING WITH THE JOLLY ROGER

because he's lost again. but he wanted you to know about the Internet, so here it is...

FYI ON "WHAT IS THE INTERNET?"

This memo provides information for the Internet community. It does not specify an Internet standard. Distribution of this memo is unlimited. - Ellen Hoffman

Abstract

This FYI RFC answers the question, "What is the Internet?" and is produced by the User Services Working Group of the Internet Engineering Task Force (IETF). Containing a modified chapter from Ed Krol's 1992 book, "The Whole Internet User's Guide and Catalog," the paper covers the Internet's definition, history, administration, protocols, financing, and current issues such as growth, commercialization, and privatization.

Introduction

A commonly asked question is "What is the Internet?" The reason such a question gets asked so often is because there's no agreed upon answer that neatly sums up the Internet. The Internet can be thought about in relation to its common protocols, as a physical collection of routers and circuits, as a set of shared resources, or even as an attitude about interconnecting and intercommunication. Some common definitions given in the past include:

- a network of networks based on the TCP/IP protocols,
- a community of people who use and develop those networks,
- a collection of resources that can be reached from those networks.

Today's Internet is a global resource connecting millions of users that began as an experiment over 20 years ago by the U.S. Department of Defense. While the networks that make up the Internet are based on a standard set of protocols (a mutually agreed upon method of communication between parties), the Internet also has gateways to networks and services that are based on other protocols.

To help answer the question more completely, the rest of this paper contains an updated second chapter from "The Whole Internet User's Guide and Catalog" by Ed Krol (1992) that gives a more thorough explanation.

The Internet

(excerpt from "The Whole Internet User's Guide and Catalog")

The Internet was born about 20 years ago, trying to connect together a U.S. Defense Department network called the ARPAnet and various other radio and satellite networks. The ARPAnet was an experimental network designed to support military research--in particular, research about how to build networks that could withstand partial outages (like bomb attacks) and still function. (Think about this when I describe how the network works; it may give you some insight into the design of the Internet.) In the ARPAnet model, communication always occurs between a source and a destination computer. The network itself is assumed to be unreliable; any portion of the network could disappear at any moment (pick your favorite catastrophe--these days backhoes cutting cables are more of a threat than bombs). It was designed to require the minimum of information from the computer clients. To send a message on the network, a computer only had to put its data in an envelope, called an Internet Protocol (IP) packet, and "address" the packets correctly. The communicating computers--not the network itself--were also given the responsibility to ensure that the communication was accomplished. The philosophy was that every computer on the network could talk, as a peer, with any other computer.

These decisions may sound odd, like the assumption of an "unreliable" network, but history has proven that most of them were reasonably correct. Although the Organization for International Standardization (ISO) was spending years designing the ultimate standard for computer networking, people could not wait. Internet developers in the US, UK and Scandinavia, responding to market pressures, began to put their IP software on every conceivable type of computer. It became the only practical method for computers from different manufacturers to communicate. This was attractive to the government and universities, which didn't have policies saying that all computers must be bought from the same vendor. Everyone bought whichever computer they liked, and expected the computers to work together over the network.

At about the same time as the Internet was coming into being, Ethernet local area networks ("LANs") were developed. This technology matured quietly, until desktop workstations became available around 1983. Most of these workstations came with Berkeley UNIX, which included IP networking software. This created a new demand: rather than connecting to a single large timesharing computer per site, organizations wanted to connect the ARPAnet to their entire local network. This would allow all the computers on that LAN to access ARPAnet facilities. About the same time, other organizations started building their own networks using the same communications protocols as the ARPAnet: namely, IP and its relatives. It became obvious that if these networks could talk together, users on one network could communicate with those on another; everyone would benefit.

One of the most important of these newer networks was the NSFNET, commissioned by the National Science Foundation (NSF), an agency of the U.S. government. In the late 80's the NSF created five supercomputer centers. Up to this point, the world's fastest computers had only been available to weapons developers and a few researchers from very large corporations. By creating supercomputer centers, the NSF was making these resources available for any scholarly research. Only five centers were created because they were so expensive--so they had to be shared. This created a communications problem: they needed a way to connect their centers together and to allow the clients of these centers to access them. At first, the NSF tried to use the ARPAnet for communications, but this strategy failed because of bureaucracy and staffing problems.

In response, NSF decided to build its own network, based on the ARPAnet's IP technology. It connected the centers with 56,000 bit per second (56k bps) telephone lines. (This is roughly the ability to transfer two full typewritten pages per second. That's slow by modern standards, but was reasonably fast in the mid 80's.) It was obvious, however, that if they tried to connect every university directly to a supercomputing center, they would go broke. You pay for these telephone lines by the mile. One line per campus with a supercomputing center at the hub, like spokes on a bike wheel, adds up to lots of miles of phone lines. Therefore, they decided to create regional networks. In each area of the country, schools would be connected to their nearest neighbor. Each chain was connected to a supercomputer center at one point and the centers were connected together. With this configuration, any computer could eventually communicate with any other by forwarding the conversation through its neighbors.

This solution was successful--and, like any successful solution, a time came when it no longer worked. Sharing supercomputers also allowed the connected sites to share a lot of other things not related to the centers. Suddenly these schools had a world of data and collaborators at their fingertips. The network's traffic increased until, eventually, the computers controlling the network and the telephone lines connecting them were overloaded. In 1987, a contract to manage and upgrade the network was awarded to Merit Network Inc., which ran Michigan's educational network, in partnership with IBM and MCI. The old network was replaced with faster telephone lines (by a factor of 20), with faster computers to control it.

The process of running out of horsepower and getting bigger engines and better roads continues to this day. Unlike changes to the highway system, however, most of these changes aren't noticed by the people trying to use the Internet to do real work. You won't go to your office, log in to your computer, and find a message saying that the Internet will be inaccessible for the next six months because of improvements. Perhaps even more important: the process of running out of capacity and improving the network has created a technology that's extremely mature and practical. The ideas have been tested; problems have appeared, and problems have been solved.

For our purposes, the most important aspect of the NSF's networking effort is that it allowed everyone to access the network. Up to that point, Internet access had been available only to researchers in computer science, government employees, and government contractors. The NSF promoted universal educational access by funding campus connections only if the campus had a plan to spread the access around. So everyone attending a four year college could become an Internet user.

The demand keeps growing. Now that most four-year colleges are connected, people are trying to get secondary and primary schools connected. People who have graduated from college know what the Internet is good for, and talk their employers into connecting corporations. All this activity points to continued growth, networking problems to solve, evolving technologies, and job security for networkers.

What Makes Up the Internet?

What comprises the Internet is a difficult question; the answer changes over time. Five years ago the answer would have been easy: "All the networks, using the IP protocol, which cooperate to form a seamless network for their collective users." This would include various federal networks, a set of regional networks, campus networks, and some foreign networks.

More recently, some non-IP-based networks saw that the Internet was good. They wanted to provide its services to their clientele. So they developed methods of connecting these "strange" networks (e.g., Bitnet, DECnets, etc.) to the Internet. At first these connections, called "gateways", merely served to transfer electronic mail between the two networks. Some, however, have grown to translate other services between the networks as well. Are they part of the Internet? Maybe yes and maybe no. It depends on whether, in their hearts, they want to be. If this sounds strange, read on--it gets stranger.

Who Governs the Internet?

In many ways the Internet is like a church: it has its council of elders, every member has an opinion about how things should work, and you can either take part or not. It's your choice. The Internet has no president, chief operating officer, or Pope. The constituent networks may have presidents and CEO's, but that's a different issue; there's no single authority figure for the Internet as a whole.

The ultimate authority for where the Internet is going rests with the Internet Society, or ISOC. ISOC is a voluntary membership organization whose purpose is to promote global information exchange through Internet technology. (If you'd like more information, or if you would like to join, contact information is provided in the "For More Information" section, near the end of this document.) It appoints a council of elders, which has responsibility for the technical management and direction of the Internet.

The council of elders is a group of invited volunteers called the Internet Architecture Board, or the IAB. The IAB meets regularly to "bless" standards and allocate resources, like addresses. The Internet works because there are standard ways for computers and software applications to talk to each other. This allows computers from different vendors to communicate without problems. It's not an IBM-only or Sun-only or Macintosh-only network. The IAB is responsible for these standards; it decides when a standard is necessary, and what the standard should be. When a standard is required, it considers the problem, adopts a standard, and announces it via the network. (You were expecting stone tablets?) The IAB also keeps track of various numbers (and other things) that must remain unique. For example, each computer on the Internet has a unique 32- bit address; no other computer has the same address. How does this address get assigned? The IAB worries about these kinds of problems. It doesn't actually assign the addresses, but it makes the rules about how to assign addresses.

As in a church, everyone has opinions about how things ought to run. Internet users express their opinions through meetings of the Internet Engineering Task Force (IETF). The IETF is another volunteer organization; it meets regularly to discuss operational and near-term technical problems of the Internet. When it considers a problem important enough to merit concern, the IETF sets up a "working group" for further investigation. (In practice, "important enough" usually means that there are enough people to volunteer for the working group.) Anyone can attend IETF meetings and be on working groups; the important thing is that they work. Working groups have many different functions, ranging from producing documentation, to deciding how networks should cooperate when problems occur, to changing the meaning of the bits in some kind of packet. A working group usually produces a report. Depending on the kind of recommendation, it could just be documentation and made available to anyone wanting it, it could be accepted voluntarily as a good idea which people follow, or it could be sent to the IAB to be declared a standard.

If you go to a church and accept its teachings and philosophy, you are accepted by it, and receive the benefits. If you don't like it, you can leave. The church is still there, and you get none of the benefits. Such is the Internet. If a network accepts the teachings of the Internet, is connected to it, and considers itself part of it, then it is part of the Internet. It will find things it doesn't like and can address those concerns through the IETF. Some concerns may be considered valid and the Internet may change accordingly. Some of the changes may run counter to the religion, and be rejected. If the network does something that causes damage to the Internet, it could be excommunicated until it mends its evil ways.

Who Pays for It?

The old rule for when things are confusing is "follow the money." Well, this won't help you to understand the Internet. No one pays for "it"; there is no Internet, Inc. that collects fees from all Internet networks or users. Instead, everyone pays for their part. The NSF pays for NSFNET. NASA pays for the NASA Science Internet. Networks get together and decide how to connect themselves together and fund these interconnections. A college or corporation pays for their connection to some regional network, which in turn pays a national provider for its access.

What Does This Mean for Me?

The concept that the Internet is not a network, but a collection of networks; means little to the end user. You want to do something useful: run a program, or access some unique data. You shouldn't have to worry about how it's all stuck together. Consider the telephone system--it's an internet, too. Pacific Bell, AT&T, MCI, British Telephony, Telefonos de Mexico, and so on, are all separate corporations that run pieces of the telephone system. They worry about how to make it all work together; all you have to do is dial.

If you ignore cost and commercials, you shouldn't care if you are dealing with MCI, AT&T, or Sprint. Dial the number and it works.

You only care who carries your calls when a problem occurs. If something goes out of service, only one of those companies can fix it. They talk to each other about problems, but each phone carrier is responsible for fixing problems on its own part of the system. The same is true on the Internet. Each network has its own network operations center (NOC). The operation centers talk to each other and know how to resolve problems. Your site has a contract with one of the Internet's constituent networks, and its job is to keep your site happy. So if something goes wrong, they are the ones to gripe at. If it's not their problem, they'll pass it along.

What Does the Future Hold?

Finally, a question I can answer. It's not that I have a crystal ball (if I did I'd spend my time on Wall Street instead of writing a book). Rather, these are the things that the IAB and the IETF discuss at their meetings. Most people don't care about the long discussions;

they only want to know how they'll be affected. So, here are highlights of the networking future.

New Standard Protocols

When I was talking about how the Internet started, I mentioned the International Standards Organization (ISO) and their set of protocol standards. Well, they finally finished designing it. Now it is an international standard, typically referred to as the ISO/OSI (Open Systems Interconnect) protocol suite. Many of the Internet's component networks allow use of OSI today. There isn't much demand, yet. The U.S. government has taken a position that government computers should be able to speak these protocols. Many have the software, but few are using it now.

It's really unclear how much demand there will be for OSI, notwithstanding the government backing. Many people feel that the current approach isn't broke, so why fix it? They are just becoming comfortable with what they have, why should they have to learn a new set of commands and terminology just because it is the standard?

Currently there are no real advantages to moving to OSI. It is more complex and less mature than IP, and hence doesn't work as efficiently. OSI does offer hope of some additional features, but it also suffers from some of the same problems which will plague IP as the network gets much bigger and faster. It's clear that some sites will convert to the OSI protocols over the next few years. The question is: how many?

International Connections

The Internet has been an international network for a long time, but it only extended to the United States' allies and overseas military bases. Now, with the less paranoid world environment, the Internet is spreading everywhere. It's currently in over 50 countries, and the number is rapidly increasing. Eastern European countries longing for western scientific ties have wanted to participate for a long time, but were excluded by government regulation. This ban has been relaxed. Third world countries that formerly didn't have the means to participate now view the Internet as a way to raise their education and technology levels.

In Europe, the development of the Internet used to be hampered by national policies mandating OSI protocols, regarding IP as a cultural threat akin to EuroDisney. These policies prevented development of large scale Internet infrastructures except for the Scandinavian countries which embraced the Internet protocols long ago and are already well-connected. In 1989, RIPE (Reseaux IP Europeens) began coordinating the operation of the Internet in Europe and presently about 25% of all hosts connected to the Internet are located in Europe.

At present, the Internet's international expansion is hampered by the lack of a good supporting infrastructure, namely a decent telephone system. In both Eastern Europe and the third world, a state-of-the- art phone system is nonexistent. Even in major cities, connections are limited to the speeds available to the average home anywhere in the U.S., 9600 bits/second. Typically, even if one of these countries is "on the Internet," only a few sites are accessible. Usually, this is the major technical university for that country. However, as phone systems improve, you can expect this to change too; more and more, you'll see smaller sites (even individual home systems) connecting to the Internet.

Commercialization

Many big corporations have been on the Internet for years. For the most part, their participation has been limited to their research and engineering departments. The same corporations used some other network (usually a private network) for their business communications. After all, this IP stuff was only an academic toy. The IBM mainframes that handled their commercial data processing did the "real" networking using a protocol suite called System Network Architecture (SNA).

Businesses are now discovering that running multiple networks is expensive. Some are beginning to look to the Internet for "one-stop" network shopping. They were scared away in the past by policies which excluded or restricted commercial use. Many of these policies are under review and will change. As these restrictions drop, commercial use of the Internet will become progressively more common.

This should be especially good for small businesses. Motorola or Standard Oil can afford to run nationwide networks connecting their sites, but Ace Custom Software couldn't. If Ace has a San Jose office and a Washington office, all it needs is an Internet connection on each end. For all practical purposes, they have a nationwide corporate network, just like the big boys.

Privatization

Right behind commercialization comes privatization. For years, the networking community has wanted the telephone companies and other for-profit ventures to provide "off the shelf" IP connections. That is, just like you can place an order for a telephone jack in your house for your telephone, you could do this for an Internet connection. You order, the telephone installer leaves, and you plug your computer into the Internet. Except for Bolt, Beranek and Newman, the company that ran the ARPAnet, there weren't any takers. The telephone companies have historically said, "We'll sell you phone lines, and you can do whatever you like with them." By default, the Federal government stayed in the networking business.

Now that large corporations have become interested in the Internet, the phone companies have started to change their attitude. Now they and other profit-oriented network purveyors complain that the government ought to get out of the network business. After all, who best can provide network services but the "phone companies"? They've got the ear of a lot of political people, to whom it appears to be a reasonable thing. If you talk to phone company personnel, many of them still don't really understand what the Internet is about. They ain't got religion, but they are studying the Bible furiously. (Apologies to those telephone company employees who saw the light years ago and have been trying to drag their employers into church.)

Although most people in the networking community think that privatization is a good idea, there are some obstacles in the way. Most revolve around the funding for the connections that are already in place. Many schools are connected because the government pays part of the bill. If they had to pay their own way, some schools would probably decide to spend their money elsewhere. Major research institutions would certainly stay on the net; but some smaller colleges might not, and the costs would probably be prohibitive for most secondary schools (let alone grade schools). What if the school could afford either an Internet connection or a science lab? It's unclear which one would get funded. The Internet has not yet become a "necessity" in many people's minds. When it does, expect privatization to come quickly.

Well, enough questions about the history of the information highway system. It's time to walk to the edge of the road, try and hitch a ride, and be on your way.

For More Information

• Hoffman, E. and L. Jackson. (1993) "FYI on Introducing the Internet --A Short Bibliography of Introductory Internetworking Readings for the Network Novice," 4 p. (FYI 19, RFC 1463).

• Krol, Ed. (1992) The Whole Internet User's Guide and Catalog, O'Reilly & Associates, Sebastopol, CA. ISBN 1-56592-025-2.

• Quarterman, J. (1993) "Recent Internet Books," 15 p. (RFC 1432).

• The Internet Society, Phone: (703) 620-8990, Fax: (703) 620-0913, E-mail: isoc@cnri.reston.va.us

• Authors' Addresses, Ellen Hoffman, Merit Network, Inc., 2901 Hubbard, Pod-G, Ann Arbor, MI 48105, Phone: (313) 936-3000, EMail: ellen@merit.edu

THE ELECTRONIC UNDERWORLD

by Shadowvex

A BRIEF HISTORY:

Many people are aware of the fact that technology is everywhere and growing in such an erratic state. We are moving at such a rate that someday everyone will own their own computer or some type of portable computing device. The "Information Superhighway" is DEFINITELY growing and growing even as I type this. Few, however, are aware that with such great leaps in technology comes a dark side to these advances. On many occasions this "dark side" is actually more advanced than the mainstream of tech-society. This dark side is comprised of what the media proclaims as "hackers".

The term "hacker" originated over 30 years ago and its meaning has consistently changed throughout these years. Originally the term was used to describe anyone that used computers. From programming punch cards for refrigerator sized machines to "computing" numbers on non portable calculators. Later it was used to describe those who built and created their own products. These were the "hackers" that brought us the first handheld calculators to the integrated circuit. During the 80's, with the introduction of the home computer came about yet another meaning: A person who gains or attempts to gain access to unauthorized systems. With all the media-hype from War Games to Lawnmower Man, it is no surprise that the term "hacker" has become very stereotyped into this meaning.

MODERN DAY HACKERS:

In the past hackers thought and created products from the bare minimums because of typical hobbyist characteristics and budget limitations. Today large corporations design and use state of the art and innovative new technologies that once were only ideas of the low-budget hacker. But as with many things, once large corporations are involved (especially government agencies), a slew of problems follow.

It was these problems that drove many electronic enthusiasts to the underground. They wanted the freedom of information, but they didn't want their ideas and desires to be regulated. However it seems whenever the government decides to dip their hands into something the clear waters turn a murky black. The last thing a government agency wants is young creative computer terrorists flooding the entire electronic empire. At least this is their viewpoint on the matter. So, in retaliation, they began a so-called "crackdown" on these "terrorists". Phone taps, police raids, equipment confiscation, interrogations, arrests, convictions and worst of all, laws were formed. Many of these actions were questionable as to their validity or simply outright illegal - but what is to stop an entity such as the government? EFF - The Electronic Frontier Foundation, as well as several other organizations were formed as a digest of thought and fact for the informationalist. Founded in their belief of freedom of information, they supply the latest news, upcoming events, and talk of the electronic frontier. These organizations help to put a dent in poor the judgements that have infringed the rights of freedom. With the help of these organizations it makes living on the edge of technology less threatening.

SO WHAT HAPPENS THE ELECTRONIC UNDERWORLD?

From hacking into a computer system of a large company to creating a device to make free phone calls to spreading "classified" information, the underworld thrives with new technology. And as with any underground movement there are good, bad, and radical motives. Guidelines and ethics to one person may mean the exact opposite to the other. But the general goal is the aquiration of information and freedom to express ideas. These ideas have made hackers who they are. Often thought of as robin hood type computer-romantics , they take pride in discovery and are often satisfied with their newfound knowledge belonging only in an inner circle of hackers. But sometimes information gradually leaks into the mainstream. For example: Ten years ago people were making free phone calls over cellular phones, but this has not reached mainstream attention until just recently. Those people who pioneered this 10 years ago are far beyond that technology... always moving forward. They also did not abuse such technology. They were more interested in the design, operation, and functions of cellular communication rather than simply making a free phone call. But there were those who abused this information and thus that led to even greater abuse until finally the mainstream realized there was a problem. The above example is just a small portion of what the electronic underworld contains.

TOOLS OF THE TRADE:

Hackers, like any hobbyist have an arsenal of "tools". Here is a list and a brief description of such tools. These descriptions are designed for those with limited computer knowledge. In future articles we will go into much further detail.

HARDWARE

CPU: This is the brain of the computer. It performs all the calculations required for operation.

CRT: Also know as a Cathode Ray Tube, or simply the viewing device known as a monitor.

INPUT PERIPHERALS: From the keyboard, to a mouse, to a data glove. These are the devices to which data is imputed and manipulated.

MODEM: The communication device that MOdulates and DEModulates data from one computer to another. These are the devices that allow a hacker unlimited access around the globe via telephone line, cellular, or even radio!

TELEPHONE: What most people use everyday and take for granted. With this device a hacker endows limitless powers. From setting up worldwide conferences to checking someones credit history to manipulating large networks, the telephone is a very powerful device.

SOFTWARE PROGRAMS: These are the actual instructions that a CPU executes. Without a program to run, a computer is useless. VIRUS: Infectious software that performs tasks - good or malicious. Many viruses have the ability to replicate and spread again and again to any unprotected computer system.

MISCELLANEOUS HARDWARE: In addition to the basics, there are hundreds of various other pieces of equipment that give even more depth to the user. This equipment includes: image scanners, sound digitizers, magnetic strip and bar code encoders/ decoders, and much much more. Look for future articles dealing specifically in these areas.

SOCIAL ENGINEERING: The fine art of being able to bullshit. Over a telephone or in person, this skill is powerful when perfected. This tactic is often implemented when gaining information electronically is not possible.

WHAT'S GOING TO BE IN FUTURE ARTICLES?

In depth explanations and reviews of the latest equipment and software being used and abused today, plus lists of phone numbers, addresses, sites, and names. We will also print examples, diagrams, and projects to be built. In addition we will keep you informed of the latest news, laws, court cases, and media attention. And we may even have occasional interviews!

Please look forward to future printings of T.E.U. and any comments, questions, and/ or suggestions are more than welcome.

22 KARRIT GOLD

I'd like to take a moment here to talk about something which, particularly in the present atmosphere, we would all probably rather not even think about anymore. Smoking. Yeah, I do mean cigarette smoking. I know that there must be among you representatives from every corner of every camp on this issue. So why must I, too blab about it when we are already swimming in a slew of propaganda regarding it? Well, what can I say. I'm just putting in two cents for my fifteen measly minutes of opinionated blather. And because I do smoke, the issue had to come up sooner or later. So let's give it one deep thought and get it over with.

Now, we all know from our precious grade school history books that the act of smoking is an American tradition. Hell's Bell's! the pipe and the meriad of things with which to pack it practically came with the territory. For both the peace- making American Indians and the U.S. Presidents who turned around and enslaved them, hemp and tobacco were staple cash crops. Little did either know the seeds that they were planting would prove to be so difficult to uproot.

I have no problem with hemp (marihuana) except for its legal status, so what I'm focusing on is the tobacco variety of smoke. We all know by now what cigarette smoking does, don't we? I don't want to be redundant but, for those of you who live in a box with no contact with the outside world save for Flipside, let it be stated that every form of internal involvement with tobacco products can produce terminal cancer in little critters like...US! So why do so many of us do it?

Even now, as I write about it, I feel myself becoming so overcome with both my conviction and anxiety that I am compelled to reach for a cigarette. And hey, I'm a smart person, fully aware of the risk I am taking and its' consequences, but I do it anyway. I must admit that I even rather enjoy it. In the ten years that I've been smoking, I have never once even tried to quit. I have to wonder about that. After all, smoking is the most self- destructive activity a person can habituate. It destroys with deadly force, and that destruction is absolute. It is also one of the few things in society that is perfectly legal and almost universally accepted.

Why do we do it in the face of all the damn good reasons not to? My friend Dee, who does not smoke, recently shared with me an interesting observation she had made about it. She noticed that when smokers are talking to others, particularly about difficult subjects, they are likely to pull out a cigarette. This is because smoking a cigarette requires one's attention and is time consuming, like a mini- hourglass. By smoking a cigarette during a conversation, we are alotting that conversation either a time- commitment, or a time- limit. Depending on the person we are talking to, or the nature of the conversation, we may also be putting up a "smoke- screen". Surrounding oneself with a cloud of smoke can be a pretty good way to maintain one's distance, or stake out territory. Smoking can also help you to think and make decisions despite external pressures. For example: Imagine you are in an awkward situation. Let's say you are arguing with a loved one...or that you just ate a sumptuous meal that you had planned to pay for on credit - only to realize that the card is maxed...or maybe you've been forced into a situation with someone who you don't get along with but must be hospitable to. These are all optimum times to grab a cigarette. In fact, at times like these, most smokers will beg, borrow or kill for one. One of the ways that a cigarette soothes is that it can buy us the time to think about what is going on or being said, therefor making it possible to respond better. See, if someone asks you a question which you can't, or simply don't want to answer - if you have a cigarette - you can create a pause in which to gather your thoughts simply by taking a hit. Even non- smokers won't notice that you are really avoiding the question or searching your brain for a way around it. It seems that those little pauses that two hits off a cigarette afforded me could be reason enough *not* to quit. Especially when I think back upon all the times when it has given me an advantage in an argument. Kudos to Dee for her brilliant powers of deduction.

Now on to something completely different. My next topic is a drug which had enjoyed some popularity during the sixties and practically disappeared for about twenty years only to resurface somewhat in the "rave" scenes of recent 'lore. I'm talking about DMT, a gnarly little substance which must be smoked (25- 50mg), lasts only a few minutes, is a very powerful psychedelic, and is not easy to come by. I myself have tried it only three times and my feelings are very mixed about the experience.

Lest you encounter this drug sometime, you might be interested to know a little background on it. I'll share with you what info I've been able to gather and follow that up with notes from a DMT trip...

8. DIMETHYLTRYPTAMINE [*Merck Index* 11: 3251]

Synonyms:	3-[2-(dimethylamino)ethyl]-indole; *N,N*-dimethyltryptamine; DMT; nigerine; Dimethyltryptamin
Physical:	$C_{12}H_{16}N_2$; molecular weight 188.26; C 76.55% H 8.57% N 14.88%
Isolation:	Fish, *J. Am. Chem. Soc.* 77: 5892, 1955 (*Anadenanthera peregrina*); Agurell, *Acta Chem. Scand.* 23: 903, 1969 (*Virola theiodora*)
Synthesis:	Manske, *Can. J. Res.* 5: 592, 1931; Speeter, *J. Am. Chem. Soc.* 76: 6208, 1954
Chemistry:	crystals from ethanol, mp 44.6–46.8°, sol. in dilute acids; picrate mp 169.5–170.5°; methiodide mp 216–217°; fumarate mp 152–152.5°
Pharmacology:	entheogenic at 1 mg/kg i.m. (Szára, *Experientia* 12: 441, 1956; Sai-Halász, *Psychiatr. Neurol.* 135: 285, 1958)
Legal Status:	controlled

From prehistory to the present, tribes throughout South America have taken DMT(**Di**Methyl **T**riptamine), in its' plant form, ritually for its' visionary characteristics. From the psychedelic plant, Ayahuasca (Banisteriopsis Caapi) an intoxicating beverage, called yage is made. Known as the "drink of true reality", the process by which yage is made is closely guarded, a priviledge reserved for shamans. Nevertheless, it was his quest for yage that sent W.S. Burroughs searching throughout the rainforest.

In addition to DMT, Ayahuasca contains other special chemicals known as beta- carbolines without which DMT is not orally active. The carbolines(harmine, harmaline, and harmol) act as MAO (**m**onoamine **o**xidase) inhibitors. This is important because without them the enzyme MAO breaks down the DMT before the psychedelic effects can be felt. DMT taken orally is, in effect, neutralized by MAO if not taken in combination with the carbolines.

But there are, as the Indians of South America figured out, alternative methods for taking the drug. DMT itself can be smoked or inhaled alone to activate its psychotropic effects. Several S.Am. and Caribbean groups, like many of those in Venezuela and Northern Brazil, prefer to inhale it, using the trusty "snuff" method to administer it. Via a long tube, the recipient takes the substance into his system(men only, in this case) by holding one end of the tube to his nose while a shaman blows it straight through the tube and directly into him. Sound harsh? Well, I'm sure it doesn't smell too pretty either, but have no doubt that it works!

In the home however, concentrated DMT can be effectively administered by smoking or injecting it. DMT is most efficiently smoked through a glass pipe with a small air chamber or, if you can get ahold of one, a classic DMT pipe. Trying to smoke it through anything else can be so difficult and wastes so much of the precious substance that it is hardly worth it. A tiny amount(about 30 milligrams) is sufficient to kick in the most unbelievable colors and images. Moderate, even lighting is preferable to bright or low light in order to really appreciate the complex patterns which weave themselves throughout your visual field. The entire experience lasts a total of about 5- 10 minutes, with a calm, mellow after- effect which lingers for about 20 minutes after that. If you do try it, use this 20 minute period to make notes on your experience, while the impression is still fresh in your memory.

NOTE! Although small amounts of DMT have been found to occur naturally in many plants and and beasties - humans included, and there is a very low toxicity level for it, DMT is still a very powerful psychedelic. I wouldn't recommend that it be anyone's first experience with psychedelics and, as always, the individual in question should be aware of the nature of the drug and have some idea about what to expect. I also think that it is a good idea to refrain from doing DMT while under the influence of other drugs or medication, at least not until you've read up on the possible risks. I recommend you get ahold of anything by Gracie & Zarkov (try to get ahold of "*The Gracie & Zarkov Reader*", it has a lot of interesting anecdotal information and is fun reading, too. It's not easy to find in a regular bookstore, but you may be able to obtain a copy of it. Al & I both have it). They were also published in *Mondo 2000*'s forerunner, *High Frontiers*. Pick up any old copies of that magazine you come across, it's terrific. Or try to write to R.U. Sirius at *Mondo*, there might be back issues available and it was his magazine. Of course, Peter Stafford's *Psychedelic Encyclopedia* is also an invaluable resource when you decide to delve into any drug research of your own. Again, DMT is a very heavy psychedelic for the serious inner-stellar travel, not the Sunday driver. And, please be wise enough to employ a friend whom you trust to accompany you. No one should ever take a drug they don't fully understand. The consequences could be a real drag. Also, keep in mind that DMT and most of the other psychotropic goodies are currently on Schedule 1 with the DEA & FDA, which means that there are nasty legal penalties attached to them.

Some notes on a DMT experience are as follows:

With eyes closed, it's really trippy...some very psychedelic but quite impersonal three- dimensional, interlocking fractal shapes/patterns of incredible beauty & intense color transformed themselves all around me. I felt like I wanted to look around or say something but it was useless to even try. Finally, I focused my vision on one moving, gyrating point. It was light yellow in color, with a row of three(?) black diamonds in the center. Once I had settled on this part of the image, the whole thing became very beautiful although I was struck by the lack of emotion I felt generated by the experience. It felt like some kind of timeless, permanent, and yet familiar space, though it was not entirely pleasant. There were these machine- like twirling color wheels spinning all around me, seemingly aware but indifferent. Were they laughing? I remember thinking the same question which had occurred to me the last time I had taken this stuff, "This is what you asked for, is this what you wanted?" Well, no. It wasn't exactly what I had expected. It was kind of scary, actually. Although I didn't feel as though I was in any physical danger, the whole vibe from it was cold and uncomfortable. I was glad when it subsided. I had gotten a good hit, too. Between 30-40mg.

But was that really "the light"? I don't think so (shudder to think!). The whole thing just seemed to be devoid of *meaning*. Beyond being like a virtual- reality kaliedescope it seemed very superficial. Ah, everyone's a critic, I know. But I've seen something like the "crysanthemum" when I have stared too long at the sun through my closed eyelids. I think the description of it sounds much cooler than the experience itself actually is, at least in this case anyway. I also think that perhaps the reason it seemed so "familiar" to me is because of the fact that I had experienced something similar to it on larger doses of acid. Then again, a large dose of acid for me is like five or six hits.

I have read and heard that DMT- Land was an "inhabited world". Personally, I am hard pressed to call what I saw "inhabited", though it was definitely moving. Unfortunately, my friend didn't hold in enough of the smoke (which smells atrocious, like burning rubber and rotting magnolias!) to get off in order to discount or corroborate with my vision. I can say with certainty, however, that on no occasion have I encountered T. McKenna's "machine elves", Gracie's "language kitties", or anything like Zarkov's "menacing, insect- like creatures". But, seeing as I have only tried it on three rare occasions, I certainly haven't ruled that out as being impossible or nonexistant.

KICKS

Did everybody go out and plant morning glories like you were instructed to last time? Good, now this time we're gonna talk about potentiating your psychedelic experience by slightly altering your body chemistry. How are we gonna do that? Well, it's very tricky, and very dangerous. But a lot of fun.

Karrit mentioned the use of MAO inhibitors and that's what we're gonna do, interfere with the protective function of monoamine oxidase. This enzymes function is to breakdown physiologically active amines such as dopamine, serotonin and epinephrine and render them inactive. If we block the function of this enzyme we get a built up of these active neurotransmitters, increasing action at their receptors, and, of course, inducing hallucinogenic effects. The danger here is two fold: First, MAO is indeed important to our normal functioning, so you don't want to knock it out for very long. There are a lot of commercial MAO inhibitors on the market, and their action can be in effect for days or even weeks! They can be very strong and possibly lethal! Even the short term inhibitors discussed here can potentially fuck you up big time. There's a good account in Terrance McKenna's "True Hallucinations" of his brother, Dennis, knocking out his MAO system and remaining on a three week mushroom trip! Be warned! The other danger with this stuff is that although it potentiates neurotransmitters, it also detoxifies tons of other things - like various drugs (especially amphetamines, where the wrong combinations can lead to anywhere from enhancement, to a hypertensive crisis, to death!) and alcohol and chemicals you ingest in your food. So unless you know what you'd like to potentiate, it's best not to drink or take anything like over the counter medicine while in the inhibited state. Otherwise you are asking for trouble. You get the picture, this is serious stuff, but then again if you didn't take drugs seriously you wouldn't be reading this column, would you?

On the brighter side, it is believed by some that as we grow older our body maintains more and more MAO - essentially keeping us very grounded and shielded from potential disturbances of our neurotransmitters. This may manifest itself as a loss or weakening of creative abilities, youthful imagination or daydream fantasies. In this case, maybe a little MAO inhibition is just what you need!

Now, more to the point, the particular MAO inhibitors I'm gonna talk about is from a group of alkaloids called the Beta- Carbolines. Harmine and harmaline (and related variations such as harmalol, harman, tetrahydroharmine etc) have been used in various cultures since time began. The most noted source of harmine (and its relatives) is from a plant native to the Middle East, *Peganum harmala*, or Syrian Rue. Some people consider the use of this plant central to Middle Eastern religious beliefs (as the sacred inebriant "Soma") as well as the basis for the "flying magic carpet" myths. Syrian rue is in fact used as a dye, the yellow extract from the seeds being rich in the carbolines of this article (up to about 3% in the seeds), and if one were to soak their hands in it all day as in dying huge Syrian rugs, then maybe they would reach a MAO inhibited state and fly off on their now "magic" carpet!

In South America these carbolines have also had extensive usage in another sacred inebriant called *ayahuasca*. The native people use a mixture of tryptamine containing plants and the carboline containing Ayahuasca vine, *Banisteriopsis caapi* to induce a visionary state in their rituals. The active alkaloid in Caapi when first isolated was given the wonderful name *Telepathine*, but was later found to be exactly the same as the harmine of the Syrian rue.

Although you'll probably never get your hands on any Caapi, and even though Syrian rue is native to the middle east, it has been introduced in the United States. It reportedly grows quite abundantly in Texas and New Mexico. If you live there you should definitely get a good botanical guide and seek out this marvelous plant. In California, however, the plant is banned as a noxious weed, and purchasing viable seeds is illegal! But we have a third, and more plentiful plant from which to procure the carbolines - the Passion Flower. It's a good thing it is plentiful, because the alkaloid content is rather low, about one half percent. Maybe you already know of a stand of the viney May Pops, it does have a very unique flower and conspicuous, bright yellow fruit when ripe. I know of many sources throughout Hollywood, L.A. and along the freeways in Long Beach. So, this is perhaps our best source.

There are a lot of ways to use this plant. Gracie and Zarakov (see Karrit) mentioned smoking the Passion Flower to achieve the desired effect. When the dosage is about 500mg that would mean about 200 grams - which is what they did!! I've also heard of drying the Passion Flower extract you can buy in health food stores and smoking it - again, it probably takes a lot. Eating that much is out of the question, but there are some references that will have you munching Syrian Rue seeds. Gracie and Zarakov have also used a total alkaloid extraction technique to concentrate the carbolines. The process is simple, you boil the ground plant material and then strain off the liquid. You repeat this procedure a number of times and finally concentrate all the liquid by boiling it down to a thick, gooey tar. This will work for you and the concentrate will include all the alkaloids, a mixture closer to the actual plant content. We're gonna use a little chemistry to extract the alkaloids in a much purer state, giving you a product that is easy to store and use. This procedure is a modified version of the one used in the excellent reference book "The Alkaloids" by Manske.

First off you have to procure some plant material. If you can get some Syrian Rue seeds (or roots), then by all means do so. It is much easier to work with and, of course, contains far more harmine alkaloids. Passion Flower is easy to get - so get a lot. 200 grams of material is gonna yield you probably one dose, the content can vary, but you'd better get a lot. The first thing to do is grind it all up in a good blender. If you have a shitty blender you'd better not use the thicker woody stems. Grind up all the leaves with some water into a nice frothy green soup. If you have a lot of material, a 5 gallon container is needed to hold your brew. If you're using Rue, a coffee grinder will work nicely to powder the seeds. Since the alkaloids are present as phosphates in the plant, we need to make them as water soluble as possible for our extraction. Adding acetic acid will do just that - turn them into very soluble acetates. You can get acetic acid in photo supply stores or from Ralphs in the form of vinegar. The cheapest white vinegar is the best, it is just dilute acetic acid anyway. If you've got the real thing then about 30 grams per liter is about right. Mix in the acid and let the mixture sit over night. The next day you should notice that all the plant material has gotten water logged and settled, leaving a yellowish liquid above the green mass. Try to pour this off into a clean one gallon glass bottle. Then strain the mass of plant material thru a t-shirt from some band you no longer like and save the liquid in another gallon bottle. In the meantime, add more acetic acid and water to the plant material and let it sit. You'll run the same process on it again in a day or two to try to recover any more yellow liquid. If you look at your gallon bottles you can see an upper clear yellow liquid layer and a lower green layer. We want the yellow stuff. A good thing to do is rig up a siphon to take this layer off without disturbing the rest. Don't even try filtering, it's impossible, this settling method works best. Siphon off the yellow, add water, siphon off the yellow, etc until you have a bottle of pure yellow liquid that nothing settles out of. If you used Rue seeds, then you don't have the green gunk, but that seed powder soaks up a lot of water, so you will have to strain the seed mush a few more times.

Now, with whatever you started with the procedure is practically the same. We need to drop the alkaloids out of the solution - so we turn them into hydrochlorides that are only slightly soluble in water, and insoluble in a salt solution. To do this we add about 400 grams of salt to a gallon of clear yellow solution. Once this is all dissolved and mixed we will put the bottle in the refrigerator. In a short time you will notice a precipitate forming on the bottom of the bottle. With Rue seeds that's pretty much the end product, with Passion Flower some more green stuff is gonna settle out of nowhere - in either case, we're gonna do some purifying. Siphon off the upper liquid (add more salt to this, let sit longer in the fridge to get a little more precipitate) and filter the cloudy residue. When the salty liquid is rinsed through, the residue is dissolved in about a liter of water and placed in a large boiling flask or pot and brought to a boil. The harmine alkaloids will dissolve into the hot water, some of the other shit won't. Filter this while hot (it may take some re- heating as this filtering process can be slow) and save the liquid. To this you are again going to add salt and cool it down. A precipitate will again form, this time much purer than the last. The white residue may now be taking on a yellowish color characteristic of pure harmine crystals, if not you might want to try heating, adding salt and cooling again. Otherwise just filter and dry.

There are a lot of different versions of harmine experiences; from stimulant to hallucinogen to narcotic - that is if you wanted to do it just by itself. People react differently to different chemicals, so all those effects could be true. Passion Flower extract is sold in health food stores as a nerve calming tonic, and it is my experience with about 500mg. doses of harmine that it does just that. Which is a really good mind set when you use it to predose a mega acid or DMT trip. Some claim it is a psychedelic in its own right, but in these experiments with crude extractions it's hard to tell just what you are ingesting. If you use it to potentiate familiar psychedelics, the quality and magnitude of the experience is vastly changed - an otherwise barren LSD world can in fact become as inhabited as the tryptamine space. The best thing to do is start from a small amount and see what it does for you and build it up from there. Using carbolines to potentiate psychedelics is the new frontier and more and more people are discovering northern hemisphere ayahuasca type brews (or "ayahuasca borealis" as Dennis McKenna refers to them). Be sure to share your discoveries!

Here's a list of some literature used to research this article and just general further reading on this fascinating subject and related topics...

- Gracie and Zarakov 1986. "Three Beta-Carboline containing plants as potentiators of synthetic DMT and other indole psychedelics" *Notes From The Underground.*
- Grubber, H. 1973. *Growing the Hallucinogens* High Times/Level Press, San Francisco CA.
- Manske, R.H.F. 1952. *The Alkaloids: Chemistry and Physiology V2* Academic Press Publishers, New York
- McKenna, T. 1993 *True Hallucinations* Harper, San Francisco
- Most, Albert 1985. *Peganum Harmala: the Hallucinogenic Herb Of The American Southwest* Venom Press, Texas
- Naranjo, C. 1987 "Ayahuasca Imagery and the Therapeutic Property of the Harmala Alkaloids" *Journal of Medical Imagery* 11(2) 131- 136
- Ott, J. 1993. *Pharmacotheon: Entheogenic Drugs, Their Plant Sources and History*, Natural Products, Kennewick, Wa. (This book alone (640 pages!) covers everything included in all the other works. A very complete and accurate compilation of all the current knowledge on these subjects. Higly recommended. Write Jonathan Ott, POB 1251, Occidental CA. 95465.)
- Swan, G.A. 1967. *Introduction to the Alkaloids* John Wiley and Sons, New York

poison control center immediately. As with any drug, if you are pregnant or nursing a baby, seek the advice of a health professional before using this product. Store at controlled room temperature (59°–86°F.).

DRUG INTERACTION PRECAUTION: Do not take this product if you are presently taking a prescription antihypertensive or antidepressant drug containing monoamine oxidase inhibitor except under the advice and supervision of a physician.

FORMULA: Active Ingredients: Each caplet contains Phenylpropanolamine Hydrochloride 75 mg · Chlorpheniramine Maleate 12 mg (which is

A very common warning found on the back of various OTC medicines.