

A Hitchhiker's Guide to Microscopy & Microanalysis Using Telecommunications, Email and the Internet.

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The Information SuperHighway, Email, The Internet, FTP, BBS, Modems.: all buzz words which are becoming more and more routine in our daily life. Confusing terminology? Hopefully it won't be in a few minutes. All you need is to have a handle on a few basic concepts and terms and you will be on-line with the rest of the "telecommunication experts". These terms all refer to some type or aspect of tools associated with a range of computer-based communication software and hardware. They are, in fact, far less complex than the instruments we use on a day to day basis as microscopists and microanalysts. The key is for each of us to know what each is and how to make use of the wealth of information which they can make available to us for the asking. Basically all of these items relate to mechanisms and protocols by which we, as scientists, can easily exchange information rapidly and efficiently to colleagues in the office down the hall, or half-way around the world using computers and various communications media. The purpose of this paper is to outline and demonstrate the basic ideas of some of the major information systems available to all of us today. For the sake of simplicity, we will break this presentation down into two distinct (but as we shall see later, connected) areas - telecommunications over conventional phone lines and telecommunications by computer networks.

Telecommunications by Phone Lines: Refers to the process of using your personal computer, some software (called a communications program) and a simple accessory device called a Modem to connect to a remote computer site over the telephone system. The Modem (an abbreviation for MODulator-DEModulator) is a device which converts a string of electronic signals created by your computer into a tone which is suitable for transmission

over telephone lines. Using this device and communications software (which you will need procure for your computer) you can have your personal computer call up and connect to another computer (which must also have a Modem connected to a phone line). The two computers using a predefined set of rules send signals to each other to establish a communications link at mutually compatible speeds and protocols. (This process is usually called handshaking). There is a wide range of definitions and terms associated with Modems. Many of these can be found in a brief synopsis published in the EMSA Bulletin¹. Using a modem you can access a single computer system, for example the MSA/EMS electronic Bulletin Board System (i.e. a BBS)(at 1-800-627-EMSA) or the MSA/EMC EMMPD (at 1-708-252-7919), which generally provide services that are designed to allow both the novice as well as the computer expert to communicate with each other by following a simple command menu. These menus tend to be mnemonic in nature and allow the user to login to the computer, read general bulletins (by allowing the host computer to type them on your screen), post messages to other users (electron mail, i.e., Email), and/or upload/download files.

Telecommunications over Networks: While phone line communications to a simple computer service are convenient, they are usually restricted to a single machine and those users connected to it. Over a decade ago, it was recognized that the potential to connect multiple computer systems over vast electronic networks would allow scientists from many diverse areas to rapidly exchange ideas and information. Bitnet was one of the early networks (started by IBM) which eased the computer literate into worldwide communications. Government agencies and Universities saw the advantages in this and a wide range of networks were rapidly developed, most of which have now converged to become compatible with a worldwide standard now called simply "The Internet". The Internet is more than just a single network, it is rather a collection of compatible networks all operating a set of compliant communication protocols which allow information to be exchanged between the diverse computer systems - which today range from the simplest of personal computers through supercomputers. Information can be exchanged in many different ways over Internet. The most common are: SMTP (Simple Mail Transmission Protocol or Email), MailServers, NewsGroups, Telnet and FTP.

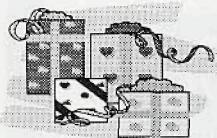
Email is the simplest of these communications links. Here you compose a message to be sent by your computer, which must be connected to the Internet, give the message an Internationally Registered Address, invoke your mail program (this program gets your mail message into a "standard" format), and away it goes! Addresses on Internet are generally of the form "Username@HostAddress", where Username is the login ID of the particular user and HostAddress is the address of the computer you wish to reach. Access to Internet by Email is available on most mainframe computer systems today. In addition, by means of gateways, access to the different on-line commercial information services such as CompuServe, America On-line, Delphi and related services is available. This is fine when you have someone to communicate with, but what if you don't know anyone and have a question involving microscopy or microanalysis? You could wait for the next MSA/MAS meeting or, if you have access to Email and the Internet, post a message to the Microscopy List/Mailserver or if you have a computer and modem post it to the MSA/EMC BBS. A mailserver is an Email reflector system where individuals post information, questions, answers to questions, comments and general hints and tips to be automatically delivered to a list of subscribers. Interested individuals register with the Mailserver (the Microscopy Mailserver address is List-server@anlemc.msd.anl.gov) by sending a subscription request, which contains a simple one line message (see MSA Bulletin for details²). Messages sent to the Microscopy Mailserver are then routed to all subscribers. Responses to the questions/comments are also posted to the server. This creates in effect, an on-line discussion group. The Microscopy Mailserver currently has in excess of 800 subscribers from 30+ countries on 6 continents. An extension of Email is the News-Group concept. NewsGroups (sometimes called UseNet) is a collection of Email messages all about a specific topic. You can connect to different NewsGroups and selectively go out at your leisure to read the information contained in the postings. This is different from the List/Mailserver concept, in that with a Mailserver everyone subscribing automatically gets every message posted. With a News-Group you generally have to go out and get the messages which have accumulated in the server and are presorted by the system operator (SysOp) into defined topics.

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Telnet (Telecommunications over Networks) and FTP (File Transfer Protocol) are additional communications options available over Internet. Using Telnet, you can login to a remote computer from your local host computer. The advantage here is that by using Telnet you can accomplish a login to the remote computer regardless of its location in the world as long as you have a valid account at the remote site. Thus, you can make a local phone call to your regional mainframe then, using Telnet, connect to an alternate computer half a world away for negligible cost. What's the advantage of this? Cost savings mainly. You can, for example, connect to the MSA/EMC BBS system using a Telnet link!³ This can be done by involving Telnet on your local host and then connecting to the remote mainframe called "anlemc.msd.anl.gov". When the username prompt appears type in EMCBBBS and when it asks for a password also type in EMCBBBS. Then simply follow directions on the screen. FTP is a different concept than Telnet. Generally, when you invoke the FTP command, your local computer is sending specific individual requests from your computer to the remote computer. FTP commands are usually associated with getting the directories of files on the remote computer which are available for copying, and then transferring copies of files from the remote computer to your local site. It is a fast and efficient way of transferring large amounts of information. ■

1. Nestor J. Zaluzec, In the Computer Corner, EMSA Bulletin, Vol. 22 No. 3, page 78, Fall, 1992.
2. Nestor J. Zaluzec, In the Computer Corner, MSA Bulletin, Vol. 24 No. 1, page 18, Jan. 1994.
3. Nestor J. Zaluzec, In the Computer Corner, MSA Bulletin, Vol. 23 No. 4, page xxx, Oct. 1993.
4. This work was supported by U.S. DoE under contract BES-MS W-31-109-Eng-38.

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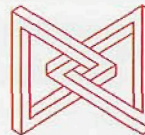
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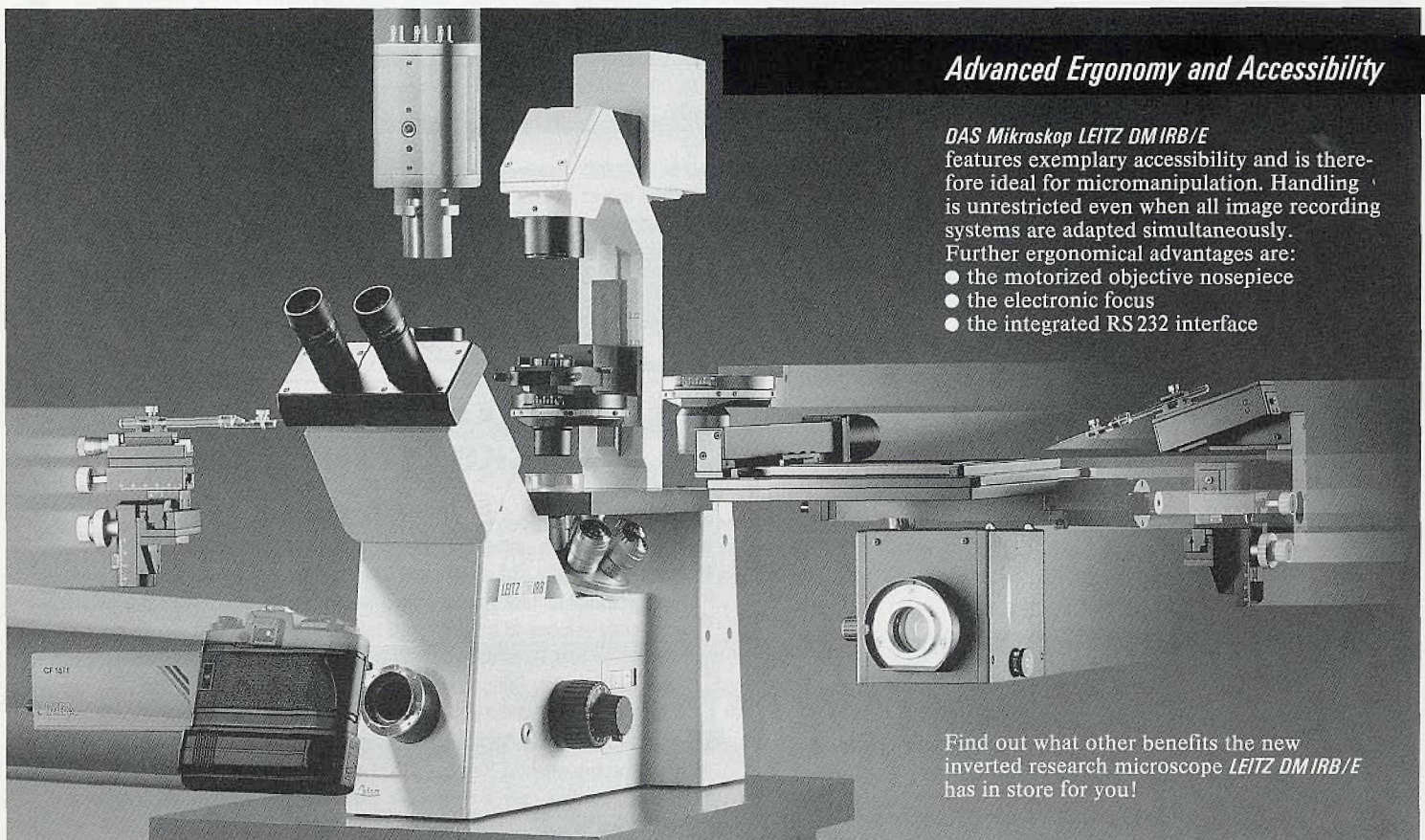
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Thanks to Mark Lund of MOXTEK, Inc., the following is a start to the list:

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(408)428-0464.

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Co: (708)913-0777.

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Conneaut lake Scientific: (814)382-1604.

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We would appreciate input from all interested in this subject - and will publish a final summary. - - - Ed.



TRICKS OF THE TRADE

PRECIPITATE STAINS?

Lead citrate grid stain (Reynold's famous formulation considered a standard in many EM labs) tends to form stains of precipitate inside the glass volumetric flask typically used to contain the stain. This precipitate stubbornly refuses to be dislodged by nylon brushes andalconox soap. Nor does it seem readily dissolved by caustic glass cleaning solutions. I have found that by filling the flask with a 2 % solution of NaOH and leaving it to soak 24 hours (or sonicate 10-15 minutes), the precipitate will be dissolved, then the flask may be thoroughly washed. This is a simple, cost-effective method, less toxic than glass cleaning solutions and can be poured down the drain if thoroughly diluted (it may actually help clean out your drain!

Now, has anyone got a method for cleaning the osmium black out of (off of) OsO₄ bottles.

Angela Welford, University of New Mexico, Albuquerque, NM