An Internet Review: The Compleat Neuroscientist Scours the World Wide Web

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The World Wide Web provides a graphical interface that allows users to explore the multiple databases of information that are accessible on the Internet. In the field of neuroscience, several hundred sites contain potentially pertinent information. This article takes a critical look at those sites and offers recommendations to those seeking broad neuroscience resources as well as those desiring sites specialized for the developmental neurosciences.

Rising to the bait of Senior Editor Pamela Hines' invitation, this ever-eager observer agreed to take a closer look at what curious scholars of the neurosciences could expect to find on the segment of the Internet's traffic that handles the World Wide Web (WWW). Some hundreds of online hours later, these callused, keyboard-weary fingers have found digital solutions out there for an entire compendium of challenges, if someone just had the right questions. The experience also provided quite a few reasons for avoiding the whole enterprise altogether unless you have some idea of what you're after, where to start to get it, and what you intend to do with it when you've got it. But for the intrepid neuroscientist who has not yet decided whether to become a Web explorer, this article will identify some extremely useful Web offerings (with some special caches to be treasured for those with a developmental bias) and a lot of suggestions for those who just choose to cruise.

Why Bother?

There are many reasons why busy neuroscientists might go exploring on the Web. These range from just plain curiosity (at the intellectually low end of the scale) to wanting to impress friends and colleagues with your knowledge of "TLAs" (three-letter acronyms: WWW, URL, LAN, WAN, CGI, API, GIF, ISP, PPP, and so on) (Table 1). There is also the strong intuitive feeling that the information you need (to run that program, fill that resource need, find that e-mail address, or check that method) is almost certainly out there someplace if you could just find it.

Depending on what else of importance you may need to do, these are all good reasons. Even the intellectual low-enders: William Gibson, the science fiction author who coined the term "cyberspace" in his 1981 novel *Neuromancer* (*1*) and who admits to eschewing e-mail, describes himself as being hooked on Web browsing (*2*). Gibson notes that "To be successful . . . is to be chronically busy." He finds in the Web a "procrastinator's dream" for "rummaging in the forefront of the collective global mind" seeking that elusive "site that contains . . . everything we have lost."

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Getting Started

If you're too busy for that kind of idyllic browsing but take your information hunter-gatherer role in life with absolute seriousness, perhaps a few examples of stellar sites will still lure you out on the Web. If you find some nuggets in the following site tours but are uncertain about how to get started, try beginning your Web experience with a visit to a site (such as **About the Internet**) that has excellent background on the Internet and its use in the graphical interface system now known as the Web. The digital address for a site is provided by its "uniform resource locator" or URL. The URL for the About the Internet site is http://home.netscape.com/home/about-the-internet.html. Once you're on the Web, how well it will meet your practical needs or exploratory urges will depend on the speed of your connection, the amount of hard drive space you can devote to storing your captured prey, and your diligence in finding what you deem of interest now or in the future.

The speed at which information resources are being added to the Web is both amazing and frustrating: It may not be there right now but it could be in a few minutes. What is out there could be fresh and accurate or merely a facade hawking a good idea, with little substance yet included; worse yet, the contents, especially the links a site offers to point you to other information providers, could be out of date or no longer even in existence. If you find a place that is rewarding to visit, either go back often or use an automated service to help you monitor it (for example, see "The URL Minder" at URLhttp://www.netmind.com/URL-minder/URL-minder.html—a free service (they have commercial sponsors) that uses a Web-surfing robot to keep track of changes in Web pages you deem important.

Some Starting Points

Most Web-browsing software comes with built-in access to online meta-sites containing large databases that can rapidly be searched for individual Web sites whose self-descriptions contain one or more of the terms about which you seek information. An advanced mode search at Alta Vista (one of the searchable meta-sites) for sites dealing with neuroscience research returned more than 10,000 sources; limiting the search query with a few specifiers such as species of organisms and research sites (universities or institutes) reduced that to only 4000—still a very daunting number.

Fortunately, pioneering colleagues in neuroscience have already paved the road toward a more logical way to find what you may want. At least five giant repositories of pointers to other neuroscience-pertinent information deserve your recognition, and maybe even a place on your list of permanent "bookmarks" or whatever your browser calls your personally chosen list of Web addresses. In this observer's opinion, these five sites stand out above the rest, and each is flavored with enough of its creators' personalities to make it more than just a collection of possibly valuable URLs. These and all the other sites mentioned (except where shortcomings are noted) gave every indication that these sites were given constant attention by their maintainers; however, there are a lot of other sites that are not. If you already know about all these sites anyway, you might decide to scroll ahead in this reconnaissance tour to some of the more specialized and less readily found sites.

1) **The Cognitive Neuroscience Resources** page of the Carnegie-Mellon University Center for the Neural Basis of Cognition (CNBC) at URL http://www.cs.cmu.edu/afs/cs.cmu.edu/Web/Groups/CNBC/other/other-neuro.html. This site provides features that will definitely facilitate its usefulness to searchers in the neuroscience wilderness who have limited speed of Internet access or relatively slow computers. Thanks to the clever people who created and main-

tain this site (their identities seem to be a closely guarded secret) its opening page choices are devoid of all graphic elements (that means it will load much faster and thus save the impatient user's time) and provide only four categories of information to choose among (each with a short list of subsets that can be directly selected from the following list): (i) **Other Home Pages** (for other sites where neuro- or cognitive sciences are to be found; for societies, for foundations, and for conferences), (ii) **Publications** (journals, publishers, publications suppliers, and online bibliographic searching), (iii) **Indices and Archives** (other neuroscience and cognitive science indices, Usenet newsgroups that discuss these topics, archive sites, and online-accessible brain atlases), and (iv) **Products** (simulators, analysis code, and products); but these are relatively limited to those appropriate for cognitive science research interests.

If you start with this site, don't be misled by the simple categories of these initial selections. There's a deep pool of information below this top level. For example, there are 147 "other" neuro- and cognitive science home pages. However, in my samplings, although some of these sites are possibly useful, there are many other and more useful sites out there that are not to be found on this list. Furthermore, in order to find what may hold value for you, the structure of this site forces you to select by scanning through sites listed only in alphabetical order. The single long source list contains a mix of academic, government, and commercial sites, but the term "site" on this list could represent any organizational level, from major universities or National Institutes of Health (NIH) institutes down to the labs of named individuals. This listing also merges sites from Australia, Austria, Finland, France, Israel, Japan, Sweden, and the United Kingdom, and lists about 10 times more U.S. sites than those from all other countries combined.

Nevertheless, this site does have many attractive resources (in the sense that it's useful both for what it offers and for what it teaches about what Web-distributed services could offer). One such feature is their CNBC creation called **Neuroscape** (Fig. 1) at URL http://neurocog.lrdc.pitt.edu/neuroscape. The anonymous Web masters of Carnegie-Mellon University describe Neuroscape as a "virtual hallway—a place to learn more about the people within our community, and the projects on which they are working." In some circles, this would be considered an intranet system (a Web-like information source that is restricted to the internal connections of local area networks and is not open to users from the Internet, except by special password-controlled gateways). However, the generous Neuroscape creators opened it up to allow the outside world to enter and browse. In this virtual hallway, users are offered clear and attractive pages that are a combination of a community newsletter, a local bulletin board, and a primer and tutorial for getting the most out of locally available computing resources and other information on and about the Web. Even on the off chance that you don't want to stay all that current with happenings at Carnegie-Mellon, the general idea of Neuroscape could be usefully exported to many other Web sites.

2) **The Keck Internet Resources** at the University of California, San Francisco's W. M. Keck Foundation Center for Integrative Neurosciences at URL http://www.keck.ucsf.edu/outside.html is another well-presented, graphics-free, easy-to-use series of lists, of which the top three sets (Neuroscience, Neural Networks, and Relevant Government Agencies) will attract the most interest for the purposes of this discussion. Of the 19 neuroscience sites listed (perhaps a subtle statement about their view of the top 20 neuroscience sites), three are mega-sites that are also noted in the set of five reviewed in this article. Two are excellent European sites—that of the Neural Systems Group of the University of Newcastle and that of the Sleep and Dreams Lab of Michel Jouvet at the Université Claude Bernard in Lyon, France (see below). The Keck list also provides a novel pointer to the **Canada Institute for Scientific and Technical Information (CISTI)**, which offers some excellent options for Internet information foragers already overwhelmed by the onslaught of traditionally published material (see below).

3) **Neurosciences on the Internet** (Fig. 2), whose URL is http://ivory.lm.com/~nab, is without doubt the largest collection of pointers to neuroscience sites on the Web, as well as in newsgroups and in other Internet-reachable electronic archives. Although attractively graphic on its native home page (and, until quite recently, with a schematic active neuron), it is easily possible to see the basic overview of this rich site nongraphically in outline view. The keeper of this site, Neil A. Busis, is chief of the Division of Neurology, Shadyside Hospital, Pittsburgh, Pennsylvania, and a clinical assistant professor of Neurology at the University of Pittsburgh School of Medicine. As a medical student 20 years ago, Busis showed his promise as a cellular electrophysiologist, publishing papers in *Science* and *Nature* before he completed his medical education with a residency in neurology. Today, in addition to his active clinical duties, Busis could lay claim to being the Eugene Fodor of neuroscience-related Web sites. Neurosciences on the Internet contains an up-to-date, comprehensive (more than 2000 sites remain available after his most recent pruning of sites that have gone down, updated at least weekly), and an almost all-inclusive list of what the Web has to offer and what he regards as its "best bets" if your browsing time is limited. These best bet choices could meet your needs, but

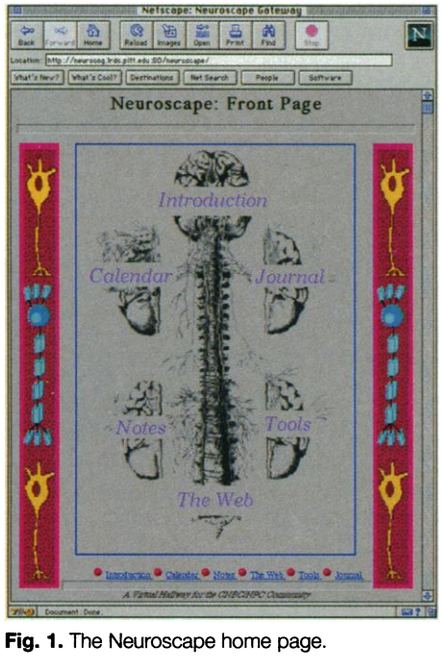

Fig. 1. The Neuroscape home page.

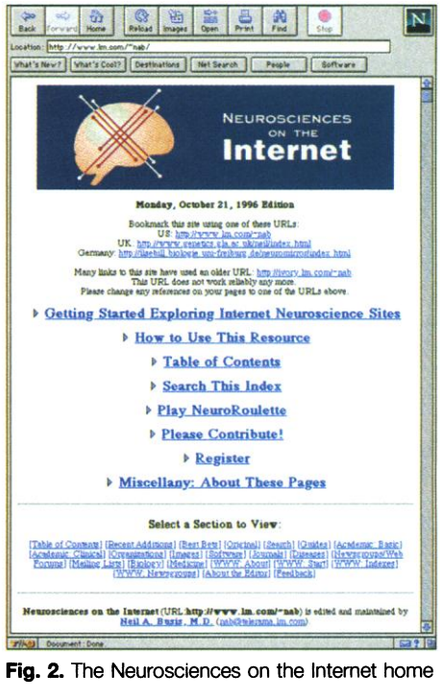

Fig. 2. The Neurosciences on the Internet home page.

the 25 or so selections are spotty, being very rich in access to clinical neuroscience Web sites but listing only a few theoretical and schematic basic neuroscience examples.

His extensive searchable index of neuroscience Web resources is also more heavily tilted toward clinical disorders than are the other four mega-sites considered here. Busis's selections emphasize neurology, neurosurgery, psychiatry, psychology, cognitive science sites, and information on human neurological disease, as well as the many lay organizations that support people with these diseases. However, although basic neuroscience sites are extremely well covered, the sheer number of listed "basic" sites (the file is 107 kilobytes) may make it taxing to find those most pertinent to your search. A more modest selection of his choices, used as an illustration of neuroscience Web possibilities for the 1996 meeting of the Association of Neuroscience Departments and Programs, is available at the slightly buried site called **A Tour of Neuroscience Web Sites** (at URL http://www.lm.com:80/~nab/andp.html). Rather than starting with his current list of more than 180 academic neuroscience research labs worldwide, and the nearly 400 specific lab groups they contain (some of whose names will mask the relevance of their content to the uninitiated), the searcher might do well to go to the more accessible list of **Non-Human Systems**.

This is a nongraphical, short, super index to a very rich underlying set of excellent information, much of it highly pertinent for developmentally oriented neuroscientists. These sites include the ***Aplysia* Hometank**, the **C. *elegans* WWW Server**, the **Flybase** and **Flybrain** *Drosophila* archives, and the **Zebrafish Server**. For neuroscientists specializing in mammalian systems, there appear to be only two hyperlink choices: **The Mouse and Rat Research Home Page** and the **Multicenter Animal Spinal Cord Injury Study**. These titles are deceptively concise, because this pair leads to a grand array of very utilitarian web resources, ranging from gene probes, to sequences, to inbred and transgenic mouse strains, and including upcoming conferences, animal use legislation, and background textbooks.

Rich as it is in many ways, Busis provides only one entry regarding nonhuman primates at this neuroscience Web site—a link to the University of Wisconsin Primate Center. (For those who need to know, all seven of the regional primate centers can be found on the Web, starting with URL http://www.ncrr.nih.gov/ncrrprog/prcdir.htm). Surprisingly, Busis does not yet provide an index that cross-references the compendium of specific research sites with the equally extensive lists of neuroscience subjects. Such an index could make this incredible universe of a site even more useful to those exploring the Web's neuroscience topics. As this report was being completed, Busis sent out a call for original material to be posted to his site, suggesting that book reviews, meeting reviews, diagnostic criteria, and more be submitted. Such original material could convert this excellent pointer source site into much more (see below).

4) The fourth stop on our tour of the neuroscience mega-sites is **NeuroLinks** (URL http://rsb.info.nih.gov/neurochem/bn5ht/neurolinks.html). The creator and maintainer of this site is R. Wayne Albers, chief of the Section on Neurochemistry in the National Institute of Neurological Diseases and Stroke Intramural Research Program at NIH. Albers and his colleagues George Siegel, Bernard Agranoff, and Robert Katzman are well known for their textbook *Basic Neurochemistry*, and this very special neuroscience-targeted mega-site was created to help Albers maintain the base of information contained in the textbook before it grew to its present size. This site makes heavy but effective use of the "frames" set of hypertext mark-up language (HTML) tags (or coding types) allowed by

Table 1. TLAs and other four-letter words Web browsers should know.

CGI: Common gateway interface. A type of program used by servers to provide access for clients (users of those servers) without regard to the kind of computer they are using.
Clients: Computers that can connect to servers.
FAQ: A file containing frequently asked questions that spares old-timers from constantly repeating their answers to the questions posed by the newbies.
ftp: The file transfer protocol used to access data archives through the Internet that was very popular in pre-Web days and still serves to accelerate data downloads in the more powerful browsers.
Gateway: A term that covers a variety of software items that can translate files between otherwise incompatible software applications or networks.
GIF: Graphics interchange format. A way to present certain kinds of images in compressed mode that is especially good when used for block images, cartoons, and simple graphics with few variations.
HTML: Hypertext markup language. The system of software tags that allows for the display of content in the style, color, and on-screen location that browsers display.
HTTP: Hypertext transfer protocol. The system of software commands that enables Web browsers to query and receive Web server information.
Internet: Basically a series of interconnected networks, 'the Internet' refers to the now-worldwide networks of networks that use the TCP/IPs to exchange all forms of information.
ISDN: Integrated system digital network. A special form of telephone connection that can provide all digital access to the Internet from private homes and offices through special ISPs with ISDN capability.
ISP: Internet service providers. These allow users without direct connections the opportunity to make them through a commercial service.
JPEG: Joint photographic expert group. A standard for graphic compression that works especially well when the image is a complex photo-like image with many shaded elements.
MPEG: Moving picture expert group, A standard protocol for encoding video images into digital format suitable for Web transmission with special "helper" programs to view playback.
Packet: For secure travel between servers and clients on the Internet, information is broken into "chunks," typically of 1.5 kilobytes or less, each of which is termed a packet.
POP: The post office protocol. The protocol used for e-mail; some advanced browsers also have added e-mail operations.
PPP: Point-to-point protocol. Allows remote users with modems to access the Internet, packaging, transmitting, and receiving their data packets in the way the Internet server protocols expect.
Server: A networked computer that can be reached by other computers on the network [a local area network (LAN), a wide-area network (WAN), or even by TCP/IP connections] to store or retrieve files. With special server software, a server can also become a Web site.
TCP/IP: Transmission control protocol/Internet protocol. The standard software used to convert data into addressable packets that can communicate between clients and servers across the Internet.
URL: Uniform resource locator. The address for the Internet site of the server that contains the set-aside space in which the Web pages are stored.
WWW: The World Wide Web. A virtual reservoir of information storage sites created by a standardized software method that uses the Internet transfer protocol for creation, transmission, and reception of hypertext links of information in the form of text, graphics, audio, or video.

the Netscape browser, so that a viewer of this site can get multiple options for selection without a great deal of new image loading, which is also a real time-saver if you have a less-than-swift connection. Not surprisingly, because he says he began this site for his own education, NeuroLinks points to the table of contents of his book and organizes forums around the topics—a clever way to keep up with advances for future editions. **The Active Zone** link offers some simple but effective animated explanations of important functional and chemical concepts, such as the activity-dependent formation and strengthening of synapses during brain development. NeuroLinks also offers a small list of gateways to other biological Web sites, but its rather narrow options do not make this facet a great attraction.

5) As a final stop, consider yet another massively hyperlinked neuroscience site, the **WWW Virtual Library: Neurosciences** whose URL is http://neuro.med.cornell.edu/VL. As the name suggests, this site is part of an even bigger WWW virtual library of scholarly content (a quick click to see that content list is worth the side trip). An eager browser will grow weary scrolling down the extremely lengthy alphabetical list of global neuroscience research sites, journals, societies (both professional clinical societies and basic societies), neuroscience publishers, and foundations, as well as funding agencies (but again, not the Regional Primate Centers). This list, whose format is dictated by the requirements of the Virtual Library format, has all of the research sites found in Neurosciences on the Internet, and then some. However, with a couple of exceptions (the Jouvet Sleep Lab site is easily found if you know who Jouvet is), unless you know what's in these sites, you'll need to visit them all to figure that out. We'll save that for another tour.

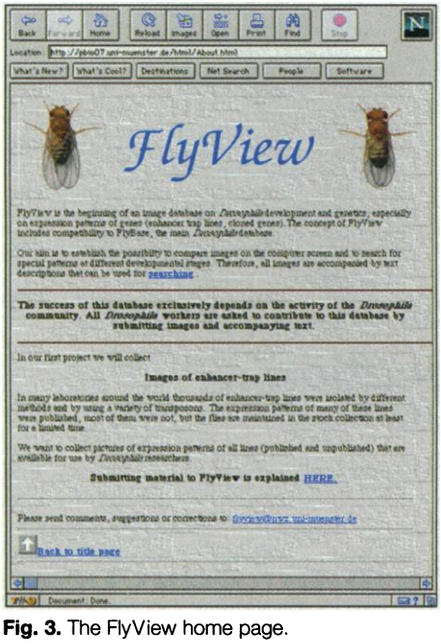

Fig. 3. The FlyView home page.

It should be noted that Dan Gardner, the Cornell professor of physiology who took the responsibility for initiating and maintaining this site with what he calls a "cold and selective eye," is also the maintainer of **APLYSIA** (not to be confused with the other "ordinary" molluscan Web sites, this is an acronym for the "Aplysia proficiently lets you scan identifying attributes" database project), which can be found at URL http://ganglion.med.cornell.edu/db-home.html. In that database connection, browsers may also find it interesting to scan the home page of the **Human Brain Mapping Project**, a large, multi-agency, international effort to bring bio-informatics together with neuroscience, at URL http://www_hbp.scripps.edu/Home.html, from which one can get overviews of the whole program, as well as the large and small projects that are under way to demonstrate the feasibility of applying informatics to neuroscience.

The Web and Journals on the Web

Most of today's neuroscience Web sites are descriptions of people or groups working in specific labs, departments, or institutes whose Web sites offer you descriptions, often colorfully presented, of their programs and personnel. Slightly more ambitious are the mega-sites that have collected all the pointers to those Web locations. A few, such as the APLYSIA and the Human Brain Mapping Project sites offer new compilations of already published data that are only available on the Web. More recently, as with Busis's call for original materials to be posted at Neuroscience on the Internet, content posted to Web distribution channels may now include totally original reports that have never been published in print. Experienced Internet users will be aware of **Psycoloquy** (URL http://cogscisoton.ac.uk/~harnad/psyc.html), which describes itself as "a refereed international, interdisciplinary electronic journal sponsored by the American Psychological Association" and publishes articles and peer commentary in all areas of psychology, cognitive science, neuroscience, behavioral biology, artificial intelligence, robotics/vision, linguistics, and philosophy.

In an extension of that trend, browsers may wish to follow two new electronic-only journals in the neurosciences. The **Neuroscience-Net e-journal** at URL http://www.neuroscience.com/ calls itself "A Scholarly Journal Devoted to Publishing Research in Basic and Clinical Neuroscience," but it had fewer than six articles when I browsed it in mid-August. **Neural Computing Surveys** is to be edited by Arun Jagota at URL http://www.icsi.berkeley.edu/~jagota/NCS for the purpose of providing "a forum that encourages the regular production and perusal of high-quality survey articles" in the evolving interdisciplinary field of neural computing.

Of course, the competition for your online viewing time changed considerably when the Society for Neuroscience (at URL http://www.sfn.org) began full-length, online publication of its *Journal of Neuroscience* with the 1 August 1996 issue (go to URL http://www.jneurosci.org/), after posting complete tables of contents and abstracts of all papers since January 1996. This bold step will pose major challenges for any other online neuroscience journals who want to compete for your original content submittals by offering the speed and electronic distribution advantages of the Web. (*Science*'s original research content is also full-length and online, effective with the 20 September issue.)

Because there are already too many journals to follow for scientists who still want to have a real life, the Web could begin to serve a more useful role by helping scientists stay abreast of the reports that are in their spheres of interest. Consider the efforts of CISTI, which recently began to offer two excellent options for Internet information seekers already overwhelmed by their journal loads. *SwetScan* is a new database service from CISTI that contains a continuously updated list of tables of contents from 14,000 different magazines and journals from around the world. *SwetScan* users can access the database and choose the journals they want to see; of course, an account, identifying details, and a password are required. However, CISTI also has another more modest service that seems quite useful on a very reasonable scale, known as a table of contents service. Using that service, a reader anywhere in North America can, for a mere $7 per year (Canadian), remain aware of recently published information in his or her field without having to pay for a journal subscription: CISTI buys the journals and allows readers to choose the articles they want to read. The reader pays only for the table of contents and for copies of articles of real interest.

Some Sites for Special Interests

We should not leave this round-the-world-in-80-clicks analysis of neuroscience on the Web without noting some smaller sites with significant exemplary features. Two are content-related sites whose informative and

attractive display of options and news will make them site models for the small research societies and laboratories: **The Sleep Home Pages** at URL http://bisleep.medsch.ucla.edu/ and the already-noted **Jouvet Sleep Lab** site at URL http://ura1195-6.univ-lyon1.fr/ (which is also an interchangeable French/English language site) will provide both clinical and basic sleep researchers with an admirable place to join in their community of interest. Both sites provide comprehensive resources for those involved in sleep research and the treatment of sleep-related disorders. Beyond their underlying content, these sites also have excellent, visually attractive and informative home pages with substantial but not excessive links to their members and their interests. Perhaps the most ambitious site found in this tour is the **G-Protein Coupled Receptor Data Base**, at URL http://receptor.mgh.harvard.edu/GCRDBHOME.html, organized and maintained by Frank Kolakowski, now at the University of Texas Health Science Center in San Antonio. It is a veritable tour-de-force organization of virtually every G protein–coupled receptor, the other members of each branch of its superfamily, its physiological properties, and its transductive mechanisms. The **Department of Neuroscience at Case Western Reserve University** (at URL http://neurowww.cwru.edu/) has provided a resource at their site that should be both illustrative and directly useful to teachers of neuroscience, whether their students are children, pre-college scholars, or adults concerned about the responsible use of animals in research (go to URL http://neurowww.cwru.edu/teach/teaching.htm).

For those whose interests lie in nervous system development, **The Visible Embryo** (go to URL http://visembryo.ucsf.edu/) offers simulations of the first 4 weeks of human embryonic development, as well as links to about a dozen other sites, including the Society for Developmental Biology, the Carnegie Institution, two sites dealing with transgenic mutations and targeted mutagenesis in mice, and the Jackson Labs. Quite naturally, all of the favored models of developmental biology have extensive Web offerings (generally linking you to others who work on those models), from *Caenorhabtitis elegans* (at URL http://eatworms.swmed.edu/ (replete with Sydney Brenner's original thoughts on doing this project) to *Drosophila*, to zebrafish. Drosophologists seem to have the largest number of interlinked choices, starting with the **Berkeley Drosphila Genome Project** (at URL http://fruitfly.berkeley.edu/) where one can gain access to the adult, pupal larval, and embryonic *Drosophila* brain archives, as well as data on specific mutant brains, and to the related Web sites Flybase and Flybrain (both maintained at the University of Freiburg in Germany) and **FlyView** (Fig. 3) (at URL http://pbio07.unimuenster.de/html/About.html), an image database on *Drosophila* development and genetics, especially the expression patterns of genes compatible with the other databases. The **Zebrafish home page** (at URL http://zebra.sc.edu/) gives the interested browser direct links to the near-dozen labs performing the work that has captivated vertebrate neuronal development.

Looking Ahead

There can be no question that neuroscientists have taken the Web to their hearts. One cannot escape the sense of sharing and creativity that permeates the sites noted here as well as the many scores of excellent sites whose acknowledgment is beyond the limits of this article. There's also no question that no single site yet provides an easy-to-use universal gateway to all of the sites a neuroscientist might find helpful. Given the tools that have been developed for recording and organizing Web sites, the orderly minded explorer might like to arrange preferred sites in a personal information manager that would contain, in addition to a way to check one's schedule against interesting meetings or seminars, ways to link important new papers (especially those timely and critical overviews of new data fields) to a bibliographic manager, to check one's data against that which has just been published, and probably a lot more functions (*3*).

Perhaps there's no compelling reason why there should be a universal neuroscience site; nor, perhaps, is there a need right now to try to define what it should contain. Maybe that's a good question to pose to you neuroscience browsers: What would you like to access that you can't at the moment? You can let me know at fbloom@scripps.edu. Maybe we'll take another tour sometime to look for those things.

REFERENCES AND NOTES

1. W. Gibson, *Neuromancer* (Ace Books, Berkeley Publishing, New York, 1981).
2. *New York Times Magazine*, 14 July 1996.
3. What to do with all those sites. Once you've gotten your Web browser "wet," so to speak, it won't be long before you're going to get interested in some ways to keep your sampled "keeper" Web sites organized. There are many shareware software programs that are available to do this, and the most competent browsers have at least rudimentary address books included for this purpose. A list with descriptions of the shareware software (such as ericsbookmarks, hotlistgrabber, urlclerk, and urlmanager) can be seen at URL http://www.jumbo.com. There are also commercial applications available that are somewhat better at this task. Compiling this survey of neuroscience Web sites gave me an opportunity to test WebWhacker and CyberFinder extensively. WebWhacker, from the ForeFront Group, version 1.0.2 http://www.ffg.com (telephone: 713-961-1101) lets you save specific pages without leaving your browser. You can then and go back to that site later and save the pages it contains, as well as some of the external links to a local file on your hard drive. In that way, you can browse to your heart's content, usually much more quickly than if you were downloading each page as you needed it from the Web. A demo version good for 30 days ia available from their Web site in both Mac and Windows versions. CyberFinder, produced by Aladdin Systems of Watsonville, CA (telephone: 408-761-6200), provides "hot keys" through which you can blindly save Web sites you like to libraries of sites that you can organize in any categories you wish; you drag saved sites from one library to another, and you can go to the selected sites immediately by using another hot key to launch your Web browser to that site. Through a sad mistake, this pioneer discovered that one cannot keep both programs installed at the same time. Web Buddy (for PowerPC Macs now) [from DataViz Inc., Trumball, CT (telephone: 203-268-0030; URL http://www.dataviz.com] will also try to perform exactly this same series of tasks but was only recently available for testing in a beta version. It goes the other commercial software one better by allowing the user to make bookmarks of a site, make immediate captures of pages at a site at many levels below the home page, or schedule those often-prolonged downloading sessions for times when the Web is less prone to heavy use (such as 3 a.m. on Sundays).