



Scotland Yard Stalks Printers' Prints

By Richard L. Hudson

Next time you use the office printer, stop and think: You may be creating evidence that could be used against you in a court of law. Or so says Mark Arbouine, a forensic scientist here at Scotland Yard's crime laboratory in London.

To demonstrate, the 29-year-old Mr. Arbouine takes a sheet of paper from a laser printer and trains a microscope on it. There in the top left corner, appears a tiny black smudge, barely visible to the naked eye, but under his microscope as telltale a piece of evidence as any bloodstain or fingerprint. He moves the paper and focuses the microscope exactly 49 millimeters down the page: an identical smudge. He moves the paper down another 49 millimeters: a third smudge. "All three marks match up exactly," he says.

But why? He examines the laser printer's drum, the revolving cylinder that transfers toner to paper. Its circumference is 49 millimeters. And there, on its shiny surface, is a tiny pockmark.

In this city where the fictional Sherlock Holmes worked a century ago, Mr. Arbouine and his colleagues are updating forensic techniques to the computer age. His elementary deduction in this case: Just as most typewriters have misaligned or damaged keys, so many laser-printer drums have random identifying defects, perhaps caused by dust particles at the factory or by rough handling when loaded into the printer. Each time the drum revolves, the flaws leave tiny marks behind on the paper. That's useful trivia to Mr. Arbouine. In court, it could link a suspect document to the printer that produced it.

For forensic scientists, technology has proved to be a double-edge sword. On one side, it has made their work easier by providing powerful new lab techniques. But it also has created headaches, especially for document specialist such as Mr. Arbouine. Each

new printing technique produces more-uniform documents than the last. With each one, forensic scientists have had to find the key flaw, the telltale mark that they need to trace a document back to its author.

So far, white-coated gumshoes like Mr. Arbouine have somehow managed to keep pace. To keep up with counterfeiters, the US Secret Service has amassed the world's biggest collection of inks. The German federal police lab has fancy computer-searching methods – to match suspect handwriting to a national database of handwriting samples, for instance. But ever since Holmes, British criminologists have been famous. Taking shoeprint impressions with plaster of paris began here in



the 19th century, as did DNA fingerprinting a decade ago at the University of Leicester in England. Mr. Arbouine's employer, the Metropolitan Police Forensic Science Laboratory, opened in 1953 as one of the world's first formal crime labs.

Mr. Arbouine works in the lab's Questioned Documents section, and spends most of his time studying forged wills, fraudulent checks, and other paper refuse of London's famous underworld. But between cases, he and colleagues squeeze in some research into new lab techniques.

It turns out no document technology is flawless. Manual and electric typewriters have loads of faults—keys worn or knocked out of line. The "golfballs"

on IBM-style typewriters from the 1960s wear down. Carbon-film typewriter ribbons are tedious but simple to mirror-read. Plastic daisy-wheels from the 1970s chip or bend from repeated impact. The dust or smudges on the glass of a photocopier leave identifying marks on copied documents. Computer tapes and disks can be painstakingly examined. And even electronic mail can be tapped. "With each step [in document technology], we thought it was going to limit what we could do," says Mr. Arbouine's boss, Alan Filby. In fact, ingenuity has kept the police abreast.

"I have a fascination about crime" is how Mr. Arbouine, a former government biochemist, explains his work. No particular case prompted the laser-printer work; he and a former colleague, Stephen Day, just thought it might come in handy someday, and London's Metropolitan Police authorities agree, recently adding laser printers to their list of routine evidence to seize in raids.

Mr. Arbouine and Mr. Day published their research in the *Journal of the Forensic Science Society*, a scholarly British quarterly whose pages, though bristling with scientific jargon, would have made even Agatha Christie squirm. "An analysis of opiates in fly larvae sampled on a putrefied cadaver" is the title of one paper, in which some French criminologists report an innovative way to check for drugs in long-deceased murder victims.

Forgers should be advised: Even examination of old-fashioned handwritten documents is now high-tech. If you alter the amount on a check, use the same pen as the original writer, because two seemingly identical inks can be distinguished by shining by ultraviolet or infrared light on them. Don't try and rub somebody's name from a will, because sprinkling a special mold on it reveals all erasure marks. And reading the impressions that a pen leaves be-



hind on a notepad is now simple. The pad is electrically charged, photocopier toner sprinkled over it, and the “ghost writing” appears instantly. This method, co-developed by the lab here, helped convict Palestinian terrorists who tried to kill the Israeli ambassador to Britain in 1983.

And technology keeps moving forward. The lab’s latest project: automatic handwriting software. One of Mr. Arbouine’s colleagues, Christopher Davies, is poring over a selection of

handwriting samples on his workbench. To an untutored eye, they look like they were all scribbled by the same person, but some were by hand and some by computer. The computer variants were produced by some new commercial software that analyzes a person’s handwriting and devises a special “font” to ape it. The aim is to personalize business correspondence to make it look handwritten even though it’s really done by a word processor and laser printer. But, Mr. Davies says, the po-

lice are concerned that this kind of product could be a godsend to forgers.

His conclusion: not yet ready for crime time. The machine-written letters are just too good. The words are spaced too evenly, the letters too uniformly shaped. Nobody writes that regularly. It would never trick a handwriting analyst. ■

(Richard L. Hudson is a staff reporter of the Wall Street Journal where this article appeared.)

Printrak Press Release

Printrak LSS 3000 now offers advanced palmprint capture capabilities. LSS 3000 successful in Miami-Dade Police Department palmprint beta project.

Printrak Inc., a leading global supplier of enterprise software and related services for information management and decision support, announced the successful initial deployment of their LiveScan Station 3000 Palmprint Capture module.

The LSS 3000, which offers advanced palmprint capabilities, was recently installed and tested as part of a beta project at the Miami-Dade Police Department. The LSS 3000 beta unit was installed at the Miami-Dade Juvenile Assessment Center (JAC) on August 6, 2000, and testing officially concluded on September 23, 2000. The Miami-Dade Police Department is one of the only agencies in the US that currently stores and searches palmprint images using an electronic database.

“We are extremely enthusiastic about Printrak’s latest technology, the

LSS 3000, and the additional palm capture capabilities,” said Glen Calhoun, Superintendent of the Fingerprint Identification Section of the Miami-Dade Police Department. “The system provides superior levels of clarity and detail quality in all palm and rolled print processing. In fact, we are so impressed with the system’s performance that we have recently purchased the LSS 3000 beta unit, and ordered 10 additional units for our agency.”

The Printrak LSS 3000 offers several new features including the Print Acquisition Scanner, that provides increased flexibility, accuracy and overall ease of use, with two scanning platens, one for rolled prints and one that allows for palm and slap images. The unit takes advantage of user interfaces and workflow processes that are consistent with Printrak’s previous LiveScan products, reducing the amount of time necessary for training.

In addition to superior ease of use, the new LSS 3000 also features local image processing, which saves agencies time by extracting minutiae locally, automatic slap to roll comparison and

Automated Fingerprint Identification System (AFIS) quality control, which ensures submission acceptance.

The LiveScan Station 3000, series U (designed for UNIX) and series N (designed to address the growing market of Windows NT networks), workstations are now available. Also available is Printrak’s DeskScan 3000, specifically designed to support the employment, enrollment and other various requirements for civil and public agency applications. ■

(Printrak International, Inc. is a leading provider of enterprise-wide information technology solutions for public safety and criminal justice agencies. Printrak’s products appreciably increase the accuracy of investigations and enhance the safety of law enforcement officials in the field by facilitating the timely flow of accurate, relevant information to the end user. For more information, visit www.printrakinternational.com or contact Cameron Triebwasser at (714) 238-2000.)

Submitting Unusual Prints

If you would like to submit a fingerprint pattern that you have found to be interesting or unusual please send it to the editor at the address listed in the 2001 Officers list behind the front cover of this publication.