network of cancer clinics.

Before his fall from grace, Bezwoda had raised high hopes in the cancer community. At the American Society of Clinical Oncology's annual meeting in Atlanta last May, he described a trial involving 154 breast cancer patients whose advanced tumors were removed but who remained at high risk of metastasis. According to his presentation, Bezwoda gave each of 75 patients two treatments with a high-dose drug cocktail. Designed to kill the cancer cells, the bombardment also inflicts heavy collateral damage: It destroys bone marrow, where blood cells are formed. To compensate, Bezwoda transplanted the patients' own marrow cells after each round of chemotherapy.

Compared to control patients given a low-dose drug therapy, Bezwoda reported, the high-dose group survived about twice as long without a relapse, on average. Similar blitzkriegs have worked against testicular cancer and some leukemias, so "many people were very enthusiastic and thought we should go ahead" with a major trial based on Bezwoda's protocol, says oncologist Marc Lippman of Georgetown University's Lombardi Cancer Center in Washington, D.C.

Observers were puzzled by a major discrepancy, however: At the Atlanta meeting, three other trials, all similar to Bezwoda's, reported that a high-dose regimen offered no benefits over standard therapy. When Rifkin and others met last December at the U.S. National Cancer Institute (NCI) to sketch out plans for a follow-up study, Rifkin recalls, "we felt we should go over there and have a closer look." NCI dispatched a seven-member audit team to South Africa on 25 January.

They were in for what Rifkin calls "a big surprise." As outlined in the audit team's report, published 10 March on *The Lancet*'s Web page (www.thelancet.com), Bezwoda could produce only 58 records of patients treated with high-dose chemotherapy, 17 fewer then he claimed in Atlanta to have treated. By his own protocol, the majority of patients should never have been enrolled, the auditors reported. Even more disturbing, there were no records on any of the 79 control patients. "It's unclear whether [the missing patients] ever existed," says Rifkin. Bezwoda offered no documentation that any patients gave informed consent to take part in the trial, and when asked by the audit team, the university's ethics board had no record that the study was submitted for review.

Apprised of these revelations, Cleaton-Jones launched a probe on 31 January. One day earlier, he had received a letter from Bezwoda in which the researcher acknowledged "improving" his results by misstating which drugs were given to control patients. However, asserts audit member Allen Herman, an epidemiologist at South Africa's National School of Public Health in Pretoria, "this was a very narrow admission that did not at all correspond to the full range of his misconduct."

According to Cleaton-Jones, Bezwoda resigned before the investigation began, effective the end of March. But a three-member jury that presided over the hearing deprived Bezwoda of that exit, firing him on 10 March instead.

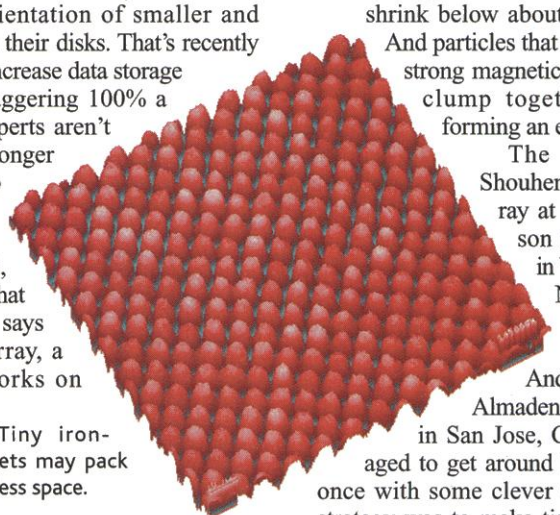
Bezwoda could not be reached for comment, but in an 11 March statement he maintains his findings are valid. He claims his misrepresentation of the control group "does not invalidate my basic conclusions" about high-dose chemotherapy and patient survival. He denies forging patient records and says he intends to appeal his dismissal.

The Health Professional Council of South Africa, which has the power to revoke Bezwoda's medical license, has launched its own investigation. Says Herman, "This story is far from over." **–MICHAEL HAGMANN**

CHEMISTRY

Nanocrystals May Give Boost to Data Storage

For companies that make magnetic disk drives, the future is scary. Over the past 5 decades, engineers have managed to control the magnetic orientation of smaller and smaller spaces on their disks. That's recently allowed them to increase data storage capacity by a staggering 100% a year. Industry experts aren't sure how much longer they can keep up that blistering pace, however. "Five years out, we don't know what will come next," says Christopher Murray, a chemist who works on new materials for future disk drives. "It's an unnerving situation."



Fine grain. Tiny iron-platinum nuggets may pack more bits into less space.

CREDIT: SUN *ET AL.*/IBM RESEARCH (WATSON AND ALMADEN LABS)

Now, Murray and his IBM colleagues have hit upon an answer that may steady a few nerves. On page 1989, the researchers report creating tiny carbon-coated metallic particles—each just 4 nanometers, or billionths of a meter, across—that they assemble into a thin sheet and bake into a magnetic film that could be used in hard disk drives. Down the road, if each of the tiny particles can be made to store a bit of information as a magnetic field, the films have the potential to hold terabytes of data per square inch, hundreds of times the capacity of today's disk drives. The new nanoparticle films aren't about to hit the computer superstores: Researchers must still work out how to make them compatible with the technology used for writing and reading bits of data to the films. Still, Jim Heath, a chemist and nanoparticle expert at the University of California, Los Angeles, says the progress thus far is impressive. "This is a big deal," he says. "It means that magnetic recording could be carried down to near molecular length scales."

Capturing the $35-billion-a-year market for disk drives won't be easy, however. Today's hard disks owe their storage prowess to films made from a cobalt alloy that are rugged and cheap to make. Manufacturers essentially spray-paint magnetic material onto a surface under vacuum and bake it. That leaves a material full of 15- to 20-nanometer magnetic grains whose magnetic orientation can be aligned by a recording head positioned just above it. Typically, a bit of information is stored as the common orientation of hundreds of those grains.

Engineers have long increased storage capacity by shrinking the magnetic grains in the films, so each bit of stored data takes up less space. But there's a limit to this process: Many magnetic materials, such as cobalt, lose their magnetic behavior when particles shrink below about 10 nanometers. And particles that do maintain their strong magnetic behavior tend to clump together instead of forming an even sheet.

The IBM team—Shouheng Sun and Murray at IBM's T. J. Watson Research Center in Yorktown Heights, New York, along with Dieter Weller, Liesl Folks, and Andreas Moser at the Almaden Research Center in San Jose, California—managed to get around both problems at once with some clever chemistry. Their strategy was to make tiny particles from iron and platinum, which would start out as weakly magnetic—allowing them to form an array—but then transform them into stronger magnets at the end.

The researchers started by concocting a solution that included two metal salts—one containing iron atoms, which are hungry for electrons, the other platinum atoms capable of donating electrons. As the salts dissolved, the iron atoms turned to the platinums for electrons, causing the atoms to begin assembling themselves into a ball. Also in the brew were soap molecules, oleic acid, and

oleyl amine. As the particles grew, the soap molecules glommed onto the metal particles and stopped them growing at 4 nanometers.

At this stage, the metal particles were weakly magnetic jumbles of iron and platinum atoms. To make an array, the IBM team simply poured the particles out of the beaker. As the solvent evaporated, the particles nestled down into a regular structure like oranges stacked in a box.

Next, the IBM researchers baked their array like a sheet of cookies, at 500°C for about 30 minutes. The heat fused the organic molecules into a hard carbon coat that locked the particles in place, and it caused the iron and platinum atoms to segregate into distinct atomic planes, a change that dramatically boosted the magnetic strength of the materials.

The IBM team showed that these materials can store data faithfully at a density equivalent to that of hard disks on the market today. The particles' small size may even allow researchers to boost that density 10-fold using current read and write heads. But if heads can be improved to manipulate magnetic fields on single particles—and that's a big if—then the films could potentially store orders of magnitude more data.

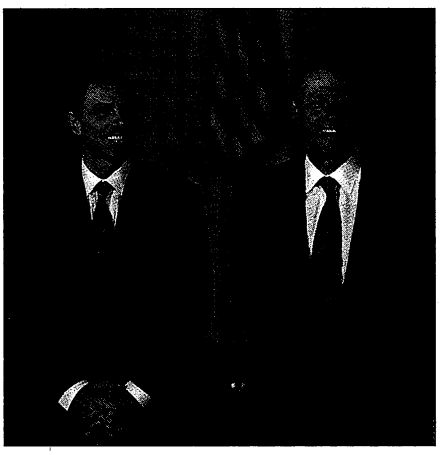
Sun and Murray are quick to point out that the new materials need more work. The biggest problem, Murray says, is that conventional recording heads work only if all the magnetic grains or particles on a disk have their crystalline axes aligned with the disk's surface. For now, however, the tiny iron-platinum particles can freeze in place facing any direction. Murray says the IBM team is working on aligning the particles by applying an external magnetic field to their films as they bake. If they succeed, the future of data storage may soon become a little less unnerving. **–ROBERT F. SERVICE**

GENOME SEQUENCING

Clinton and Blair Back Rapid Release of Data

It's not often that heads of state wade into a furious quarrel in the scientific community, but both President Clinton and British Prime Minister Tony Blair did so this week. On 14 March, the two leaders announced that they enthusiastically support the rapid release of human genome sequence data, a principle long advocated by Francis Collins, director of the National Human Genome Research Institute (NHGRI), and other scientists in the nonprofit sector.

Clinton released a joint statement with Blair at *Science*'s press time arguing for the rapid release of human genome data. Afterward, Clinton made some personal remarks that went even further. Speaking at the annual medal of science ceremony at the White House, Clinton urged private companies to "make raw [DNA] data publicly available" and make "responsible use of patents." The statements were carefully worded to support patents on "new gene-based health care products." But they seemed directed at the activities of some private data-marketing companies—such as Celera Genomics and Incyte—that have been engaged in high-



View from the top. Two leaders say raw gene data should be unencumbered by restrictions.

volume sequencing of human DNA and collecting genes and genetic variations.

Although the high-level attention to this debate is new, the debate itself is not. The largest DNA sequencing labs funded by the U.S. government and by the Wellcome Trust, a British charity, endorsed very similar principles for data release at a meeting of top genome sequencers in Bermuda in 1996. Typically, these big labs release new human DNA data within 24 hours of production, posting results on the Internet. But the labs' insistence on this practice has caused some friction with the private sector. Recently, for example, talks broke down between Celera and a group of nonprofit centers over how they might collaborate on completing the sequence of the human genome. They clashed specifically on public access to data (*Science,* 10 March, p. 1723).

In addition to giving Collins's side of the debate a boost, this high-level endorsement of the Bermuda rules may have an impact on discussions within the U.S. Patent and Trademark Office (PTO). For several years, Collins and former National Institutes of Health director Harold Varmus have tried to persuade PTO leaders that they should not grant patents on simple gene discoveries. In letters and speeches, both have argued that only inventors who clearly describe the "utility" of a gene, such as a plan to develop a medical product, deserve to win a patent. Although the PTO has proposed tighter policies, it hasn't gone as far as Collins would like (*Science*, 18 February, p. 1196).

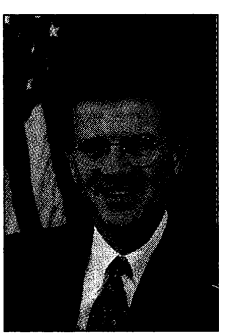
Collins calls the Clinton-Blair announcement a "very encouraging" and "gratifying endorsement" of NHGRI's strategy. But presidential enthusiasm may not carry much legal weight. PTO biotech section leader John Doll says: "It doesn't seem like this is going to affect biotech patenting at all." And Celera said in a statement that the company "welcomes" the Clinton-Blair policy, calling it "completely consistent" with Celera's plan to publish the human genome in a peer-reviewed journal and make the information "available to researchers for free." **–ELIOT MARSHALL**

BIOMEDICINE

Congress Investigates Fetal Tissue Sales

At a packed hearing on 9 March, members of a congressional committee vowed to investigate whether some companies are profiting from the sale of fetal tissue. One committee member said after the hearing that he would introduce a bill requiring researchers to report the source and cost of fetal tissue they use. But—much to the disappointment of antiabortion groups that had hoped the hearing would spark outrage over grisly tales of trade in body parts—the testimony itself turned up no persuasive evidence of wrongdoing.

Indeed, one key witness, a clinic technician who had made gruesome allegations in a video that an antiabortion group had been circulating on Capitol Hill, backed away from many of the claims he had made on the tape. That left for evidence a network news broadcast, aired the previous night, in which a Missouri pathologist on hidden camera seemed to admit selling fetal tissue for a profit—but committee members disagreed over whether that indicated widespread disregard for the law.



Keeping track. Representative Tom Coburn.

Under a law enacted in 1993, researchers can pay for the cost of procuring and shipping fetal tissue. However, buying or selling fetal tissue for a profit is strictly forbidden. At the hearing, both Republicans and Democrats voiced support for fetal tissue research while condemning any possible for-profit sales. "Full and vigorous enforcement of the law against the sale of fetal tissue is essential to prevent a negative impact on legitimate research," said Michael Bilirakis (R–FL), chair of the subcommittee.

The impetus for last week's hearing arose

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