jumpers. To do that, you take 7 strands of brillium copper wire with a diameter of 4.3 mils, weld it every 32 mils, grab the welds, and twist it backward to make sort of little bird cages between the wells to match where the circuit boards are. You do that 8 times in a jumper a quarter of an inch long, then pull it through the board. These little spring 7 strands of wire that are sprung cause very high quality contact--namely 7 points for every board as you pull it through. It makes a little noise though you can't hear it, but you know that if you were an ant down there, you could hear it clicking. There are a number of problems, mostly relating to quality control in the production engineering sense, to do this assembly. We have about 12,000 of these jumpers in each module. It's hard to do that by hand because you need a microscope to see what you're doing. You have to pull it through just the right amount and then you have to cut the ends off and it's very challenging. What we're doing now is working with Hughes in their Carlsbad operation in California. They've been making robots and ball bounders and were happy to take on this assignment of making automatic assembly machines. We don't know if they're successful yet--they start delivering at the end of September. They're delivering 12 or 15 machines by mid-November that are supposed to automatically load up the entire module with 12 or 16,000 jumpers without human intervention, and they manufacture the jumpers on the site. You just put in a spool of wire and do the welding, the cutting, and the bulging, so this will be something to see. That's a critical part of our program right now.

Q: Is there a technology beyond gallium arsenide right now?

A: Yes, because the communication people don't use it anymore. They've all moved on to indium phosphide. What's very popular is epitaxial indium phosphide on silicon. You put down just a few molecules on a stable surface. That's what AT&T is doing at the moment in the communication business. This has another factor of 2 in electron mobility over gallium arsenide so one could expect to head in that direction. On the other hand, we're at such a primitive level on gallium arsenide, we may have a few more steps to take before we need to do that. So it looks like multiple choice in the near future.

Q: Do you expect to see gallium arsenide memory circuits in the next few years?

A: I had a little flier at that myself because I wanted to find out where the