

Here in Canada they are helping fabricate automobiles, aircraft, and jet engines, among other things, and many of them are welders.

A robot welds no faster than a human, but when a human must pause every few minutes to check his work, light a cigarette, or rest, a robot is never tired, and never bothered by fumes or other health and safety hazards. Because they can sustain the most brutal rhythms and conditions of work, and thus greatly boost productivity, welding robots are being adopted in growing numbers.

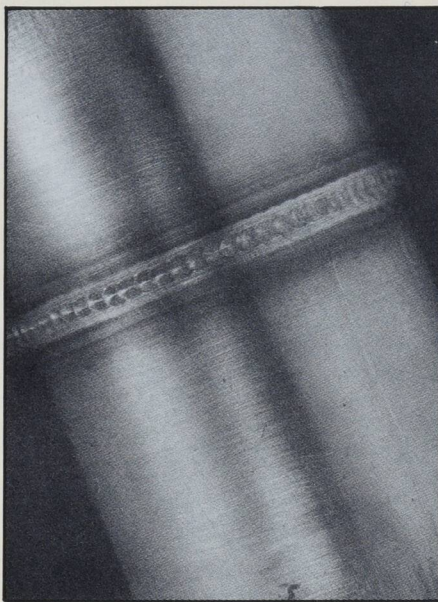
But according to Ghislain Bégin, a researcher with the Welding Institute of Canada who works at NRC's Industrial Materials Research Institute (IMRI) in Montreal, most of the welding robots commercially available are limited; they are not "interfaced with their milieu." Prisoners of inflexible programs, they cannot adapt to minor changes. Mindlessly, they continue to weld at the pre-programmed spot even when small irregularities in the pieces of metal they are joining mean that particular spot is no longer the right one.

By making them intelligent, by giving eyes and brains to these slavish robots, Bégin and others hope to set them free.

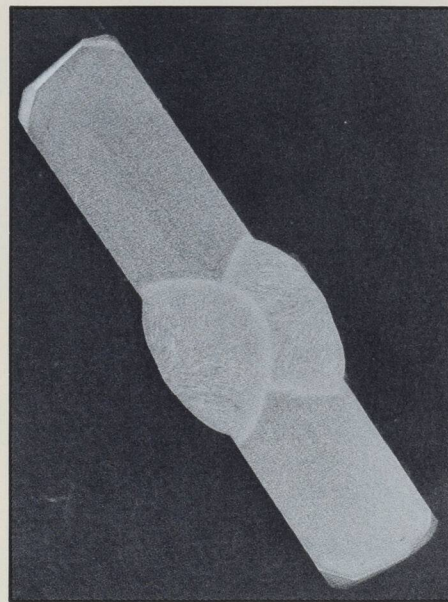
In practical terms this entails developing computer-aided feedback control systems. Such a system needs sensors to monitor a welding operation and computer software to respond to signals from the sensors by appropriately and instantaneously modifying the signals that control the welding torch.

Freeing the welding robots also entails developing new ways of teaching them. Conventional welding machines learn the sequence of tasks they must perform by copying a human teacher. This is inefficient, and since it requires a human to enter the work area of a robot and do some welding here, it can be dangerous. George Bata, the director of the Institute hopes that the robots of the future will teach themselves, directly working out, from engineering drawings, what must be done to assemble the final product.

The autodidactic cybernetic welding robot does not yet exist, but what you see on these pages may be its progenitor. ☾



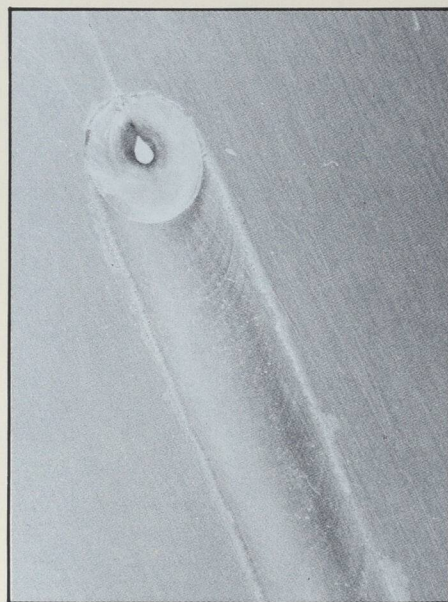
*Automatic seam tracking.*



*One pass on each side.*



*Total penetration on one side.*



*Pulsed current weld.*

