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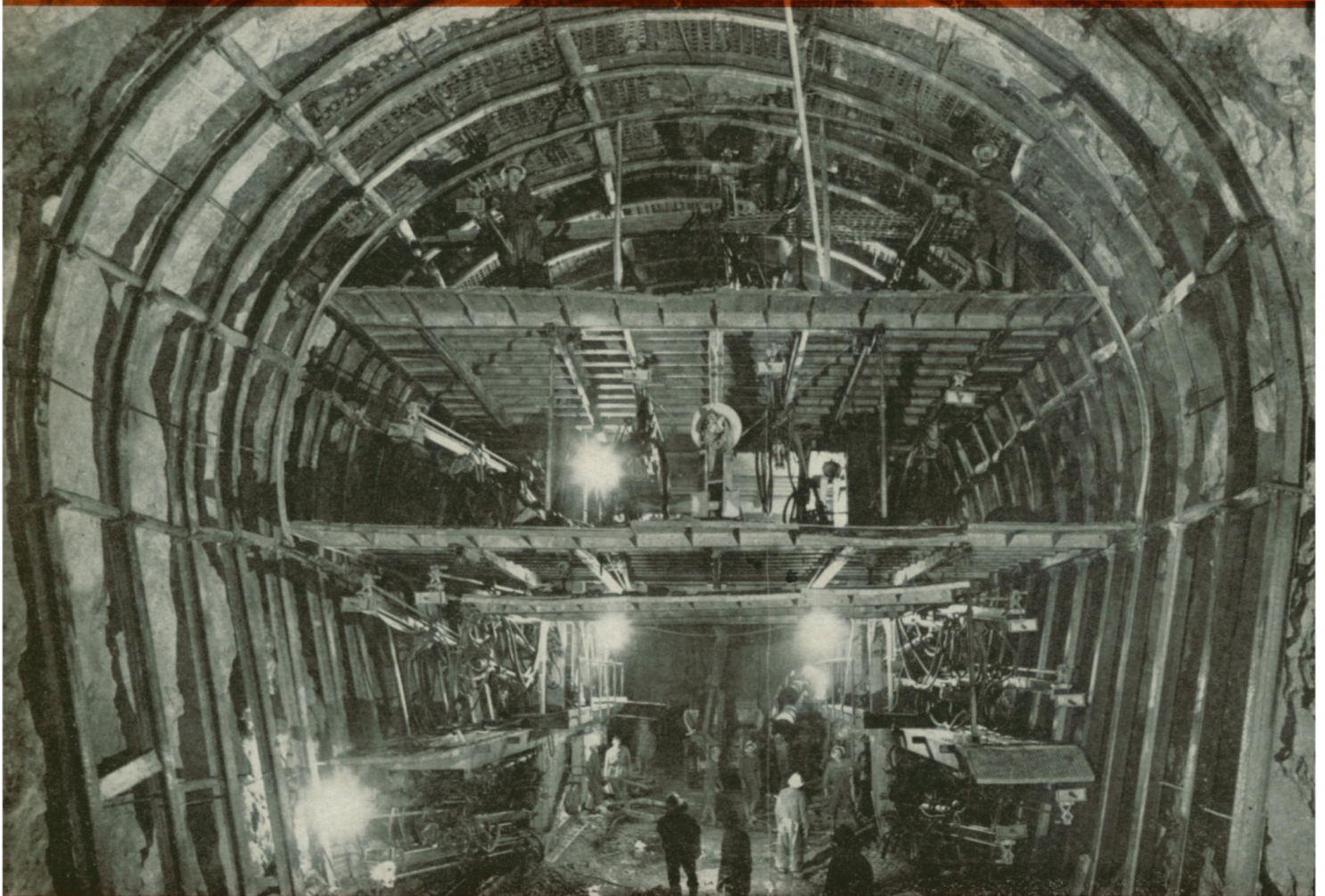
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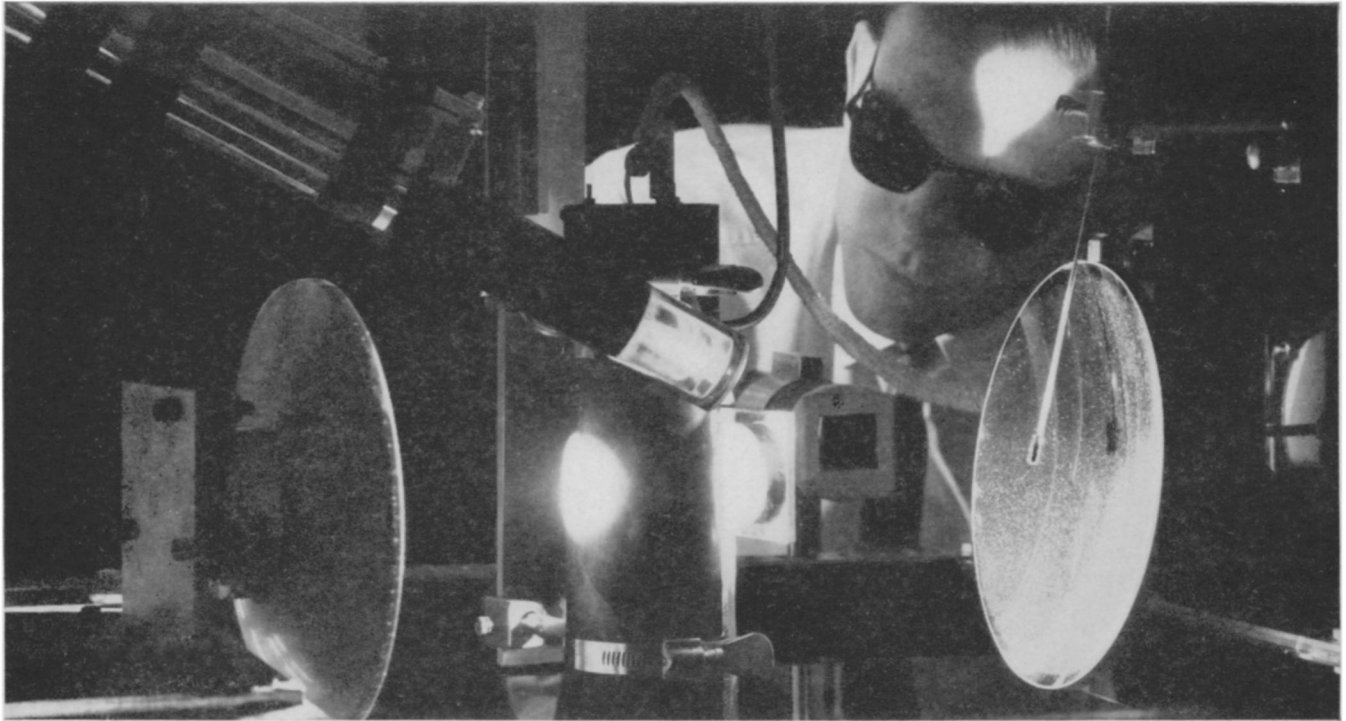
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Jumbo Platform

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A SCIENCE SERVICE PUBLICATION



Exploring the possibilities in Coherent Light

At Bell Laboratories, Donald F. Nelson studies a beam of coherent red light produced by a continuously operating ruby optical maser. The heart of the device is a uniquely shaped ruby crystal immersed in liquid nitrogen in the tubular glass dewar extending from upper left to center. Light from the mercury arc lamp (lower center) is reflected by round mirror at left to mirror at right and then is focused on the ruby crystal to produce maser action. Coherent light emerging from end of dewar is picked up by a detector.

Is it feasible to take advantage of the enormous bandwidth available at optical frequencies? Could coherent light, for example, be sent through protecting pipes to provide high-capacity communication channels between cities?

To study such possibilities it is, first of all, necessary to have a source of continuous coherent radiation at optical frequencies. Such a source was first produced when Bell Laboratories scientists developed the gaseous optical maser.

Recently, our scientists demonstrated the generation of continuous coherent light by solid materials. Using a crystal of neodymium-doped

calcium tungstate, a material developed at Bell Laboratories, continuous optical maser action was obtained in the near infrared. It has also been attained with visible light, using a new optical "pumping" arrangement to excite a ruby crystal. (See illustration above.)

Multichannel light highways for communications are still far from realization. But with continuous sources of coherent light available, it becomes possible to explore the problems of modulating, transmitting, detecting, amplifying and, in general, controlling light for possible communications applications.



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