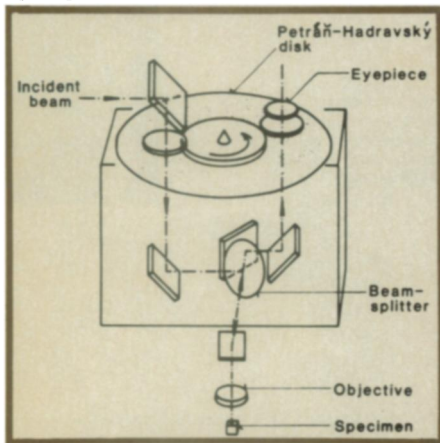


SCIENCE NEWS of the week

Viewing a Slice of Life

One of the most important advances in optical microscopy was born almost 20 years ago. Since then, however, its development has been stifled by social and political pressures, and only now is it emerging as a powerful tool, capable of providing glimpses into the inner structures of a wide variety of fossil or living matter.

"This machine is particularly desirable," says anatomist David Krause of the State University of New York (SUNY) at Stony Brook, "because we'll be able to look below the surface of fossil teeth without having to damage them physically." Simply focusing the microscope to illuminate a given slice of a translucent specimen has the same effect as grinding away its upper layers. "That will be a major improvement over anything we have been able to do in the past," he says. SUNY expects to get its "tandem scanning reflected-light" microscope next spring.



In a tandem scanning reflected-light microscope, the incident light beam is focused through a group of holes in a rapidly rotating disk. The light then passes through the objective lens, which focuses the beam within a specimen. Light reflected from this plane passes back through the lens, through the disk holes and into the eyepiece. Light from other planes is blocked by the disk.

Making the microscope even more valuable is a new technique for directly recording stereoscopic images at the limit of resolution in optical microscopy. "This approach provides a simple means of photographing translucent specimens to obtain stereoscopic views from which [three-dimensional] aspects of internal structure can be appreciated," says Alan Boyde of University College in London, England. Boyde's report appears in the Dec. 13 SCIENCE.

The idea for the microscope actually goes back almost 20 years. It was in-

vented by Mojmir Petráň and Milan Hadravský of Charles University in Plzeň, Czechoslovakia. Petráň, who described the design and construction of a prototype instrument in the July 21, 1967 SCIENCE, wanted a reflected-light microscope that would allow him to see processes within the brain cells of living animals.

The scheme involves focusing light into a very thin layer within the object and making sure that only light reflected from that plane reaches the eyepiece. This is the basis for what are now known as confocal microscopes. To get a clear image, a rapidly spinning disk, punctured by thousands of tiny holes arranged in spirals and built into the microscope, generates a large number of optically sharp spots that the human eye

"assembles" into a complete picture.

Few people took this notion seriously at the time, and Petráň's career went through a period of serious decline after the Soviet Union's invasion of Czechoslovakia in 1968. Many years later, Alan Boyde visited Czechoslovakia, learned of the microscope and, at the end of 1983, managed to get one for his laboratory in London — the first microscope of this type outside of Czechoslovakia.

"Were it not for Alan Boyde's interest in it," says Lawrence Martin, "it would never have got into use." Martin, now at Stony Brook, once worked with Boyde.

"With this microscope, we can look at things without destroying them," says Martin. "We can put something the size of an elephant's skull on the microscope and look at its enamel structure." It can even be used to examine the eyes or teeth of a living human being.

"It's the kind of instrument," says Martin, "that almost every biological research laboratory will want to own."

— I. Peterson

Calcium as antihypertensive agent?

If there were a critics' pick list for minerals, calcium might take this year's honors. On the heels of a report linking high calcium intake to a lowered colorectal cancer risk (SN: 12/7/85, p. 362) come data showing that calcium can lower high blood pressure.

The report, which appears in the December ANNALS OF INTERNAL MEDICINE, is from David A. McCarron and Cynthia D. Morris of the Oregon Health Sciences University in Portland. The researchers previously stirred controversy with a finding that calcium, potassium and vitamins A and C were more important than salt in blood pressure control (SN: 6/30/84, p. 404).

In the current study, McCarron and Morris looked at 48 people with high blood pressure and 32 people with normal blood pressure before and after eight weeks of taking 1 gram a day of elemental calcium — slightly more than the National Research Council's 800-milligram recommended dietary allowance.

In the hypertensive subjects, reclining systolic (contracting) blood pressure dropped 3.8 millimeters of mercury and diastolic (relaxation) pressure dropped 2.3 mm. The average blood pressure of the others remained essentially unchanged.

Epidemiologic research has shown that a drop of a few millimeters or so of mercury in blood pressure readings for the entire population would significantly reduce hypertension-related illness and death.

Some people responded better than others — 44 percent of the hyperten-

sives had drops of 10 mm or greater.

"We're dealing with a nutrient already being underconsumed in our society," McCarron says. While it would be foolhardy to pop massive doses of calcium, says McCarron, making sure one gets the recommended standard is a good idea.

But while McCarron saw "absolutely no side effects," an accompanying editorial by Hunter Heath III and C. Wayne Callaway of the Mayo Clinic in Rochester, Minn., expresses concern about possible constipation, nausea, bloating, interference with drug absorption, kidney stone formation and kidney damage associated with taking calcium tablets.

What remains to be seen is in whom, and why, the blood pressure effect occurs. The study, funded by the federal government, two private organizations and Miles Laboratories, Inc., of Elkhart, Ind., was large enough to pick up the blood pressure change, "but to get predictors we would have needed a study 10 times the size," says McCarron.

Says Michael Horan, head of hypertension research at the National Heart, Lung, and Blood Institute in Bethesda, Md., "With high blood pressure afflicting nearly 58 million Americans, we're of necessity always interested in non-pharmacological approaches to the problem." While he hadn't yet seen the McCarron study, he told SCIENCE NEWS that "the trial sounds reasonable" and that evidence is beginning to accumulate that dietary calcium may play a role in the modulation of blood pressure.

— J. Silberner