

letters

made by Rust of 200.

One place where Rust has erred is in the ΔT of the pressurized water reactor's steam generator. In a typical steam generator, the reactor coolant flow enters at 618.5°F, and leaves at 557.2°F, whereas the boiling temperature on the steam side is 544.6°F, corresponding to a pressure of 1000 psi. We deduce a mean driving ΔT of not more than 44°F, while Rust assumes a ΔT_{nuc} of at least 100°F. Further, it appears that the heat-transfer coefficient U_{nuc} is less than U_{ss} , presumably because of thermal impedance on the boiling side.

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Light sources for holography

I would like to elaborate on a point concerning holography made by Toraldo di Francia in his February article, which discussed the importance of the laser to holography (page 32). This light source is valuable not only for the off-axis method, but indeed for nearly all of holography. Our own experience indicates in fact that the laser source offers no particular bias in favor of the off-axis configuration. This new source offered reduced exposure time, ease of setting up interferometer configurations, and the possibility of holographing arbitrary, three-dimensional objects in reflected light. It did not, however, affect our development of off-axis holography. Our first published off-axis hologram (1962), a rather simple one, was made with the conventional mercury-arc source. In the ensuing year, we labored to perfect the process, and thereby produced the vastly improved and more complex results of our 1963 paper. The improvements came about by the use of better quality optical components and by improvement of techniques for avoiding the artifacts (dust, dirt, scratches, striations, and so on) on or within the various optical elements. At about the middle of this effort the laser became available, and we tried it. It offered no decisive advantages, and we shifted between the laser and the mercury source, uncertain as to which would best help us attain our goal. In the end we chose the laser, primarily because this permitted exposure time of seconds instead of minutes, and saved the bother of equalizing the reference beam and object beam optical paths. So far as image quality was concerned, there was little difference, except that the mercury source gave slightly higher quality.

The lack of any overwhelming ad-

vantage for the laser was of course a consequence of using transparencies for objects; the several-centimeter coherence length of the helium-neon gas laser was quite unnecessary for this type of object, and indeed made the artifact noise worse. We noted in our 1963 publication that the laser, though helpful, was not required, and that we had achieved comparable results with mercury sources. We always had adequate coherence with the mercury source.

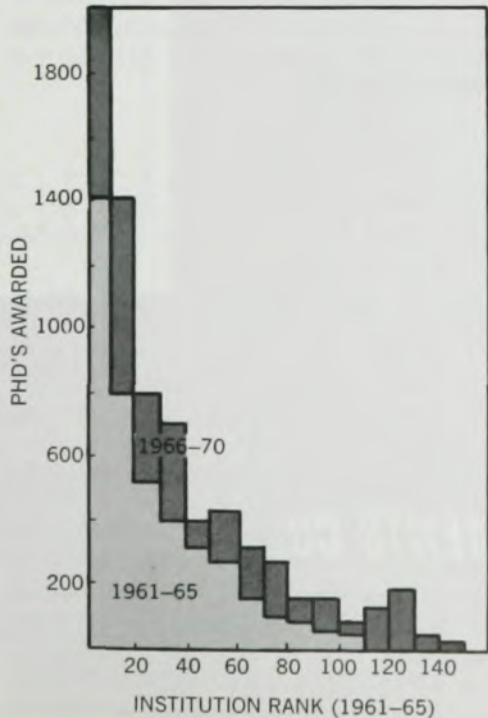
Later research demonstrated that, with proper interferometer arrangements, the coherence requirements of off-axis holography reduce exactly to those of in-line holography.

The great advantages of the laser became manifest when we advanced from transparencies to arbitrary, reflecting objects, and when B. J. Thompson and G. B. Parrent used the pulsed laser to holograph moving objects. These were accomplishments that, so far as I know, cannot be carried out with the classical coherent sources.

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PhD production

We find it regrettable that such a fine article as that entitled "Physics in Perspective" (July 1972, page 23) by D. Allan Bromley should give such a distorted view concerning the changing patterns in PhD production. Not only is the semi-logarithmic plot given in figure 3 misleading, but more important, the caption is in our opinion incorrect. Most of the "leading" institutions did not realize until 1969 or 1970 the seriousness of the employment situation, and it was at this time that



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