

In his article Herman is much too modest as to the far-reaching implications of his work. I would like to add to his discussion a brief description of a very fruitful direction of research and development which derived from his work.

At the Atlantic City Conference on Photoconductivity in 1954, John Bardeen presented a paper on the band structure of GaAs. He pointed out that the sharp optical absorption edge of this material could be explained by the fact that the minimum of the conduction band coincides in *k*-space with the maximum of the valence band, and that both minima are at the zone center. Since optical transitions need not be phonon assisted as they are in germanium and silicon, the sharp absorption edge of GaAs is to be expected from this model.

In 1955 Ruben Braunstein reported² on the observation of *p-n* junction electroluminescence in GaAs. This phenomenon is the inverse of the absorption analysed by Bardeen. However, the true significance of the GaAs electroluminescence was not recognized until five years later when Sumner Mayburg and his colleagues discovered³ the high efficiency of the process.

I think that the most elegant experiments on junction electroluminescence were performed^{4,5} by Nick Holonyak Jr and his colleagues. They prepared a series of GaAs-GaP mixed crystals and measured the efficiency and wavelength of the junction electroluminescence. In the progression from pure GaAs to pure GaP they observed a large decrease in emission efficiency at a composition of about 40% GaP. (Compositions just on the efficient side of this transition are familiar for their use in modern visible LED displays.) Holonyak even prepared a composition which was inefficient at room temperature but which abruptly became efficient as the temperature was lowered. He correctly interpreted these results in terms of the relative shift with composition and temperature of the energies of the central and zone edge conduction band minima.

Around the same time that Holonyak was doing his work, John B. Gunn showed^{6,7} how electrons in GaAs could acquire enough energy under the influence of a strong electric field to transfer from the high-mobility central minimum of the conduction band to the low-mobility zone-edge minimum. Practical microwave oscillators are based on this effect.

In 1955 Herman speculated on the band structure of III-V compounds. Even though he erred in detail, I think that his model of the band structure of diamond and zincblende materials fired the imaginations of his contemporaries and of a couple of scientific

generations to come. Those were exciting days of discovery in semiconductor research. Herman's work was the prototype of the alliance between the very fundamental and the very practical—a connection which came to be almost a unique characteristic of semiconductor research and development.

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7/84

Sophomores for peace

I propose a program, entitled "Sophomores For Peace" for resolving the current nuclear war stalemate between the United States and the Soviet Union. In this program each year the entire college sophomore class of the United States would be exchanged for that of the Soviet Union. Consequently there would be a constant population (although each year the individuals change) of a million or so American sophomores in the USSR and vice versa.

With the cream of our youth exchanged there would be two major effects. First, it would constitute a more effective deterrent to nuclear war than the current balance of terror. Secondly, the major problem between the USA and the USSR is really that of goodwill not nuclear weapons. The impact of a million American sophomores on the USSR and vice versa with the myriad of individual human emotions, feelings and relationships that would ensue deals with the source of the problem and cannot help but create a sense of greater cohesiveness and friendliness between the two countries. True, exchange programs between the two countries have occurred before but these have had little impact because they were too small: It is a case where adequate quantity makes a change in the quality of the total interaction. . . .

What is needed is a jump out of the cycle [of ill will] onto a new level that can reach out and energize the latent shrunken pockets of goodwill. Such an

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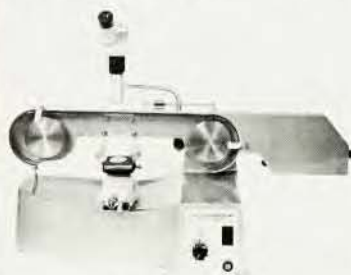
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letters

approach must be dramatic, massive, abrupt and preferably naive, not be vulnerable to existing paranoic fears. The present sophisticated, technological and highly intellectually balanced technocratic approach has proven sterile. . . ."

7/84

JEROME PRESSMAN
Lexington, Massachusetts

Volunteer retirees

I read with interest your news article about volunteer retirees in science (July, page 67). However, I was disappointed at the mention in two places that the Owens Science Center is in "Prince George County, Virginia." Actually, the center is in Prince George's County, Maryland. I should know because the center, which opened in 1978, was built right next to the high school that I attended: DuVal Senior High School.

7/84

LEONARD STRACHAN JR
Harvard University
Cambridge, Massachusetts

Department oversight

I wish to thank you for your excellent article in June (page 65) discussing the department of physics of the University of Texas at Austin. It should be pointed out that the physics department has been improving and expanding over a long period of time with many distinguished individuals contributing to this growth. Foremost among those who were not included in your article were George Sudarshan and Bryce DeWitt who have provided leadership in our theoretical program.

7/84

ROGER BENGTSON
University of Texas at Austin
Austin, Texas

We apologize for neglecting to mention Sudarshan and DeWitt by name. Members of the Texas department called our attention to them in interviews, and my failure to name them was purely an oversight and not in any sense the result of a deliberate decision or personal slight. —ws

Attention, presidors

I would like to make a suggestion that I hope will be considered by future conference session presidors. I think that, at the very minimum, the presidor should introduce the speakers. All too often I see presidors fail to do this for multiple author papers. The speaker deserves some individual recognition for his presentation. In addition, it is

often of interest to the audience to know who the speaker is. Besides an introduction, the presidor might conclude the presentation with, "Thank you, Dr. . . ."

7/84

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Corrections

January, page S-8, and July, page 104—In a story by Steven Shore for *Physics News in 1983* and a in a subsequent letter by Shrinivas Kulkarni, respectively, an error was made in identifying IRAS, launched in 1983, as the first satellite to 'discover' a comet. The SOLWIND instruments detected three sungrazing comets in 1979 and 1981 via the P78-1 satellite. Additionally, the comet that was detected by IRAS was incorrectly identified in both the original article and the subsequent letter; its correct name is IRAS-Araki-Alcock 1983d.

July, page 105—In the letter by J. Rand McNally Jr on fusion criterion, the central temperature T_0 for Alcator C should be given as 1.5, not 12.5 keV. □

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