

Report on the "Flash" in Argon Bulb Prepared in 1931

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That there may be a "flash" in the afterglow of certain gases was shown by the writer about eight years ago. An account of the same was presented before the Academy at its twenty-fifth annual meeting and published in the Transactions of the Academy for the year 1932, p. 173. The initial and practically only bulb (Fig. 1) that still successfully shows this phenomenon was prepared in May, 1931. On two or three later dates an occasional bulb was primed that exhibited flashing but only for a day or two, when this quality would cease. During the second year of A Century of Progress, Chicago, 1934, a 12-liter bulb was exhibited showing the afterglow in nitrogen. After a run of several weeks this began to show flashes, i. e., it flashed

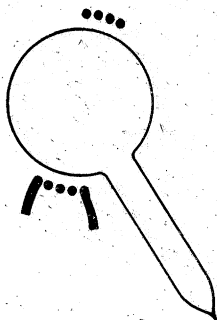


Fig. 1.

for an instant during the period of decay of the illumination of the active-nitrogen afterglow. The writer happened to be present when this flash first became perceptible. In his endeavor to get a more marked effect, by allowing the mechanism that intermittently operated the bulb to continue several hours more, the stem under the exciting coil became hot, softened and was sucked in, thus ending what probably would have been an exceedingly fine prospect,—even better than the 1-liter bulb of May, 1931. Further attempts at the Fair with other bulbs proved unsuccessful. Nor were the experiments at the physics laboratory (University of Illinois) successful either.

Later, during the years 1934 and 1935, the original bulb of 1931 was put through a spectroscopic test, in an endeavor to determine the composition of the residual gas within. The study revealed strong lines due to cyanogen in addition to traces of the more common gases. To check this experimentally pure cyanogen was used in priming a number of bulbs, but wholly without success so far as flashes were concerned. Other gases were also introduced with the cyanogen in varying amounts, all without success.

It thus seems from the observations through these years that the exact surface conditions within the bulb (for it seems to be a surface effect) for marked and permanent flashing are exceedingly difficult to obtain. Even the operator's breath in preparing the bulb may have been a very variable factor too. Nor has the original bulb remained "put". It has changed with

the years. During the first few the flash occurred within a second or two after turning off the current in the energizing coil. Then during the spectroscopic study, referred to above, it was sort of smeared out, beginning a little later, continuing some longer, but decidedly less bright. In fact at times it was doubtful whether there even was a flash. However after periods of six months or more the bulb seemed to regain, in part at least, this property, but never with the same original characteristics. After a rest of over a year (April, 1938) the bulb (Fig. 1) was again subjected to an excitation. This was done last week and to the writer's surprise quite a *marked flash* occurred, however late on the decay curve, some 15 or 20 seconds after the exciting energy was shut off. Only one trial was made at the time for fear that the effect might be "killed" if subsequent excitations followed closely on the heels of this one. Because of the success of this trial it was decided to report the life-history of the bulb to the physics section of the Academy at its May, 1938, meeting at Carbondale. The excitation was carried out in an "inky dark" room, with some misgivings as to its probable outcome. Some of the audience reported a faint flash, others none, others were not sure. The writer from his position at the lecture table (operating the exciting mechanism) also was not sure. Further excitations may have followed but none were conclusive.

The foregoing shows quite conclusively that the ability of the bulb to flash may build up over long periods of time, however that one or two excitations following in close succession (even separated by periods of a few days) seem to remove the possibility of the gas flashing. It also seems quite certain now that the composition of the gas was intrinsically changed during those long periods of excitation at the time of the spectroscopic study. The bulb has practically lost this unique quality; however, the interest in the problem has not waned. It is planned to continue the study with this and other bulbs. The elusiveness of the phenomenon makes the problem the more fascinating.