NOTE

An Improved Quartz Mercury Vapor Lamp.—Earlier models[1,2,3] developed in the laboratories of this University enjoyed such advantages as operation under constant pressure, a highly concentrated discharge, absence of sealed-in leads, and ease of renewal without special vacuum technique. The present model retains these advantages while it eliminates cemented joints and the objectionable capillaries formerly used to check mercury oscillations. Figure 1 is an axonometric view of the device, conveniently about 30 cm. in height. Quartz tubing 8 mm. in internal diameter perhaps affords the best compromise between high concentration of the discharge and rapidity of deterioration. The novel feature consists of the tapered Pyrex plungers P, ground into tapers in the quartz walls at J. After the lamp is filled, these plungers are lowered until oscillations of mercury are negligible, but not quite enough to close the joints completely; otherwise the lamp may melt or blow up. Tungsten wires W are sealed into the ends of the plungers, and when the latter are filled with mercury, a current path of negligible resistance, incapable of arcing, is provided. The two U-tubes, U, stand in open rectangular copper tanks (not shown). We made them about 160 mm. deep (right) and 60 mm. deep (left). Obviously the length of either side of the arc (in our work 150 mm., from M to M_1) can be changed by varying the depth of the corresponding tank. Tubes soldered in, top and bottom, permit rapid circulation of water; this must be distilled if the tap supply abounds in mineral salts, otherwise the quartz will disintegrate near the water surfaces.

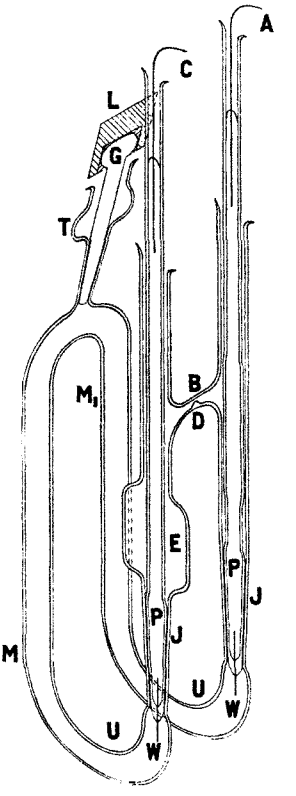

Fig. 1.—Quartz mercury vapor lamp, showing ground-in plungers to control oscillations of mercury, and bridge for return of distilled mercury.

The lamp is filled and boiled out through the trap T, provided with a ground-in quartz plug G held down by the lead weight, L and sealed with mercury. The trap is bent 30° from the vertical, otherwise hot air ascending during operation will distil the mercury out of it. After closing the circuit through a suitable resistance, the arc is started by holding a

[1] Harrison and Forbes, *J. Opt. Soc. Am.*, **10**, 6 (1925).

[2] Forbes and Harrison, *ibid.*, **11**, 100 (1925).

[3] P. A. Leighton and Forbes, THIS JOURNAL, **51**, 3550 (1929).

flame below T. This arc now sinks to the water surfaces, and operates at 3.5 amperes and 170 volts. As a much larger amount of mercury is displaced on the cathode side, the enlargement E is necessary to accommodate it. As the mercury distils from the hot cathode to the cooler anode,[4] it returns via the bridge B, which has a dam D to break up the trickles into drops and thus avoid momentary short circuits.

When the transparency of the quartz is seriously impaired (after about 500 hours' use in the case of λ406 mμ or λ366 mμ) the lamp is taken down. The section M to M_1 (only) is treated with hydrofluoric acid and heated in an oxygen–gas flame until softening begins. After several such treatments this section must be replaced, but the original trap can be used repeatedly.

The light intensities obtainable, at the various wave lengths, are comparable to those already reported[5] for a lamp carrying a similar discharge. With a steady source of current, also nearly constant barometric pressure, and ventilation the total variations in light intensity over considerable periods seldom exceed three per cent.

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ISOMERIC ALPHA-PHENYL-BETA-PARA-TOLYL-DELTA-KETONIC ACIDS

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Introduction

In a communication "Isomeric Alpha,Beta-Diphenyl-Delta-Ketonic Acids. I,"[1] it was pointed out that δ-ketonic acids of the formula $CO(R)CH_2CH(C_6H_5)CH(C_6H_5)COOH$ show in their inactive forms essentially the same isomerism as glutaric acids of similar configuration. It was anticipated that the inactive forms discussed might, like the glutaric acids, be resolved into optically active isomers. Since this communication was published, the authors of this paper have definitely isolated in pure form the lower melting isomeric α,β-diphenyl-γ-trimethylacetylbutyric acid. Further, they have found that none of the acids previously considered can be resolved into optical isomers by the methods used in the glutaric series. After a brief statement of this work in the experimental part, attention will

[4] P. A. Leighton and Forbes, *J. Opt. Soc. Am.*, **12**, 58 (1926).

[5] Ref. 3, p. 3550.

[1] Avery and Jorgensen, THIS JOURNAL, **52**, 3628 (1930).