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APPENDIX

Relationship between acid production, as μl. CO_2, and manometer reading

The following assumptions or definitions are made:

(1) $k_{O_2} = 1{\cdot}40$ and $k_{CO_2} = 1{\cdot}63$,

(2) $CO_2(R)$ = respiratory CO_2,

(3) R.Q. $= CO_2(R)/O_2 = 0{\cdot}7$ (Laser & Rothschild, 1939),

(4) $CO_2(A) = CO_2$ due to acid production $= +a\,\mu$l.,

(5) $\dfrac{CO_2(R)+CO_2(A)}{O_2} = \dfrac{130}{70} = 1{\cdot}86$ (Laser & Rothschild, 1939).

Hence
$$\frac{CO_2(R)+a}{O_2} = 1{\cdot}86,$$

and
$$\frac{CO_2(R)+a}{10CO_2(R)/7} = 1{\cdot}86,$$

and
$$7CO_2(R)+7a = 18{\cdot}6CO_2(R),$$

and
$$CO_2(R) = 0{\cdot}605a.$$

The manometer reading, H, will be

$$H = +\frac{a}{1{\cdot}63}+\frac{0{\cdot}605a}{1{\cdot}63}-\left(\frac{10}{7}\times 0{\cdot}605a\times\frac{1}{1{\cdot}40}\right)$$
$$= a/2{\cdot}7.$$

The acid production, in μl. CO_2 is therefore 2·7 times the observed manometer reading.

ADDENDUM

Aketa (1957, pp. 273–5), says there is a marked increase in lactic acid content following the fertilization of Japanese sea-urchins and that 'This observation conflicts with those of other workers, who have been unable to detect any such change'; and that the difference may be ascribed to the fact that 'other investigators performed their estimations at longer intervals after insemination than the author did'. Referring to the fertilization acid, Aketa says 'it is still premature to deny the possibility of a relation between the manometric production of unknown acid and the lactic acid production shown in this paper'. On the basis of these remarks, I concluded that Aketa believed the fertilization acid was lactic acid. But in correspondence since the acceptance of this paper, Aketa told me he did not believe the fertilization acid was lactic acid, but that it would be unwise to deny this possibility.