More recently, Shribman and Crossland[30] have published data on the detonation velocity of the following explosives, which are readily available in Great Britain:

1. *Metabel* sheet explosive, produced by Imperial Chemical Industries, Ltd., and normally provided in sheets $10 \times 5 \times \frac{1}{8}$ in ($254 \times 126 \times 3$ mm). It has a density of 1·47 g/cm³, a detonation velocity of 7000 m/s, and an energy release of 900–1050 cal/g (3760–4500 J/g).

2. *Trimonite No.* 1, a powder explosive produced by Imperial Chemical Industries, Ltd., with a density of 1·10 g/cm³ (and in the granulated form 0·7 g/cm³) and an energy release of 1260 cal/g (5260 J/g). A detonation velocity is not given as it is very sensitive to thickness of layer.

3. *Trimonite No.* 3, as for No. 1 but with a density of 0·98 g/cm³ and an energy release of 1034–1260 cal/g (4330–5260J/g).

4. *Nitroguanadine* (picrite) is a powder explosive that is extremely difficult to handle because of its light feathery nature. At a density of 0·16 g/cm³, and a layer thickness of 1–2 in (25–50 mm), it has a detonation velocity of $\sim$ 2300 m/s and an energy release of 950 cal/g (3960 J/g).

The detonation velocity was measured by three methods: Dautriche, parallel plate with pin contactors, and insertion of pins in the explosive at a known distance apart.

For *Nitroguanadine* the detonation velocity for thicknesses from 1 to 2 in was found to be $2400\ ^{+4.5}_{-4}\%$ m/s and for *Metabel* sheet explosive the detonation velocity for thicknesses of 0·125–0·5 in (3·175–12·7 mm) was $7000 \pm 5\%$, $6990 \pm 3{\cdot}8\%$, and $7100 \pm 2{\cdot}8\%$ m/s, respectively, for the three methods used. For *Trimonite No.* 1 and *No.* 3, the detonation velocity varied considerably with thickness, and the data are given in Fig. 8 and 9.

Experimental information on flyer-plate velocity is very sparse. However, Shribman and Crossland[30] give data for the explosives mentioned above. For *Metabel* sheet explosive they cite the values of the ratio V_P/V_D for various values of R, the ratio of mass of explosive to mass of flyer plate, where the explosive is uniformly distributed over the plate. They compared these data wth various equations that have been proposed and found that the best agreement was obtained with the equation proposed by Gurney[31]

$$\frac{V_P}{V_D} = \frac{0{\cdot}612R}{2+R} \qquad \ldots [8]$$

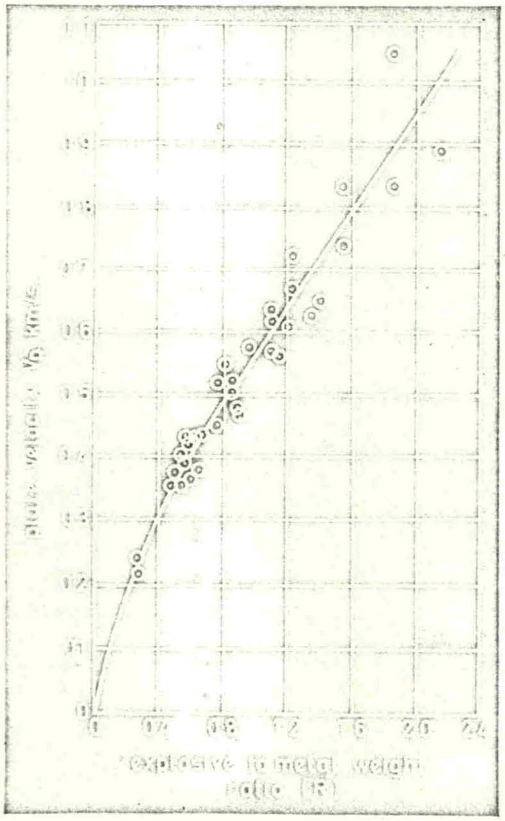
Table III gives the experimental values and those predicted by this equation.

Table I. Properties of explosives[20]

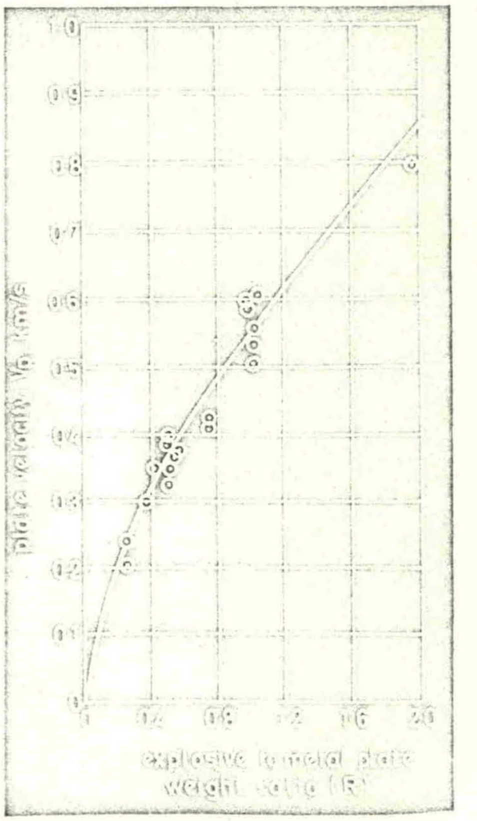
Explosive	Calorific value, cal/g	J/g	Detonation velocity, m/s	Density, g/cm³
TNT	1080	4500	6700	1·56
RDX	1280	5350	8180	1·65
PETN	1390	5400	8300	1·70
PETN	1390	5400	3500	0·5
Tetryl	1100	4600	7850	1·71
Composition B	1240	5190	7840	1·68
EL–506D	870	3640	7100	1·40

Table II. Effect of diameter on detonation velocity[29]

Diameter		Velocity of Detonation, m/s	
in	mm	TNT powder	Nitroglycerine powder
0·75	19	3190	1830
1·25	32	3680	2250
2·00	51	4060	2610
2·5	64	4030	—
3·0	76	4100	3150
4·0	102	4560	3290
5·0	127	—	3440
6·0	152	4815	—
8·5	216	—	3920



10 Variation of V_P with R for *Trimonite No. 1* explosive. ρ = 1·1 g/cm³.



11 Variation of V_P with R for *Trimonite No. 3* explosive. ρ = 0·98 g/cm³.