e given in tables 1 and 2 in the form of pre:
cally in fig. 2 and 3.
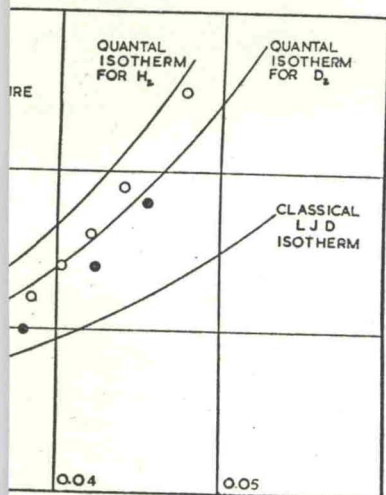
(MOLES . CM⁻³)

otherms at 78·9° K. The open circles are
H₂, the filled circles are for D₂.

CUSSION

npared with the classical LJD and qua:
and 78·9° K. The theoretical curves h
tential energy between a pair of molec
eqn. (1) with $\epsilon^* = 50·75 \times 10^{-16}$ ergs, :
ers were derived by de Boer and Michel
virial coefficients of H_2 and D_2. The
between H_2 and D_2 molecules is justi:
gases [7] when the temperature is high eno:
rtant. We have interpolated in the tab
Curtiss [3] to find the classical LJD pressu
is of eqn. (2) to obtain the quantal isother:
at the experimental points lie closer to :
otherms, particularly at the higher densi:
iore accurately. This fact alone, howe:
ty of the quantal inflation of the press:
t be inaccurate at these reduced pressu
nificant fact, therefore, is that the differe:
en density is roughly that predicted by
classically there would, of course, be

rious paragraph can be met by plotting :
together with the results for other sim:
isotherms. It is then possible to comp.
nd light gases and the predictions of :
this, we introduce the quantities :

$$p^* = pv_0/N\epsilon^* = pD^3/\epsilon^*,$$
$$v^* = v/v_0 = v/ND^3,$$
$$T^* = kT/\epsilon^*,$$

lder and Curtiss.[3] It is also convenie
i terms of the dimensionless parame:

$h D(m\epsilon^*)^{\frac{1}{2}}$ which de Boer [11,12] showed occurs in the general expression reduced equation of state in quantum statistics. Eqn. (2) then becomes

$$\Delta p^* = T^*\left[v^{*-1} + \frac{3}{2}\frac{d \log y^*}{d v^*}\right][9·0710\, y^{*\frac{1}{3}}T^{*\frac{1}{2}}v^{*\frac{1}{3}}\Lambda^{*-1} - 1]^{-1}, \qquad (3)$$

re y^* is a function of v^*, the relationship between them being

$$(1 + 12y^* + 25·2y^{*2} + 12y^{*3} + y^{*4})(1 + y^*)^{-1}(1 - y^*)^{-6} - 2v^{*2} = 0. \qquad (4)$$

, in conformity with the general considerations of de Boer [11,12] our reduced
.tal equation of state is of the type

$$p^* = f(T^*, v^*, \Lambda^*),$$

re f is a universal function.
For the general plot of p^* against v^* in fig. 4, we have selected the reduced
perature $T^* = 2·14$ corresponding to our experimental temperature $T = 78·9°$ K

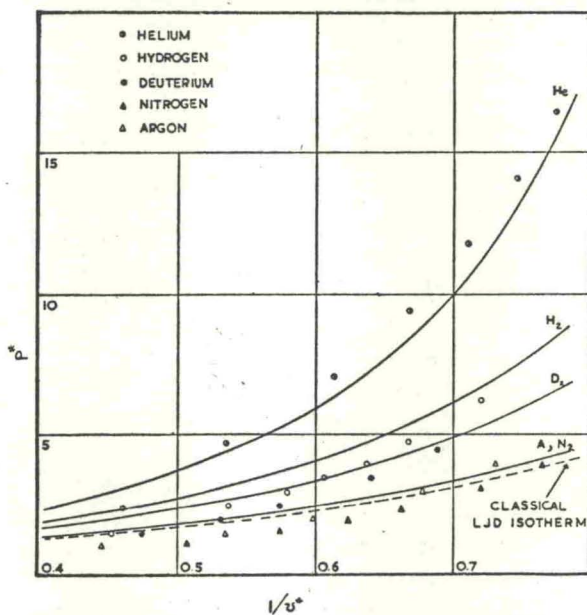4.—Reduced isotherms for $T^* = 2·14$. The full curves are the quantal isotherms.

TABLE 3.—MOLECULAR CONSTANTS

	ϵ^*/k (°K)	D (cm × 10⁻⁸)	Λ^*
He	10·2	2·56	2·64
H_2	37·0	2·92	1·73
D_2	37·0	2·92	1·22
N_2	96·6	3·72	0·225
A	120·3	3·41	0·187

r H_2 and D_2. The intermolecular force parameters and the values of Λ^* have
een taken from the tables of de Boer.[11,12] They are listed in table 3. The
perimental data for He, N_2 and A were given by short extrapolations on
the temperature scale from the measurements of Buchmann [13] on He; Bartlett,
Hetherington, Kvalnes and Tremearne [14] on N_2; Michels, Wijker and Wijker [15]
i A.