

ERRATA

Molecular hydrogen in the atmosphere

By ULRICH SCHMIDT, *Max-Planck-Institut für Chemie (Otto-Hahn-Institut)*
Mainz, West Germany

(Manuscript received July 5, 1974)

Some misprints have occurred in the final printing of the article by U. Schmidt in vol. 26, 1-2:

On page 86, right column, seventh line, read correctly: "(e.g. Q_A is the global anthropogenic H_2 -production of which ...)"

On page 88, left column, ninth line, read correctly: "The terms kM_{TN} and kM_{TS} represent the ..."

On page 88, right column, equations (22) and (23) read correctly:

$$Q_A = 1.43Q_O + 0.10Q_C + 5.41k(M_{TN} - M_{TS}); \quad (22)$$

$$S_S = 2.43Q_O + 0.31Q_C + 5.41k(M_{TN} - M_{TS}); \quad (23)$$

On page 88, right column, line 14, read correctly:

$$\text{"... for } k (M_{TN} - M_{TS}) = 3.5 \times 10^{12} \text{ g/yr. ..."}$$

and in line 28 read correctly:

$$\text{"... } S_S \text{ results in } 30.0 \text{ to } 32.0 \times 10^{12} \text{ g/yr."}$$

On page 87, Table 2 has been printed without legend and its arrangement is completely misleading. The corrected Table is presented below.

Table 2. H_2 budget data. Two sets of values are given which have been obtained from, A: direct estimates based on measurements, B: calculations of the tropospheric H_2 -budget

The H_2 content values have been calculated from data obtained during measurements over the Atlantic Ocean. Sources, Q , and sinks, S , are given in terms of 10^{12} g H_2 /yr

	A: from measurements			B: from budget calculations		
	Northern hemisphere	Southern hemisphere	Total	Northern hemisphere	Southern hemisphere	Total
Anthropogenic activity Q_A	11.0	2.0	13.0	21.7	3.8	25.5
Oceans Q_O	1.6	2.4	4.0	1.6	2.4	4.0
Photochemistry Q_C	2.4-4.8	2.2-4.4	4.6-9.2	3.7	3.3	7.0
Various fields, Volcanoes ^a	—	—	0.1	—	—	—
ALL SOURCES	15.0-17.4	6.6-8.8	21.7-26.3	27.0	9.5	36.5
Photochemistry S_C	1.9-3.7	1.8-3.6	3.7-7.3	2.8	2.7	5.5
Soils S_S	76.0	38.0	114.0	20.7	10.3	31.0
ALL SINKS	77.9-79.7	39.8-41.6	117.7-121.3	23.5	13.0	36.5
Tropospheric residence time (yr)	—	—	6.1-7.4	—	—	4.4
Average mixing ratio (ppmv)	0.575	0.550	—	—	—	—
Average concentration ($\mu\text{g}/\text{m}^3$)	51.2	49.0	—	—	—	—
Atmospheric reservoir ($\times 10^{12}$ g)	104.0	100.0	204.0	—	—	—
Tropospheric reservoir ($\times 10^{12}$ g)	81.5	78.0	159.5	—	—	—

^a Kojama (1964).

In addition to the correction of the printer's errors there is need for further correction. In the original paper the sink at the soil surface, S_g , was calculated to be 12×10^{12} g/yr. However, for the given uptake rate $P = 3 \times 10^{-12}$ g H_2 /cm² sec, the correct value should be

$$S_g = 11.4 \times 10^{13} \text{ g/yr}$$

as given in the corrected Table 2.

This value is now much higher than all the other source and sink terms. To balance equation (23) this value would require either Q_O to be higher by a factor of 10, or Q_C to be higher by factor of 40 than our estimates (see Table 2A). This is totally unrealistic since Q_O is considered to be the best-known quantity and Q_C can hardly be expected to be much higher, according to the discussion in the original paper.

Moreover, if these alternatives for Q_O and Q_C

were to be accepted, equation (22) would give values of Q_A higher by a factor of 4 or 6 respectively. This again is not very likely in view of our H_2 and CO data from the city of Mainz. Therefore, we conclude that the estimate of S_g in Table 2A is too high.

This is also supposed by recent unpublished data by Liebl on uptake rates over grassland, which are lower by a factor of about 5 than those previously obtained over bare soil. We should also consider the fact that global estimations on the basis of a few spot measurements are in principle uncertain due to the large variability of soil conditions over the earth's surface.

For these reasons the calculated values in Table 2B are still considered presently to be the most reliable estimates which give both a balanced budget and reasonable agreement with the observations.