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A TABLE OF NUCLEAR MOMENT DATA

H. E. Walchli

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A TABLE OF NUCLEAR MOMENT DATA

Harold E. Walchli, Editor

February 1, 1955

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ABSTRACT

A Table of Nuclear Moment Data (ORNL-1469) was issued in April 1953 and subsequently in June 1953 the first supplement was prepared and issued (ORNL-1469 Supplement I). Since that time much new data have been published and it is the purpose of this second supplement to compile this data for addition to the original table. A complete revision of the weighted nuclear magnetic moments has been made utilizing approximately 95 new measurements which are also reported. A section is devoted to information useful in deleting obsolete data and for correcting the original table. All new data available up to December 1954 is included.

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A TABLE OF NUCLEAR MOMENT DATA

Introduction

Since the Spring of 1953 when a Table of Nuclear Moment Data (ORNL - 1469, hereinafter referred to as TND) was issued a great many new data have appeared in the literature. In addition to this, several interested scientists have taken considerable time to supply me with new information, to suggest changes, and to point out oversights and discrepancies in TND. It is the objective of this supplement II to correct TND and supplement I and to supply addition information to make the Table accurate and current as of December 1954. Time has not yet permitted the addition of nuclear quadrupole data.

In order to bring TND up to date this supplement has been divided into sections closely resembling those of the original report. Section I is designed in a manner such that the original TND can be corrected simply by making changes directly in it. For this purpose a page number is given for each entry corresponding to the page in the original on which the correction should appear. Section II lists new data not previously recorded. This section also includes supplemental Reference and Author indexes which contain corrections not easily incorporated in Section I. Information for interpreting the data of this supplement is given in TND and is not repeated here.

Section III is a revision of the weighted nuclear magnetic moment values and supersedes Table 2.1 (TND) which is now declared obsolete. Additional values for magnetic moment ratios appear in Table 2.2a and are used to supplement the original Table 2.2 (TND).

Section IV Includes miscellaneous comments, and listings of measured resonance shifts due to shielding effects. Two new figures 2.2a and 2.3a are included which correct errors in TND and include the new data. It is suggested that the originals now be marked obsolete.

No further supplements for the Table are now being planned, however a completely new Table will be issued when sufficient new information occurs to warrant. I will appreciate greatly if authors will continue to send

me reprints and preliminary information of a nature that should be included in future reports. Comments and corrections on the original Tables and this supplement II will also be appreciated.

No further copies of TND are available from the editor, however, additional copies may be obtained from the Office of Technical Services, Department of Commerce, Washington 25, D. C for the nominal price of ninety cents.

SECTION I

The pages in this section are devoted to correcting and modifying information occurring in the original ORNL-1469 table. It is suggested that the following changes be entered directly into the original report to correct it as of December 1954.

Corrections to ORNL-1469

Page	Change
8	Line 29 should read: only data of significance determined from hyperfine structure are included.
9	Symbol for nuclear alignment should be NL.
21	Symbol for method for F 18 should be T.
59	Delete spin 1/2 and [KD 38] for OS 189.
65	Lines 15 and 17 change 5.58550 to 5.585486.
65	Line 23: value for μ_H = 2.792743.
65-78	See revised Table 2.1a and additions to Table 2.2 this report.
72	Delete WTD value for Cu 65/Cu 63 ratio.
73	Delete WTD value for Ag 109/Ag 107 ratio.
73	Change reference TI 52-2 to TI 53 for In 115/In 113 ratio.
73	Delete WTD value for Nd 145/Nd 143 ratio.
74	Change GW 53 entry for Tl 205/Tl 203 ratio to 1.009838(1)
77	See new Figure 2.3 correcting Cr 53, Ti 47, Ge 73
78	Line 7 should read: GD 49, SO 50, JR 51, LM 51-2, and TH 50-2, etc.
80	Correct spelling of hexafluoride in next to last line.
91	See new Figure 3.3b with new data.
95	Change reference in footnote to Phys. Rev. 80, 563 (1950).
98	See new Figure 3.5b.
105	Add to reference BM 53 the elements K, Rb, Cs.
104	Reference for BA 53 should be. Journ physique radium 14, 135 (1953).

Page	Change
109	Change reference GI 33 to GI 35 and delete Nature reference.
110	Correct spelling of name in GR 52 to Tolhoek.
112	To reference JR 53 add: July, August 1953.
118	Add IN to TI 52.
119	Delete WL 52-5 and add new data as given in Reference Section. This work preliminary values see WL 54 for final values.
119	To reference WJ 49 add Phys. Rev. 91, 499a (1953).
119	To WJ 53 add· Science 118, 431-436 (1953).

Corrections to Supplement I.

2	Entry four should be P 30 not P 33.
2	Spin reference for Ca 43 should be JR 53 not JR 52.
3	Chemical compound for Nb 93 should be BCl_3 not $SbCl_3$.
4	Entry for KL 53 should read: communications of February and May 1953...

TABLE 1.1

Page	N	Z	Atom	A	Change Information
16	3	3	Li	6	delete data and reference WL 52-5.
17	4	3	Li	7	delete data and reference WL 52-5.
23	14	13	Al	27	delete data and reference WL 52-5.
24	15	14	Si	29	delete spin reference [SA 51] and add [WI 54], [OG 54].
[illegible]	16	15	P	31	delete data and reference WL 52-5.
26	18	17	Cl	35	delete reference WL 52-5 and data.
28	23	20	Ca	43	delete reference and data for SA 51.
29	25	22	Ti	47	delete spin reference [SA 51], delete predicted $\mu = 1.79$ by SA 51, μ value for JR 52-2 based on $I = \frac{7}{2}$, delete. JR 53 data and reference, add JR 53-5 data.
[illegible]	27	22	Ti	49	delete JR 53 reference and SA 51 reference and data.
30	29	24	Cr	53	delete reference and data for JR 53 and SA 51
31	33	27	Co	60	delete spin reference [DS 52], MO 34 reference, correct reference RE 52 to read BE 52, add to reference and data DS 52 reference BE 54.
32	34	29	Cu	63	delete reference WL 52-5 (two entries) and data.
33	36	29	Cu	65	delete reference WL 52-5 and data.
34	38	31	Ga	69	delete data and reference WL 52-5.
[illegible]	40	31	Ga	71	delete data and reference WL-52-5.
[illegible]	40	31	Ga	71	add data to reference BG 48 Tolerance ±0.000 08 f(x)/f(H) = 0.304 945 (24).
36	44	35	Br	79	change WL 52-5 reference to WL 54 and change tolerance to 0.000 009 (7m).
37	46	35	Br	81	delete data and reference WL 52-5 for measurement using Na 23 standard.
38	48	37	Rb	85	delete data and references for last two WL 52-2 entries.
39	50	37	Rb	87	delete reference WL 52-5 (only) retain WL 52-2 and data.
40	52	41	Nb	93	correct reference SW 50-3 chem. info. to read Nb_2O_5 in HF and BCl_3.
[illegible]	52	41	Nb	93	correct reference SW 51 chem. infor. to read Nb_2O_5 + HF and $ScCl_3$.
44	66	49	In	115	correct chem. info. for reference TI 52 and TI 53 to read $ScCl_3$ instead of $SeCl_3$.
46	73	51	Sb	124	change calculated to predicted.

Page	N	Z	Atom	A	I	Change Information
48	78	53	I	131		delete $I = \frac{9}{2}$, [DO 42] and add $I = \frac{7}{2}$.
49	75	54	Xe	129		add method S to reference BH 52 and change μr to 1.131.
	77	54	Xe	131		add method S to reference BH 52.
	77	54	Xe	131		delete T from method for BT 36.
50	78	55	Cs	133		change μ value for reference CH 49 to 2.5595(26).
	78	55	Cs	133		delete data and reference WL 52-5.
	79	55	Cs	134		delete spin (4) and change references [JC 52] [BM 53] μ values to correspond ie 1.48(1).
52	82	59	Pr	141		add to reference BX 53, chem info. calculated from data of White, Phys. Rev. 34, 1397 (1929).
57	108	73	Ta	181		correct reference GI 33 to GI 35 add $\mu = 1.9$ uncorrected for mag. shielding.
59	114	77	Ir	191		change μ to +0.16(3) for reference MW 52.
60	119	80	Hg	199		for reference FS 51 add method S.
62	124	81	Tl	205		delete data and reference WL 52-5.
	124	81	Tl	205		for reference GW 53 correct to read tolerance 0.000 001, chem info. to 1.4 m aq $Tl(Ac)_2$ or Tl_2O_3 in aqua regia.
63	126	83	Bi	209		change reference TI 52-2 to TI 53.
	140	92	U	233	$\frac{5}{2}$	[VA 54].
	143	92	U	235	$\frac{7}{2}$	[VA 54] add μ - .85 Theory MN-53, μ = .8(2) Theory VA 54.
64	144	93	Np	237		change 287 to 237.
	145	94	Pu	239	$\frac{1}{2}$	[VB 54] [BE 54-2].
	148	95	Am	243	$\frac{5}{2}$	[CN 54].

SECTION II

This section provides an addenda to the Reference Index and Author Index of ORNL-1469. This addenda has been compiled to be used as a supplement of the original indices.

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AK 54	Aksenov, S. I. and K. V. Vladimirskii, Doklady Nauk. SSSR 96, 37 (1954).	Ge
AY 53	Alder, F. and K. Halbach, Helv. Phys. Acta 26, 426 (1953).	Cr
BC 54	Baker, J. M. and B. Bleaney, private communication 1954.	Tb
BE 54	Bleaney, B., J. M. Daniels, M. A. Grave, H. Halban, N. Kurti, F. N. H. Robinson, and F. E. Simon, Proc. Roy. Soc. A221, 170 (1954).	Co
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BJ 54	Burke, B. F., M. W. P. Strandberg, V. W. Cohen, W. S. Koski, Phys. Rev. 93, 193 (1954).	S 35
BU 54	Brun, E., J. Oeser, H. H. Staub, and C. G. Telschow, Phys. Rev. 93, 172 (1954).	K 41, Y-89, Ag
BU 54-2	Brun, E., J. Oeser, H. H. Staub, and C. G. Telschow, Phys. Rev. 93, 904 (1954).	Xe
BX 52	Brix, Peter, Zeits. f. Physik 132, 579 (1952).	Eu, Gd, Yb
CG 54	Corngold, Noel, Thesis, Harvard University, February 1954.	n
CO 54	Cohen, V. W. and D. A. Gilbert, Phys. Rev. 95, 569 (1954).	Cs
CN 54	Conway, J. G. and R. D. McLaughlin, Phys. Rev. 94, 498 (1954).	Am

CN 54-2	Conway, J. G., and R. D. McLaughlin, Phys. Rev. 96, 541 (1954).	Np
EO 53	Elliott, R. J. and K. W. H. Stevens, Proc. Phys. Soc. A219, 387 (1953).	Sm, Nd, Er
FF 54	Frauendelden, H., J. S. Lawson, Jr., W. Jentschke, Phys. Rev. 93, 1126 (1954).	
FU 52	Fujiwara, Shizuo and Shoichi Hayashi, Reports the University of Electro-Communications, No. 4, 101, Dec. 1952.	F, Cu
GM 54	Goodman, L. S. and S. Wexler, Phys. Rev. 95, 570 (1954).	Cs
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HB 54	Halbach, K., Helv. Phys. Acta 27, 259 (1954).	Cr
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JR 53-2	Jeffries, C. D., Phys. Rev 90, 1130 (1953).	Ca
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JR 53-5	Jeffries, C. D., Phys. Rev. 92, 1096A (1953).	Ti
JR 54	Jeffries, C. D., personal communication February 12, 1954.	Rh
KI 53	King, J. C. and V. Jaccarino, Phys. Rev. 91, 209a (1953).	Br
KK 53	Kikuchi, C., M. H. Sirvetz, and V. W. Cohen, Phys. Rev. 92, 109 (1953).	V
KM 53	Kessler, K. G. and R. E Trees, Phys. Rev. 92, 303 (1953).	Tc

KO 52-2	Kanda, T., Y. Masuda, R. Kusaka, Y. Yamagata, and J. Itoh, Jour. Phys. Soc. Japan 7, 297 (1952).	F
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LO 54	Loeliger, H. R. and L. R. Sarles, Phys. Rev. 95, 291 (1954).	Os
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MN 53	McNally, J. Rand, Jr., Personal Correspondence Nov. 1954.	U
MW 53	Murakawa, K. J., Jour. Phys. Soc. Japan 8, 535 (1953).	Ru
MW 53-2	Murakawa, K., and T. Kamei, Phys. Rev. 92, 325 (1953).	Dy
MW 54	Murakawa, K., and Shigeki Suwa, J. Phys. Soc. Japan 9, 93 (1954).	Pr, Sm
MW 54-2	Murakawa, K., Phys. Rev. 93, 1232 (1954).	Sm
OG 54		
RO 54	Royden, Virginia, Phys. Rev. 96, 543 (1953).	C
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SG 54-2	Sogo, P. B. and C. D. Jeffries - personal correspondence from C. D. Jeffries, November 26, 1954.	W, Cl
SU 53	Suwa, S., J. Phys. Soc. Japan, 8, 734 (1953).	Zr
TN 53	Trenam, R. S., Proc. Phys. Soc. (London) A66, 414 (1953).	Fe
VA 54	Vander Sluis, K. L. and J. R. McNally, Jr., Jour. Opt. Soc. Am. 44, 87 (1954).	U

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VA 55-2	Vander Sluis, K. L., G. W. Charles, and P. M. Griffin, personal communication February 7, 1955.	Po
VB 54	Vanden Berg, Martha, P. F. A. Klinkenberg, and Pierre Regnaut, Physica 20, 37 (1954).	Pu
VN 53	Von Siemans, W. V., Physik 13, 158 (1953).	Au, Ir
WE 53	Weaver, H. E., Jr., Phys. Rev. 89, 923 (1953).	Si, S, Zn, As, Se, Te
WI 54	Williams, G. A., D. W. McCall, and H. S. Gutowsky, Phys. Rev. 93, 1428 (1954).	Si
WL 52-2	Walchli, H. E., ORNL-1469 - A Table of Nuclear Moment Data.	Li, Al, F, P, Cu, Ga, Br, Cs, Tl
WL 53	Walchli, H. E., Phys. Rev. 90, 331 (1953).	Se
WL 54	Walchli, H. E., Thesis, M. S., June 1954, University of Tennessee; also Report ORNL-1775	Li, Na, Al, P, Cl, V, Cu, Ga, Se, Br, Cs, Tl
WO 54	Woodward, E. C., Jr., Phys. Rev. 93, 954a (1954).	Mo
WS 53	Wessel, G. and Hin Lew, Phys. Rev. 91, 476a (1953).	Ag

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121	Asmodt, L. C.	AA 54	
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122	Bleaney, B.	BE 54, 54-2, 54-3	BC 54
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	Wexler, S.		GM 54
	Williams, G. A.	WI 54	
	Woodward, E.C., Jr.	WO 54	

SECTION III

This section includes Tables of new measurement data entered in the same manner as in the original ORNL-1469. Although it is not recommended that this material be entered in the original tables a page reference number is given for each entry indicating the page in ORNL-1469 where this information would normally occur. It is suggested that an identifying mark be made in ORNL-1469 (Table 1.1) to call attention to the fact that Supplement II should be referred to for new information.

A new table of weighted nuclear moments corrected for diamagnetic effects is included as Table 2.1a. The table 2.1 of ORNL-1469 is now obsolete and should be so marked. Additional data supplementing Table 2.2 are included as Table 2.2a.

All nuclear moments are based on a proton moment of 2.7926700... n. m. and on a proton correction factor of 1.0000262 giving a value of 2.792743... for the proton moment with diamagnetic correction.

TABLE 1.1a

Page	N	Z	Atom	A	I	Magnetic Moment	Q	Meth.	Std.	f(x)/f(Std)	Tolerance	Chemical Information	Ref.	f(x)/f(H)
13	1	0	n			-1.913 146 (34)		R	H^1	0.685 057 9	.000 001 1 (preliminary)		CG 54	.685 057 9 (11)
16	3	3	Li	6		0.821 921 (33)		R	D^2	0.958 638	.000 038	aq.LiCl + 0.2m $MnSO_4$ + 0.2 cc D_2O	WL 54	.147 156 9 (59)
17	4	3	Li	7		3.255 999 (67)		R	Na^{23}	1 469 225	.000 003	aq LiCl + 0.2m $MnSO_4$ + 0.2 cc D_2O	WL 54	.388 636 3 (80)
	4	3	Li	7		3.255 947 (62)		R	Li^6	2.640 910 7	.000 005 0 (18m)		AD 51-2	.388 630 1 (74)
	7	6	C	13		0.702 197 6 (14)		R	H^1	0.251 443 1	.000 000 5	CH_3I with 51% C^{13}	RO 54	.251 443 1 (5)
21	10	9	F	19		2.626 8 (14)		R	H^1	0.940 6	.000 5	NH_4F	FU 52	.940 6 (5)
22	12	11	Na	23		2.216 125 (44)		R	D^2	1.723 167	.000 034	aq. NaCl + 0.2m $MnSO_4$ and D_2O	WL 54	264 516 9 (52)
23	14	13	Al	27		3.638 356 (46)		R	Na^{23}	0.985 055	.000 012	aq $AlCl_3$ and NaBr aq. + 0.2m $MnSO_4$	WL 54	.260 564 7 (32)
24	16	15	P	31		1.130 488 (10)		R	Li^7	1 041 611	.000 030	aq LiCl and H_3PO_4	WL 54	404 805 5 (35)
	16	15	P	31		1.130 499 (3)		R	Na^{23}	1.530 366	.000 042	H_3PO_4 and NaBr aq. + .05m $MnSO_4$	WL 54	.404 809 2 (11)
25	19	16	S	35		1 00 (4)		W				OCS	BJ 54	
26	18	17	Cl	35		0 820 905 (8)		R	D^2	0 638 302	.000 008	aq. RbCl + 0.01 cc D_2O	WL 54	.097 983 3 (9)
	19	17	Cl	36		1 283 8 (2)		R	D^2	0.748 73	000 03	4N HCl and D_2O	SG 54-2	114 935 (5)
27	20	19	K	39		0 390 943 (6)		R	K^{41}	1.821 96	000 27	15m. aq KCO_2H	BU 54	.046 663 (7)
28	22	19	K	41		0.214 57 (4)		R	K^{39}	0.548 86	.000 08	15m. aq. KCO_2H	BU 54	.025 611 5
	23	19	K	42	2	[BM 53]								
	23	20	Ca	43		-1.315 33 (12)		R	D^2	0.438 32	.000 04	0 7m $CaBr_2$ with 68% Ca^{43}	JR 53-2	.067 285 (6)
	23	20	Ca	43	$\frac{7}{2}$	[KY 54]								

TABLE 1.1a (Con't.)

Page	N	Z	Atom	A	I	Magnetic Moment	Q	Meth.	Std.	f(x)/f(Std.)	Tolerance	Chemical Information	Ref.	f(x)/f(H)
29	25	22	Ti	47		0.787 10 (9)		R	D^2	.367 209	.000 04	$TiCl_4$ and Mn^{++} in D_2O	JR 53-5	.056 369 (6)
	25	22	Ti	47		0.786 58 (9)		R	Cl^{35}	.574 93	.000 06	$TiCl_4 + D_2O$ + 1m Mn^{++}	JR 53-5	.056 332 (6)
	27	22	Ti	49		1.101 51 (12)		R	Cl^{35}	.575 08	000 06	$TiCl_4 + D_2O$ + 1m Mn^{++}	JR 53-5	.056 347 (6)
	27	22	Ti	49		1.102 23 (12)		R	D^2	.367 306	.000 04	$TiCl_4 + D_2O$ + 1m Mn^{++}	JR 53-5	.056 384 (6)
	27	23	V	50				X	V^{51}	gr = 379 2	.000 08	V Tutton salt	KK 53	
	27	23	V	50		3.341 264 (99)		R	Rb^{85}	1.032 631	.000 029	$VOCl_3$ and RbCl + 0.1 cc D_2O	WL 54	099 703 4 (31)
	27	23	V	50		3.341 281 (34)		R	Cl^{35}	1.017 583	.000 011	$VOCl_3$ and RbCl + 0.1 cc D_2O	WL 54	.099 703 9 (10)
	27	23	V	50		3 341 321 (48)		R	D^2	.649 518	.000 008	$VOCl_3$ and RbCl + 0.1 cc D_2O	WL 54	.099 705 1 (14)
30	29	24	Cr	53	$\frac{3}{2}$	[HB 54]								
	29	24	Cr	53		-0.473 53 (4)		R	D^2	.368 20	000 03	1.1 m aq. Na_2CrO_4 and D_2O + 1m $MnCl_2$ (90% Cr^{53})	JR 53-4	.056 521 (5)
	29	24	Cr	53		-0.473 55 (4)		R	N^{14}	.782 26	.000 05	Na_2CrO_4 and HNO_3	AY 53	.056 523 (4)
31	31	26	Fe	57		$<$ 0.05		X				40% Fe^{57} in ferric potassium selenate alum	TN 53	
32	34	29	Cu	63		2.225 820 (32)		R	Na^{23}	1.004 371	.000 014	metal powder	WL 54	.265 674 1 (37)
	34	29	Cu	63		2.220 584 (36)		R	Na^{23}	1.002 008	.000 016	$CuCl_2$ and Cu_2Cl_2	WL 54	.265 049 1 (43)
	34	29	Cu	63		2.220 765 (12)		R	Na^{23}	1.002 09	.000 05		FU 52	265 071 (14)
	35	29	Cu	64	1	[LE 54]								
	35	29	Cu	64		0.40		M					LE 54	
33	36	29	Cu	65		2.384 471 (27)		R	Na^{23}	1.075 960	.000 011	metal powder	WL 54	284 610 7 (32)
	36	29	Cu	65		2.378 964 (25)		R	Na^{23}	1.073 475	.000 010	$CuCl_2$ and Cu_2Cl_2	WL 54	.283 953 4 (29)
	36	29	Cu	65		2.378 999 (43)		R	Cu^{63}	1.071 324	.000 019	$Cu_2Cl_2 + CuCl_2$ + NaBr aq.	WL 54	.283 957 6 (51)
	36	29	Cu	65		2.378 896 (42)		R	Cu^{63}	1 071 277	.000 018	powdered Cu metal and aq. NaBr	WL 54	.283 945 2 (49)

Table 1.1a (Cont'd)

Page	N	Z	Atom	A	I	Magnetic Moment	Q	Meth.	Std.	f(x)/f(Std.)	Tolerance	Chemical Information	Ref.	f(x)/f(H)
34	38	31	Ga	69		2.010 81 (52)		R	Na^{23}	.907 349	.000 020	GaCl + HCl + NaCl	WL 54	.240 010 (61)
	40	31	Ga	71		2.554 919 (26)		R	Na^{23}	1.152 872	.000 008	GaCl + HCl + NaCl	WL 54	.304 955 3 (30)
35	41	32	Ge	73		-0.876 745 (78)		R	D^2	.227 24	.000 02	$GeCl_4$	AK 54	.034 882 8 (31)
	41	32	Ge	73		-0.876 783 (115)		R	D^2	.227 25	.000 03	Calc. from Cl^{35}/D^2 of WL 52-2	JR 53-4	.034 884 3 (46)
	41	32	Ge	73		-0.876 02 (10)		R	Cl^{35}	.355 72	.000 04	$GeCl_4$ and $TiCl_4$	JR 53-4	.034 854 (4)
	41	34	Se	75	$\frac{5}{2}$	[AA 54]								
	43	34	Se	77		0.532 479 (9)		R	D^2	1.242 100	.000 019	liquid H_2Se and D_2O + 1m $MnSO_4$	WL 54	.190 670 1 (30)
36	45	34	Se	79		-1.015 (15)		W				OC Se	HR 54	
	44	35	Br	79		2.098 99 (25)		R	Na^{23}	.947 140	.000 009	NaBr sat. aq.	WL 54	.250 535 (3)
37	46	35	Br	81		2.262 595 (31)		R	Na^{23}	1.020 965	.000 014	Na Br sat. aq.	WL 54	.270 063 5 (37)
	46	35	Br	81		2.262 691 (25)		M	Br^{79}	1.077 94			KI 53	.270 075 (3)
39	49	38	Sr	87		-1.089 26 (15)		R	D^2	0.282 32	.000 03	aq. $SrBr_2$ and 1m Mn^{++} in D_2O also 3.1m aq. $SrBr_2$ (60% Sr^{37}) + 1m $MnCl_2$	JR 53-4	.043 338 (5)
40	50	39	Y	89		.136 824 (3)		R	H^1	.048 994	.000 001	3.3m aq. $Y(NO_3)_3$	BU 54	.048 994 (1)
	51	40	Zr	91		-1.3 (3)		S					SU 53	
41	55	42	Mo	97		-0.949 5		S	Mo^{95}	1.022			WO 54	.068 00
	56	43	Tc	99		5.54 (30)		S					KM 53	
	55	44	Ru	99	$\geq \frac{5}{2}$, $\leq \frac{9}{2}$	μ negative		S					MW 53	
	57	44	Ru	101	$\geq \frac{5}{2}$, $\leq \frac{9}{2}$	μ negative		S					MW 53	
42	58	45	Rh	103		-0.088 128 (3)		R	D^2	.205 574	.000 007	metal and 1 m Mn^{++} in D_2O	JR 54, SG 54-2	.031 556 9 (11)

Table 1.1a (Cont'd)

Page	N	Z	Atom	A	I	Magnetic Moment	Q	Meth.	Std.	f(x)/f(Std.)	Tolerance	Chemical Information	Ref.	f(x)/f(H)
42	60	47	Ag	107		-0.113 149 (6)		M	Ag^{109}	.866 27	.000 04	metal (?)	WS 53	.040 516 3 (19)
	60	47	Ag	107		-0.113 031 (13)		R	Ag^{109}	.869 851	.000 02	6m $AgNO_3$ + D_2O + 2m $MnNO_3$	JR 53, SG 54	.040 468 1 (10)
	60	47	Ag	107		-0.113 617 (3)		R	H^1	.040 684	.000 001	colloidal silver metal	BU 54	.040 684 (1)
	60	47	Ag	107		-0.113 014 (3)		R	H^1	.040 468	.000 001	7m $AgNO_3$ + 1m $MnNO_3$	BU 54	.040 468 (1)
42	62	47	Ag	109		-0.129 962 (13)		R	D^2	.303 16	.000 03	6m $AgNO_3$ + D_2O + 2m $MnNO_3$	JR 53, SG 54	.046 537 (5)
	62	47	Ag	109		-0.130 616 (3)		R	H^1	046 771	.000 001	colloidal silver metal	BU 54	.046 771 (1)
	62	47	Ag	109		-0.129 923 (3)		R	H^1	.046 523	.000 001	7m $AgNO_3$ + 1m $MnNO_3$	BU 54	.046 523 (1)
	62	47	Ag	109		-0.130 615 (3)		R	Ag^{107}	1.149 61	.000 04	metal	BU 54	.046 770 7 (17)
	64	47	Ag	111		$\frac{1}{2}$ [LE 54]								
	64	47	Ag	111	(?)	0.144		M					LE 54	
49	75	54	Xe	129		-0.772 545 (14)		R	H^1	.276 633	.000 005	Xe gas at 50 atmospheres and H_2O + 1m $MnSO_4$	BU 54-2	.276 633 (5)
	77	54	Xe	131		-0.686 796 (9)		R	H^1	.081 976	.000 001	Xe gas at 50 atmospheres and H_2O + 1m $MnSO_4$	BU 54-2	.081 976 (1)
50	78	55	Cs	133		2 564 21 (6)		R	D^2	854 496	.000 018	$CsNO_3$ aq. + 0.3m D_2O	WL 54	.131 170 5 (28)
	79	55	Cs	134		(+) 1.10 (1)		X					CO 54, GM 54	
	79	55	Cs	134	8	[CO 54] [GM 54]								
52	82	59	Pr	141		+ 4.0 (1)		S					MW 54	
	83	60	Nd	143		-1.0 (2.5)		X	Nd^{145}	μr = 1.61	calculated	Nd ethyl sulphate	EO 53	
	83	60	Nd	143				X	Nd^{145}	μr = 1.608 3	.001 2	Nd ethyl sulphate	BE 54	
53	85	60	Nd	145		add [BE 50] spin reference								
	85	60	Nd	145		-0.62 (15)		X	Nd^{143}	μr = 0.62	calculated	Nd ethyl sulphate	EO 53	
	85	62	Sm	147		-0.83 (15)		X	Sm^{149}	μr = 1.22	calculated	Sm ethyl sulphate	EO 53	
	85	62	Sm	147		-0.76 (8)		S	Sm^{149}	μr= 1.198	.015		MW 54, MW 54-2	
	87	62	Sm	149		-0 68 (10)		X	Sm^{147}	μr = 0 82	calculated	Sm ethyl sulphate	EO 53	

Table 1 1a (Cont'd)

Page	N	Z	Atom	A	I	Magnetic Moment	Q	Meth	Std.	f(x)/f(Std.)	Tolerance	Chemical Information	Ref.	f(x)/f(H)
53	87	62	Sm	149		-0.64 (6)		S					MW 54,MW 54-2	
54	90	63	Eu	153		1.5		S	Eu^{151}	$\mu r = 0.443$			BX 52	
55	94	65	Tb	159		1.5 (4)		X				Tb ethyl sulphate	BC 54	
	95	66	Dy	161	$(\frac{7}{2})$	[MW 53-2]								
	99	68	Er	167		-0.50 (12)		X				Er ethyl sulphate	EO 53	
57	109	74	W	183		-0.117 44 (13)		R	D^2	0.273 95	.000 03	metal	SG 54-2	.042 053 (47)
59	113	76	Os	189		0.650 039 (77)		R	Cl^{35}	0.791 896	.000 093	OsO_4 and $TiCl_4$	LO 54	.077 590 8 (92)
	114	77	Ir	191		+0.2 (1)		S					VN 53	
	116	77	Ir	193		+0.2(1)		S					VN 53	
60	118	79	Au	197		+0.14 (2)		S					VN 53	
61	122	82	Pb	204	2	$+0.14\ (^{+12}_{-6})$		X	first excited state				FF 54	
62	124	81	Tl	205		1.611 622 (84)		R	Tl^{203}	1.009 816	.000 022	1 1m Thallous Acetate	WL 54	577 09 (3)
63	125	84	Po	209	$\frac{1}{2}$	[VA 55-2]								
	141	92	U	233	$\frac{5}{2}$	[VA 54] μ positive								
	143	92	U	235	$\frac{7}{2}$	[VA 55]								
	143	92	U	235		(-) 0.8 (2)		S,T					VA 54	
	143	92	U	235		(-) 0.85							MN 54	
64	145	94	Pu	239		- 0.4		X,T					BE 54-2	
	145	94	Pu	239	$\frac{1}{2}$	[BE 54-2] μ negative								
	146	93	Np	239	$\frac{1}{2}$	[CN 54-2]								
	147	94	Pu	241	$\frac{5}{2}$	[BE 54-3]								
	147	94	Pu	241		1.4		X	Pu^{239}	$\mu r = 3.53$	.02	$(UO_2)\ Rb(NO_3)_3$ crystal	BE 54-3	
	148	95	Am	243	$\frac{5}{2}$	[CN 54]								

TABLE 2.1a

WEIGHTED MAGNETIC MOMENTS AND STANDARDIZED FREQUENCY RATIOS

N	Z	Atom	A	I	μ diamagnetically corrected	n	ppm	f/f(H)
1	0	n	-	$\frac{1}{2}$	-1.913 141 (2)	2	220	.685 057 9 (11)
0	1	H	1	$\frac{1}{2}$	+2.792 743 (0)	7	60	1 000 00 (6)
1	1	H	2	1	+0.857 407 3 (2)	7	1.6	.153 506 20 (24)
2	1	H	3	$\frac{1}{2}$	+2.978 84 (1)	3	15	1.066 635 (15)
1	2	He	3	$\frac{1}{2}$	-2.127 544 (7)	1	3	.761 786 6 (23)
3	3	Li	6	1	+0.822 004 (22)	4	21	.147 156 8 (40)
4	3	Li	7	$\frac{3}{2}$	+3.256 314 (19)	5	21	.388 634 7 (22)
5	4	Be	9	$\frac{3}{2}$	-1.177 37 (41)	3	349	.140 518 (49)
5	5	B	10	3	+1.800 81 (49)	3	270	.107 454 (29)
6	5	B	11	$\frac{3}{2}$	+2.688 52 (4)	6	12.5	.320 838 (4)
7	6	C	13	$\frac{1}{2}$	+0.702 381 (2)	1	4	.251 443 (1)
7	7	N	14	1	+0.403 71 (6)	2	153	072 256 (11)
8	7	N	15	$\frac{1}{2}$	-0.283 13 (12)	2	435	.101 349^5(44)
9	8	O	17	$\frac{5}{2}$	-1.893 70 (9)	1	440	.135 566 (6)
9	9	F	18	(1)	[+ 0.8 (1)]	0		Theory
10	9	F	19	$\frac{1}{2}$	+2.628 50 (5)	5	20.1	.940 777 (19)
11	10	Ne	21	$\geq \frac{3}{2}$	[-0.5 (1)]	0		Theory
11	11	Na	22	3	+1.746 9 (22)	1	1350	.104 19 (14)
12	11	Na	23	$\frac{3}{2}$	+2 217 529 (10)	4	5 8	.264 518 (11)
13	11	Na	24	4	+1.688 (5)	1		.075 55 (25)
13	12	Mg	25	$\frac{5}{2}$	-0.855 32 (14)	1	180	.061 211 (11)

TABLE 2.1a (Cont'd)

N	Z	Atom	A	I	μ diamagnetically corrected	n	ppm	f/f(H)
13	13	Al	26	(5)	[+2.8 (2)]	0		Theory
14	13	Al	27	$\frac{5}{2}$	+3.641 421 (30)	6	8.1	.260 569 9 (21)
15	14	Si	29	$\frac{1}{2}$	-0.555 25 (11)	2	201	.198 65 (4)
15	15	P	30	(1)	[+0.6 (1)]	0		Theory
16	15	P	31	$\frac{1}{2}$	+1.131 62 (10)	6	273	.404 816 (35)
17	16	S	33	$\frac{3}{2}$	+0.643 42 (13)	1	196	.076 717 (15)
19	16	S	35	$\frac{3}{2}$	+1.00 (14)	1		
17	17	Cl	34	(3)	[+1.4 (4)]	0		Theory
18	17	Cl	35	$\frac{3}{2}$	+0.821 808 (71)	5	86	.097 978 4 (84)
19	17	Cl	36	2	+1.285 38 (6)	1		.114 935 (5)
20	17	Cl	37	$\frac{3}{2}$	+0 684 09 (6)	1	860	.081 559 (70)
19	19	K	38	(3)	[+1.4 (4)]	0		Theory
20	19	K	39	$\frac{3}{2}$	+0.391 46 (7)	1	172	.046 663 (8)
21	19	K	40	4	-1.298 1 (4)	1	310	.058 027 (18)
22	19	K	41	$\frac{3}{2}$	+0.215 173 (84)	2	234	.025 649 (10)
23	19	K	42	2	-1.137 (5)	1	4400	.101 8 (5)
23	20	Ca	43	$\frac{7}{2}$	-1.317 201 (12)	1	92	.067 285 (6)
24	21	Sc	45	$\frac{7}{2}$	+4.756 31 (12)	3	21	.242 939 (5)
25	22	Ti	47	$\frac{5}{2}$	-0.788 130 (84)	1		.056 352 (6)
27	22	Ti	49	$\frac{7}{2}$	-1.103 77 (12)	2	178	.056 372 (6)
27	23	V	50	6	+3.347 02 (94) for $NaVO_3$	3	28	.099 704 7 (28) for $VOCl_3$
28	23	V	51	$\frac{7}{2}$	+5.147 0 (57) for $NaVO_3$	3	137	.262 89 (29)
29	24	Cr	53	$\frac{3}{2}$	-0.474 391 (42)	2		.056 521 (5)
30	25	Mn	55	$\frac{5}{2}$	+3.467 66 (14)	3	41	.247 867 (10)

TABLE 2.1a (Cont'd)

N	Z	Atom	A	I	μ diamagnetically corrected	n	ppm	f/f(H)
31	26	Fe	57	$(\frac{3}{2})$	<0.05	1		
31	27	Co	58	2	+3.5 (3)	1		
32	27	Co	59	$\frac{7}{2}$	+4.648 8 (5)	1	101	.237 297 (24)
33	27	Co	60	5	+3.5 (5)	1		
33	28	Ni	61	$(\frac{3}{2})$	[+0.10 (10)]	0		Theory
34	29	Cu	63	$\frac{3}{2}$	+2.226 64 (17)	5	75	.265 053 (20)
35	29	Cu	64	1	0.40	1		
36	29	Cu	65	$\frac{3}{2}$	+2.384 73 (45)	6	188	.283 959 (53)
37	30	Zn	67	$\frac{5}{2}$	+0.875 71 (10)	1	112	.062 559 (7)
37	31	Ga	68	1				
38	31	Ga	69	$\frac{3}{2}$	+2.016 05 (51)	1	100	.240 010 (61)
40	31	Ga	71	$\frac{3}{2}$	+2.561 58 (26)	3	50	.304 955 (30)
41	32	Ge	73	$\frac{9}{2}$	-0.879 14 (12)		137	.069 769 (10)
42	33	As	75	$\frac{3}{2}$	+1.438 96 (16)	3	111	.171 266(19)
41	34	Se	75	$\frac{5}{2}$				
43	34	Se	77	$\frac{1}{2}$	+0.534 058 (14)	4	26	.190 671 4 (50)
45	34	Se	79	$\frac{7}{2}$	-1.018 (15)	1		
44	35	Br	79	$\frac{3}{2}$	+2.105 55 (30)	4	140	.250 547 (35)
46	35	Br	81	$\frac{3}{2}$	+2.269 58 (3)	5	11.2	.270 066 (3)
47	36	Kr	83	$\frac{9}{2}$	-0.969	1		.038 46
48	37	Rb	85	$\frac{5}{2}$	+1.352 68 (11)	2	81	.096 552 2 (78)
49	37	Rb	86	2	(-)1.67 (40)	1		
50	37	Rb	87	$\frac{3}{2}$	+2.750 529 (38)	1	14	.327 213 7 (45)
49	38	Sr	87	$\frac{9}{2}$	-1.093 02 (13)	1		.043 338 (5)
50	39	Y	89	$\frac{1}{2}$	-0.137 314 (29)	1		.048 994 (1)
51	40	Zr	91	$\frac{5}{2}$	[-1.2 (4)]	2		

TABLE 2.1a (Cont'd)

N	Z	Atom	A	I	μ diamagnetically corrected	n	ppm	f/f(H)
52	41	Nb	93	$\frac{9}{2}$	+6 167 13 (35)	2	58	.244 431 (14)
53	42	Mo	95	$\frac{5}{2}$	-0 932 70 (18)	1	196	.066 533 (13)
55	42	Mo	97	$\frac{5}{2}$	-0.952 29 (10)	1	103	067 930 (7)
56	43	Tc	99	$\frac{9}{2}$	+5.680 48 (35)	1	6.3	225 082 6 (14)
55	44	Ru	99	$\frac{5}{2}$	- μ			
57	44	Ru	101	$\frac{5}{2}$	- μ			
58	45	Rh	103	$\frac{1}{2}$	-0 088 512 (?)	1		.031 556 (?)
59	46	Pd	105	$\frac{5}{2}$	-0.57 (5)	1		
60	47	Ag	107	$\frac{1}{2}$	-0.113 556 (14)	2		.040 473 9 (48)
62	47	Ag	109	$\frac{1}{2}$	-0 130 53 (19)	2		046 525 (67)
63	47	Ag	111	$\frac{1}{2}$	0 144	1		
63	48	Cd	111	$\frac{1}{2}$	-0.594 99 (8)	1	142	212 04 (3)
65	48	Cd	113	$\frac{1}{2}$	-0.622 43 (8)	1	136	.221 82 (3)
64	49	In	113	$\frac{9}{2}$	+5.523 17 (54)	1	97	.218 669 (21)
66	49	In	115	$\frac{9}{2}$	+5.534 41 (66)	5	119	.219 118 (26)
65	50	Sn	115	$\frac{1}{2}$	-0.917 798 (76)	1	83	326 997 (27)
67	50	Sn	117	$\frac{1}{2}$	-0.999 90 (19)	2	814	356 25 (29)
69	50	Sn	119	$\frac{1}{2}$	-1.046 11 (84)	3	81	372 71 (3)
70	51	Sb	121	$\frac{5}{2}$	+3 358 92 (19)	3	55	.239 315 (13)
72	51	Sb	123	$\frac{7}{2}$	+2.546 53 (3)	3	11.6	129 595 (15)
73	51	Sb	124	(3)	[+3.2 (2)]			Theory
71	52	Te	123	$\frac{1}{2}$	-0.735 87 (23)	1	305	.262 097 (80)
73	52	Te	125	$\frac{1}{2}$	-0.887 16 (26)	1	300	.315 985 (94)
73	53	I	126	2				
74	53	I	127	$\frac{5}{2}$	+2 808 97 (23)	5	80	.200 076 (16)

TABLE 2.1a (Cont'd)

N	Z	Atom	A	I	μ diamagnetically corrected	n	ppm	f'/f(H)
76	53	I	129	$\frac{7}{2}$	+2 617 266 (12	2	4 5	.133 157 5 (6)
78	53	I	131	$\frac{7}{2}$				
75	54	Xe	129	$\frac{1}{2}$	-0.776 86 (79)	2	69	276 631 (28)
77	54	Xe	131	$\frac{3}{2}$	+0.690 635 (85)	1		081 976 (1)
76	55	Cs	131	$\frac{5}{2}$	+3.48 (4)	1		
78	55	Cs	133	$\frac{7}{2}$	+2.578 87 (30)	4	11.5	.131 169 (15)
79	55	Cs	134	8	+1.10 (1)	1		
80	55	Cs	135	$\frac{7}{2}$	+2.738 2 (19)	2	3600	.139 27
82	55	Cs	137	$\frac{7}{2}$	+2.850 2 (25)	2	3460	.145 0
79	56	Ba	135	$\frac{3}{2}$	+0.835 5 (24)	1		
81	56	Ba	137	$\frac{3}{2}$	+0.932 4 (27)	1		
81	57	La	138					
82	57	La	139	$\frac{7}{2}$	+2.778 07 (61)	3	219	.141 260 (31)
82	59	Pr	141	$\frac{5}{2}$	+3.9 (3)	1		
83	60	Nd	143	$\frac{7}{2}$	-1.0 (2)	1		
85	60	Nd	145	$\frac{7}{2}$	-0.62 (9)	1		
86	61	Pm	147	$(\frac{7}{2})$				
85	62	Sm	147	$\frac{7}{2}$	-0.78 (37)	1		
87	62	Sm	149	$\frac{7}{2}$	-0.65 (23)	1		
88	63	Eu	151	$\frac{5}{2}$	+3.6	1		
90	63	Eu	153	$\frac{5}{2}$	+1.6	1		
91	64	Gd	155	$(\frac{3}{2}, \frac{7}{2}, \frac{9}{2})$	+0.3 (2)	1		
93	64	Gd	157	$(\frac{3}{2}, \frac{7}{2}, \frac{9}{2})$	+0.3 (2)	1		

TABLE 2.1a (Cont'd)

N	Z	Atom	A	I	μ diamagnetically corrected	n	ppm	f/f(H)
94	65	Tb	159	$\frac{3}{2}$	[1.5 (4)]			
95	66	Dy	161	$(\frac{7}{2})$				
97	66	Dy	163	$(\frac{7}{2})$				
98	67	Ho	165	$\frac{7}{2}$	[+3.0 (5)]	0		Theory
99	68	Er	167	$\frac{7}{2}$	-0.50 (12)	1		
100	69	Tm	169	$\frac{1}{2}$	[+ .8 or - 15]	0		Theory
101	70	Yb	171	$\frac{1}{2}$	+0.45	1		
103	70	Yb	173	$\frac{5}{2}$	-0.65	1		
104	71	Lu	175	$\frac{7}{2}$	+2.9 (5)	1		
105	71	Lu	176	(≥ 7)	+4.2 (8)	1		
105	72	Hf	177	$(\frac{1}{2},\frac{3}{2})$	[+0.6]	0		Theory
107	72	Hf	179	$(\frac{1}{2},\frac{3}{2})$				
108	73	Ta	181	$\frac{7}{2}$	+2.1	1		[illegible]
109	74	W	183	$\frac{1}{2}$	+0.118 46 (13)	1		.042 053 (47)
110	75	Re	185	$\frac{5}{2}$	+3.171 56 (34)	1	107	.225 142 (24)
112	75	Re	187	$\frac{5}{2}$	+3.175 91 (34)	1	107	.225 451 (24)
111	76	Os	187					
113	76	Os	189	$\frac{3}{2}$	+0.655 914 (78)	1		.077 590 8 (92)
114	77	Ir	191	$\frac{3}{2}$	+0.2 (1)	0		
116	77	Ir	193	$\frac{3}{2}$	+0.17 (22)			
117	78	Pt	195	$\frac{1}{2}$	+0 605 96 (21)	1	346	.214 978 (74)
118	79	Au	197	$\frac{3}{2}$	+0.14 (2)	1		
119	80	Hg	199	$\frac{1}{2}$	+0.504 117 (41)	1		178 789 (16)
121	80	Hg	201	$\frac{3}{2}$	-0.613 (3)			
122	81	Tl	203	$\frac{1}{2}$	+1 611 6 (14)	2	875	.571 48 (50)

TABLE 2.1a (Cont'd)

N	Z	Atom	A	I	μ diamagnetically corrected	n	ppm	f/f(H)
124	81	Tl	205	$\frac{1}{2}$	+1.627 34 (42)	6	87	.577 05 (5)
122	82	Pb	204	2	+0.14 (12)	1		excited state
125	82	Pb	207	$\frac{1}{2}$	+0.589 43 (14)	1		.209 00 (5)
126	83	Bi	209	$\frac{9}{2}$	+4.079 70 (81)	2		.160 695 (32)
125	84	Po	209	$\frac{1}{2}$				
138	89	Ac	227	$\frac{3}{2}$				
140	91	Pa	231	$\frac{3}{2}$				
141	92	U	233	$\frac{5}{2}$				
143	92	U	235	$\frac{7}{2}$	-0.8(2)			
144	93	Np	237	$\frac{5}{2}$				
146	93	Np	239	$\frac{1}{2}$				
145	94	Pu	239	$\frac{1}{2}$	0.4			
147	94	Pu	241	$\frac{5}{2}$	1.4			
146	95	Am	241	$\frac{5}{2}$				
148	95	Am	243	$\frac{5}{2}$				

TABLE 2.2a

MAGNETIC MOMENT RATIOS

Addenda to Table 2.2

Page	Isotopes	μ ratio	Reference
72	${}_{35}Br^{81}/{}_{35}Br^{79}$	1.077 94 (1)	KI 53
72	${}_{29}Cu^{65}/{}_{29}Cu^{63}$	1.071 324 (19) Salt 1.071 277 (18) Metal	WL 54 WL 54
73	${}_{47}Ag^{109}/{}_{47}Ag^{107}$	1.149 62 (13) 1.149 61 (4)(Metal) 1.154 37 (6)	JR 53, SG 54 BU 54 WS 53
73	${}_{60}Nd^{145}/{}_{60}Nd^{143}$	0.621 77 (45)	BE 54
74	${}_{62}Sm^{149}/{}_{62}Sm^{147}$	0.834 7 (11)	MW 54
74	${}_{81}Tl^{205}/{}_{81}Tl^{203}$	1.009 816 (22)	WL 54
74	${}_{63}Eu^{155}/{}_{63}Eu^{153}$	0.443	BX 52
74	${}_{94}Pu^{241}/{}_{94}Pu^{239}$	3.53 (2)	BE 54-3

SECTION IV

Additional information on shifts due to nuclear shielding is given on page 35. This summary lists only those shifts that have been observed due to a difference in the chemical compound. No attempt has been made to record or indicate shifts in resonance frequencies due to concentration or temperature as this information was deemed to be outside the purpose and scope of this report.

Figure 2.2 (page 76-NTD) and Figure 2.3 (page 77-NTD) of the original tables have been replaced by new Figure 2.2a and Figure 2.3a. Additional information on the shielding in compounds and metals is given in supplementary Figure 3.3b2 (page 91-NTD), Figure 3.5 (page 97-NTD), and Figure 3.5b2 (page 98-NTD).

Because of the large number of articles concerning nuclear resonance phenomena which have occurred in the literature during the past two years it has not been feasible to tabulate all of these in this supplement. The reader is referred to the quarterly summaries of Nuclear Science Abstracts, and the Indices of The Physical Review and Journal of Chemical Physics for much of this information. In addition, some of the publications containing material of a general reference nature is included in this section.

NUCLEAR RESONANCE SHIFT INFORMATION

Page

99 Silicon - $_{14}Si^{29}$

H. E. Weaver (WE 53) has measured the shift in powdered silicon metal and finds the resonance occurs with $\Delta H/H = 0.018$ per cent lower than the silicon resonance in cobalt or lead glass, and SiO_3.

100 Chlorine - $_{17}Cl^{35}$

C. D. Jeffries (JR 53-4) has found that the Cl 35 resonance in $TiCl_4$ occurs at a lower field than the same resonance in RbCl such that νCl 35 ($TiCl_4$)/νCl 35 (RbCl) = 1.000 88 ± 0.000 25.

102 Selenium - $_{34}Se^{77}$

Walchli (WL 53) has observed shifts in the selenium resonance in H_2Se and H_2SeO_3. The resonance for Se 77 in H_2Se appearing 0.15 per cent higher in applied field than that for H_2SeO_3 (See Figure 3.3). WL 54 gives the Se 77 ratios in three liquids to be:

$$\nu H_2SeO_3/\nu H_2Se = 1.001\ 498 \pm 0.000\ 005$$

$$\nu H_2SeO_4/\nu H_2SeO_3 = 1.001\ 570 \pm 0.000\ 027$$

102 Rubidium - $_{37}Rb^{85}$

H. S. Gutowsky (GW 53-2) has measured the shift in the rubidium resonance in the concentrated solid halides with respect to the concentrated aqueous RbCl and finds the shifts to be for:

RbF = -0.006 ± 0.001%
RbCl = -0.0089 ± 0.0005%
RbBr = -0.0129 ± 0.0005%
RbI = -0.0149 ± 0.0005%

102 Silver - $_{47}Ag^{107,109}$

Jeffries and Sogo (JR 53) have observed a shift for the metal relative to the resonance in $AgNO_3$ solution to be 0.52% lower in field. A h.f.s. anomaly of 0.412% is also present.

Page

102 Tellurium - $_{52}Te^{123, 125}$

H. E. Weaver (WE 53) reports no observable shift for finely powdered tellurium powder.

102 Cesium $_{55}Cs^{133}$

H. S. Gutowsky (GW 53-2) has measured shifts in the solid Cs halides with respect to the concentrated CsCl aqueous solution and finds the shifts to be:

CsF = - 0.009 ± 0.002%
CsCl = - 0.0163 ± 0.0005%
CsBr = - 0.0208 ± 0.0005%
CsI = - 0.0252 ± 0.0005%

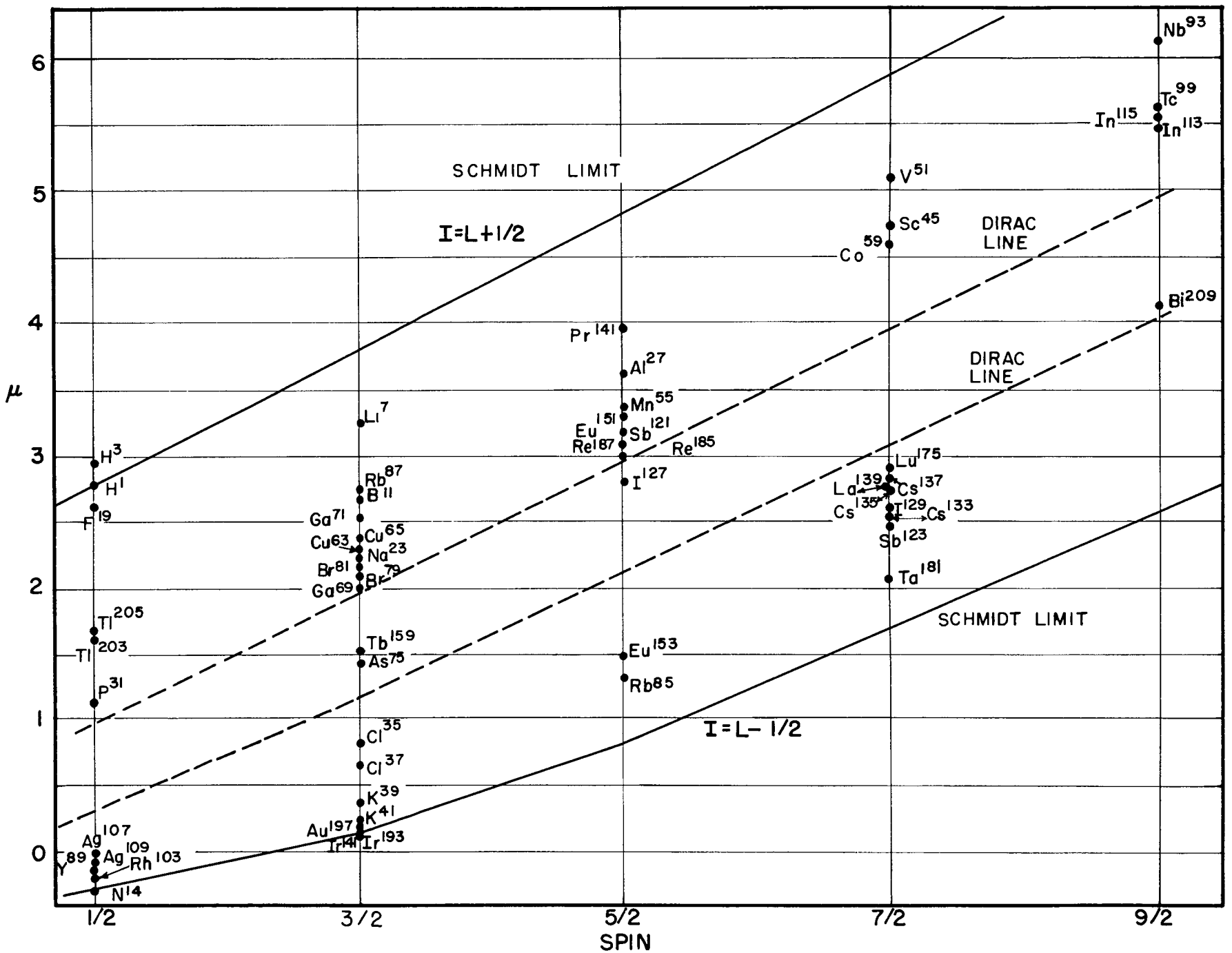

FIGURE 2.2 a μ-I PLOT FOR ODD PROTON NUCLEI

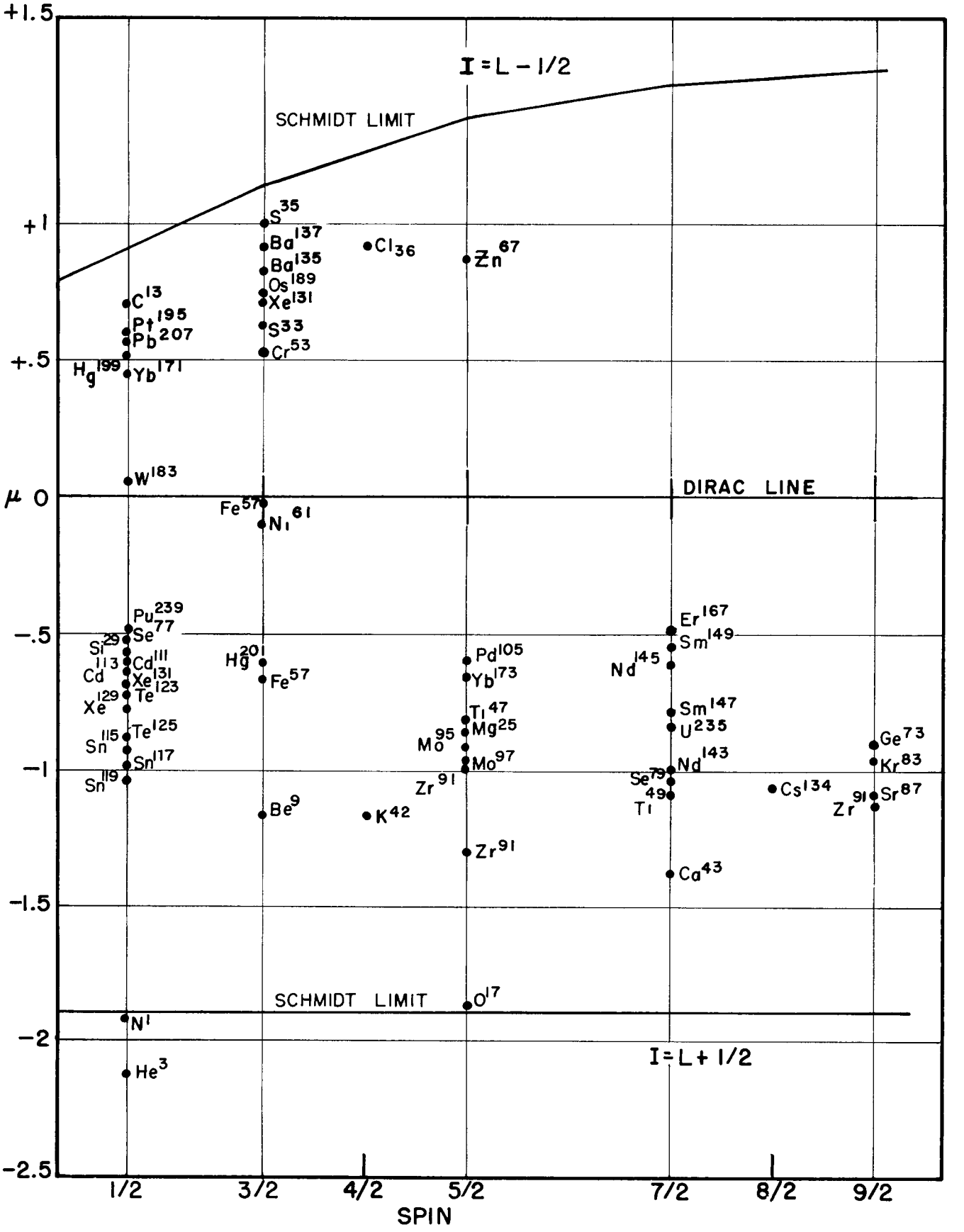

FIGURE 2.3a. PLOT FOR ODD NEUTRON NUCLEI

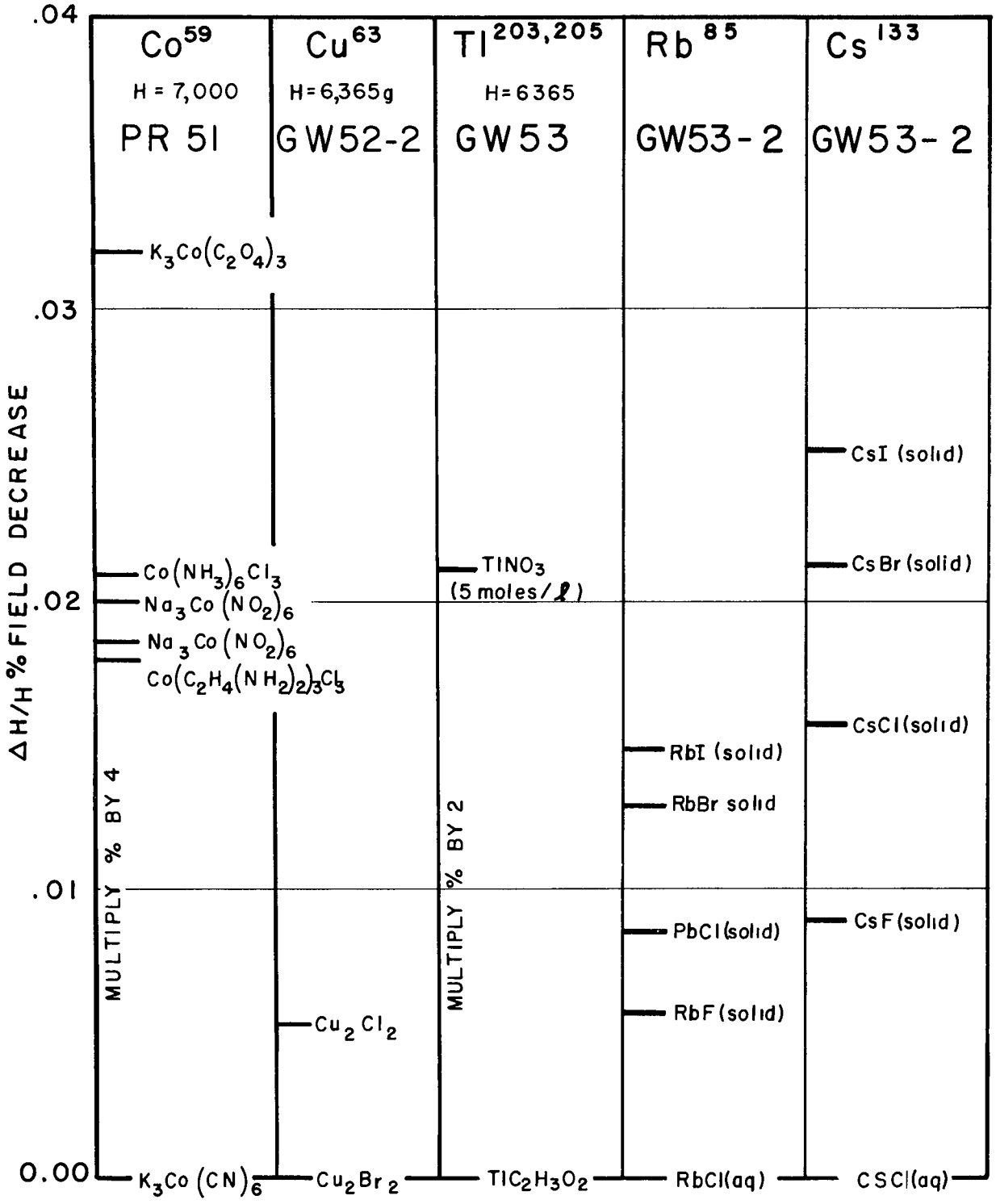

FIGURE 33b2 MAGNETIC SHIELDING OF VARIOUS COMPOUNDS

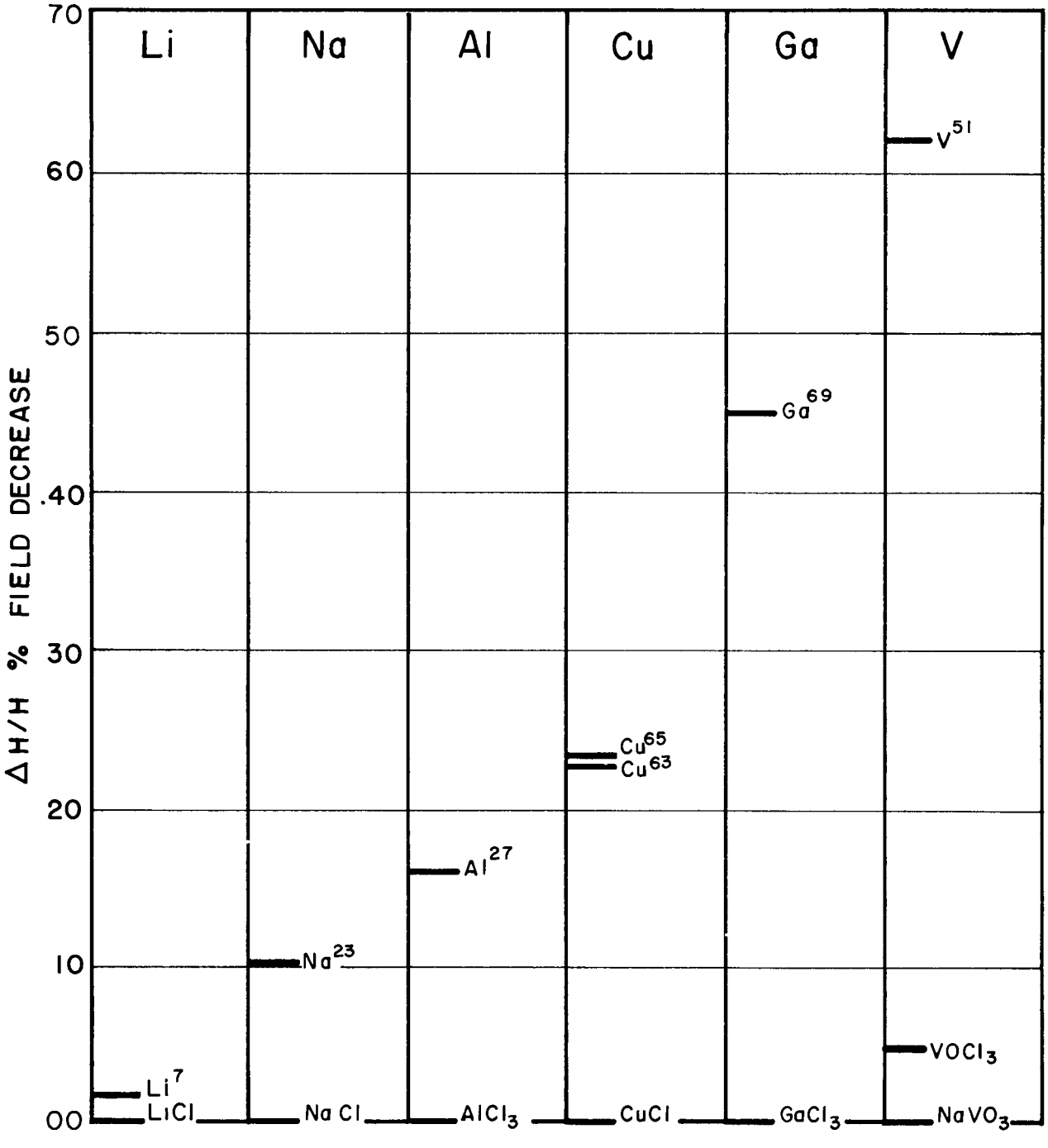

FIGURE 35 SHIELDING EFFECTS IN METALS

(CONTINUED ON FIG 35b)

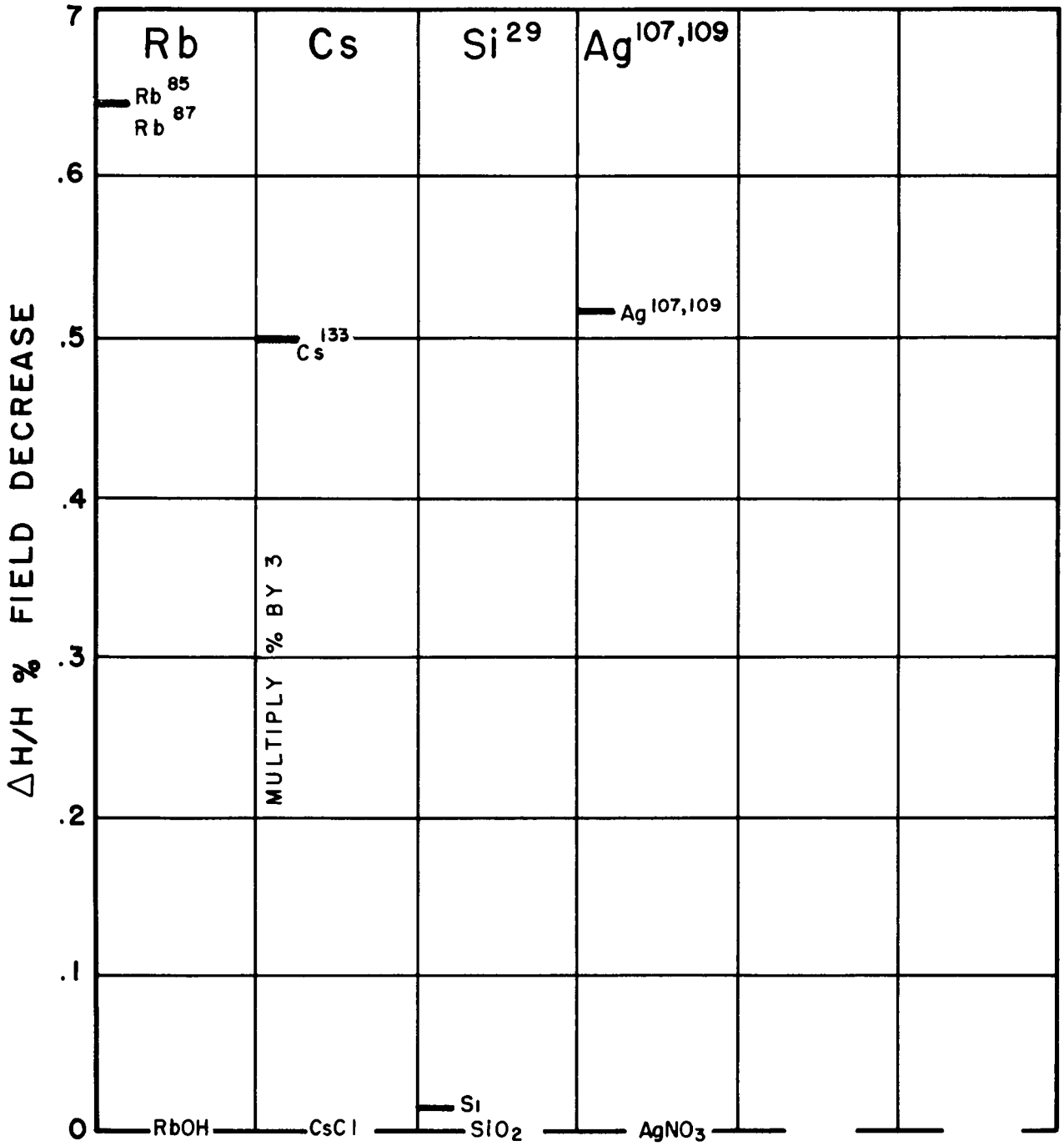

FIGURE 3.5b.2 SHIELDING EFFECTS IN METALS

PUBLICATIONS CONTAINING NUCLEAR RESONANCE TABULATIONS AND REFERENCES

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2. ....., Technical Memo No. Res. 165 (December 1953).

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4. Table of Nuclear Gyromagnetic Ratio (In English). Shizuo Fujiwara, Reports of the University of Electro-communication, No. 4, December 1952.

5. Table of Nuclear Moments (In Japanese). Murakawa and Kamei, Reports of the Institute of Science and Technology, University of Tokyo, Vol. 7, No. 6, December 1953.

6. Nuclear Moments (book), N. F. Ramsey, John Wiley and Sons, New York 1953 pp 78-89.

ACKNOWLEDGEMENTS

The editor wishes to express his appreciation to the many persons who have submitted comments and data for this supplement and wishes to give recognition to the following individuals without whose assistance the labors of this supplement would have been greatly increased: B. Bleaney, V. W. Cohen, S. S. Dharmatti, H. S. Gutowsky, C. D. Jeffries, P. F. A. Klinkenberg, W. G. Proctor, N. F. Ramsey, H. H. Staub, and H. E. Weaver.