THE EFFECT OF PROLONGED SIMULATED NON-GRAVITATIONAL ENVIRONMENT ON MINERAL BALANCE IN THE ADULT MALE

VOLUME II

THE EFFECT OF PROLONGED SIMULATED NON-GRAVITATIONAL ENVIRONMENT ON MINERAL BALANCE IN THE ADULT MALE

Exhibit A Contract No. T-58941

Final Report

Volume II

TABLE 1

Calcium Metabolism (mg/day)
Mean Values for Three Subjects

Week	Intake	Output				Balance
		Sweat	Urine	Stool	Total	
Amb 1	908	28	202	881	1111	-203
2	"	18	190	617	825	+83
3	"	18	187	818	1023	-115
Mean		21	193	772	906	-78
Bed 1	908	12	194	494	700	+208
2	"	16	242	532	790	+118
3	"	14	274	573	861	+47
4	"	10	291	1175	1476	-568
5	"	14	308	1027	1349	-441
6	"	17	300	847	1164	-256
7	"	11	329	1046	1386	-478
8	"	15	306	681	1002	-94
9	"	29	294	746	1069	-161
10	"	24	291	830	1145	-237
11	"	15	295	906	1216	-308
12	"	26	260	774	1060	-152
13	"	20	253	901	1174	-266
14	"	27	278	830	1135	-227
15	"	19	274	921	1214	-306
16	"	38	260	900	1198	-290
17	"	39	253	716	1008	-100
18	"	21	237	1066	1324	-416
19	"	27	240	1065	1332	-424
20	"	27	245	849	1121	-213
21	"	16	245	779	1040	-132
22	"	20	234	627	881	+27
23	"	22	251	891	1164	-256
24	"	22	245	602	869	+39
25	"	28	218	900	1146	-238
26	"	28	245	729	1002	-94
27	"	22	241	1237	1500	-592
28	"	22	238	670	930	-22
29	"	15	235	571	821	+87
30	"	18	235	1088	1341	-433
Mean		21	260	832	1113	-205
Reamb 1	908	25	183	813	1021	-113
2	"	25	175	885	1085	-177
3	"	31	168	895	1094	-186
Mean		27	175	864	1066	-158

TABLE 1 (continued)

Calcium Metabolism (mg/day)
Mean Values for Three Subjects

The weeks shown are all those in which complete collections for all three subjects were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the first 30 weeks of bed rest (Bed), and the first 3 weeks of reambulation (Reamb).

TABLE 2 Calcium Metabolism (mg/day)
Subject R.R.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	908	44	187	828	1059	-151
2	"	14	153	676	843	+65
3	"	15	149	614	778	+130
Mean		24	163	706	893	+15
Bed 1	908	9	178	103	290	+618
2	"	28	211	145	384	+524
3	"	24	264	271	559	+349
4	"	7	295	1839	2141	-1233
5	"	14	326	1422	1762	-854
6	"	13	297	1020	1330	-422
7	"	16	347	984	1347	-439
8	"	22	324	734	1080	-172
9	"	46	311	682	1039	-131
10	"	20	304	981	1305	-397
11	"	17	289	820	1126	-218
12	"	34	250	675	959	-51
13	"	21	233	966	1220	-312
14	"	36	309	888	1233	-325
15	"	20	295	970	1285	-377
16	"	27	273	961	1261	-353
17	"	27	265	526	818	+90
18	"	22	238	1243	1503	-595
19	"	27	257	1094	1378	-470
20	"	25	249	912	1186	-278
21	"	18	249	751	1018	-110
22	"	(18)	241	853	1112	-204
23	"	(18)	258	530	806	+102
24	"	(18)	254	240	512	+396
25	"	36	223	1350	1609	-701
26	"	(36)	256	618	910	-2
27	"	(36)	244	1140	1420	-512
28	"	(36)	265	540	841	+67
29	"	13	261	584	858	+50
30	"	(13)	251	928	1192	-284
31	"	(13)	259	1327	1599	-691
32	"	(13)	252	1496	1761	-852
33	"	19	237	1282	1538	-630
34	"	(19)	246	815	1080	-172
35	"	(19)	238	956	1213	-305
36	"	(19)	243	951	1213	-305
Mean		22	264	878	1164	-256

TABLE 2 (continued)

Calcium Metabolism (mg/day)
Subject R.R.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	908	38	170	1031	1239	-331
2	"	(38)	154	829	1021	-112
3	"	34	141	1031	1206	-298
4	"	(34)	111	607	752	+156
5	"	(34)	115	702	851	+57
Mean		36	138	840	1014	-106

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject R.R. were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 5 weeks of reambulation (Reamb).

TABLE 3 Calcium Metabolism (mg/day)
Subject G.B.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	908	(22)	(255)	940	1217	-309
2	"	(22)	258	896	1176	-268
3	"	22	251	647	920	-12
4	"	25	248	899	1172	-264
5	"	24	225	553	802	+106
6	"	19	222	893	1134	-226
Mean		22	243	805	1070	-162
Bed 1	908	7	214	699	920	-12
2	"	9	267	936	1212	-304
3	"	10	291	528	829	+79
4	"	16	294	709	1019	-111
5	"	17	297	982	1296	-388
6	"	26	298	978	1302	-394
7	"	7	306	765	1078	-170
8	"	12	282	879	1173	-265
9	"	20	270	822	1112	-204
10	"	20	284	664	968	-60
11	"	22	296	733	1051	-143
12	"	33	272	1128	1433	-525
13	"	30	260	679	969	-61
14	"	26	261	633	920	-12
15	"	21	252	1121	1394	-436
16	"	73	242	787	1102	-194
17	"	45	252	603	900	+8
18	"	26	223	1022	1271	-363
19	"	26	238	1098	1362	-454
20	"	39	226	731	996	-88
21	"	19	237	1005	1261	-353
22	"	(19)	225	513	757	+151
23	"	25	236	1101	1362	-454
24	"	(25)	236	698	959	-51
25	"	(25)	208	585	818	+90
26	"	(25)	242	991	1258	-350
27	"	23	236	1300	1559	-651
28	"	(23)	223	394	640	+268
29	"	(23)	200	774	997	-89
30	"	(23)	216	1083	1322	-414
Mean		24	253	831	1108	-200

TABLE 3 (continued)

Calcium Metabolism (mg/day)
Subject G.B.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	908	23	226	689	938	-30
2	-	(23)	(215)	(790)	(1028)	(-120)
3	908	44	204	891	1139	-231
4	"	(44)	190	487	721	+187
Mean		34	209	714	957	-49

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject G.B. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 30 weeks of bed rest (Bed), and the 1st 4 weeks of reambulation (Reamb). Data from the 2nd week for reambulation are extrapolated from the 1st and 3rd week values, since the subject left the hospital for 3 days during this period.

TABLE 4 Calcium Metabolism (mg/day)
Subject C.S.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	908	(17)	197	697	911	-3
2	"	(17)	238	1156	1411	-503
3	"	(17)	223	592	832	+76
4	"	(17)	198	794	1009	-101
5	"	17	174	1273	1464	-556
6	"	15	170	915	1100	-192
7	"	17	193	623	833	+75
8	"	20	189	946	1155	-247
Mean		17	198	874	1089	-181
Bed 1	908	21	191	681	893	+15
2	"	11	248	516	775	+133
3	"	9	267	919	1195	-287
4	"	8	285	978	1271	-363
5	"	11	302	677	990	-82
6	"	12	305	542	859	+49
7	"	11	335	1390	1736	-828
8	"	12	312	429	753	[illegible]5
9	"	21	301	733	1055	[illegible]7
10	"	31	286	845	1162	-254
11	"	7	299	1166	1472	-564
12	"	11	259	518	788	+120
13	"	9	267	1058	1334	-426
14	"	18	264	969	1251	-343
15	"	15	275	671	961	-53
16	"	15	264	953	1232	-324
17	"	46	243	1020	1309	-401
18	"	15	251	932	1198	-290
19	"	29	225	1004	1258	-350
20	"	17	259	905	1181	-273
21	"	10	249	580	839	+69
22	"	22	237	515	774	+134
23	"	(22)	258	1042	1322	-414
24	"	(22)	246	868	1136	-228
25	"	(22)	224	765	1011	-103
26	"	(22)	237	578	837	+71
27	"	8	243	1270	1521	-613
28	"	(8)	225	1075	1308	-400
29	"	(8)	244	356	608	+300
30	"	17	237	1253	1507	-599
31	"	(17)	228	1076	1321	-413
32	"	(17)	191	801	1009	-101
33	"	(17)	220	890	1127	-219
34	"	6	215	894	1115	-207
35	"	(6)	209	905	1120	-212
36	"	(6)	208	744	958	-50
Mean		15	253	848	1116	-208

TABLE 4 (continued)

Calcium Metabolism (mg/day)
Subject C.S.

Week	Intake	Sweat	Urine	Feces	Total	Balance
Reamb 1	908	15	152	720	887	+21
2	"	(15)	155	1037	1207	-299
3	"	(15)	159	763	937	-29
Mean		15	155	840	1010	-102

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject C.S. were obtained; the last 8 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 3 weeks of reambulation (Reamb).

TABLE 5 Serum Calcium Concentrations (mg/100ml)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	10.18	9.90	9.54	9.87
	2	10.28	10.30	9.58	10.05
Bed	1	10.28	10.30	9.66	10.08
	2	10.10	10.34	10.20	10.21
	3	10.08	10.58	9.86	10.17
	4	10.16	10.24	9.76	10.05
	5	9.66	10.12	9.74	9.84
	6	9.58	9.86	9.62	9.69
	7	9.92	9.86	9.62	9.80
	8	9.70	10.16	10.20	10.02
	9	9.78	9.70	9.76	9.75
	10	9.52	10.12	9.76	9.77
	11	9.66	10.32	9.64	9.87
	12	9.82	10.22	9.88	9.97
	13	10.16	10.22	9.52	9.97
	14	9.72	9.76	9.60	9.69
	15	9.50	9.74	9.24	9.49
	16	9.40	10.22	9.84	9.82
	17	9.46	10.18	9.44	9.69
	18	9.52	9.84	9.26	9.54
	19	9.96	10.08	9.62	9.89
	20	9.56	10.06	9.48	9.70
	21	9.60	10.10	9.52	9.74
	22	9.76	9.70	9.50	9.65
	23	9.66	9.84	9.46	9.65
	24	9.50	9.65	9.78	9.64
	25	9.46	10.02	9.64	9.71
	26	9.74	9.88	9.76	9.79
	27	9.40	9.78	9.69	9.62
	28	9.52	9.92	9.54	9.66
	29	9.57	9.94	9.68	9.73
	30	10.12	10.15	10.01	10.09
	31		9.89	9.74	
	32		9.92	9.63	
	33		9.90	9.65	
	34		9.75	9.57	
	35		9.93	9.40	
	36		9.77	9.95	
Reamb	1	9.36	9.55	9.02	9.31
	2	(8.76)	9.60	9.57	9.31
	3	9.48	9.42	9.37	9.42
	4	9.43	9.22	9.48	9.38
	5		9.28		
	6		9.49		

Value in parentheses is an extrapolated value.

TABLE 6 Phosphorus Metabolism (mg/day)
Mean Values for Three Subjects

Week	Intake	Output			Balance
		Urine	Stool	Total	
Amb 1	1422	855	540	1395	+27
2	"	922	378	1300	+122
3	"	873	525	1398	+24
Mean	"	883	481	1364	+58
Bed 1	1422	893	278	1171	+251
2	"	981	318	1299	+123
3	"	989	378	1367	+55
4	"	1006	687	1693	-271
5	"	995	597	1592	-170
6	"	1039	486	1525	-103
7	"	1003	618	1621	-199
8	"	1032	391	1423	-1
9	"	1022	407	1429	-7
10	"	997	488	1485	-63
11	"	1003	567	1570	-147
12	"	995	392	1387	+35
13	"	972	522	1494	-72
14	"	995	518	1513	-91
15	"	963	477	1440	-18
16	"	1020	538	1558	-136
17	"	993	446	1439	-17
18	"	975	586	1561	-139
19	"	960	600	1560	-138
20	"	948	494	1442	-20
21	"	950	374	1324	+98
22	"	967	419	1386	+36
23	"	962	451	1413	+9
24	"	971	319	1290	+132
25	"	984	559	1543	-121
26	"	955	401	1356	+66
27	"	952	582	1534	-112
28	"	989	394	1383	+39
29	"	969	322	1291	+131
30	"	941	561	1502	-80
Mean	"	981	472	1453	-31
Reamb 1	1422	781	432	1213	+209
2	"	769	500	1269	+153
3	"	783	500	1283	+139
Mean	"	778	477	1255	+167

TABLE 6 (continued) Phosphorus Metabolism (mg/day)
Mean Values for Three Subjects

The weeks shown are all those in which complete collections for all three subjects were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the first 30 weeks of bed rest (Bed), and the first 3 weeks of reambulation (Reamb).

TABLE 7 Phosphorus Metabolism (mg/day)
Subject R.R.

Week	Intake	Output			Balance
		Urine	Feces	Total	
Amb 1	1422	917	385	1302	+120
2	"	899	438	1337	+85
3	"	816	447	1263	+159
Mean	"	877	423	1300	+122
Bed 1	"	866	80	946	+476
2	"	980	96	1076	+346
3	"	1016	272	1288	+134
4	"	1049	1134	2183	-761
5	"	1017	870	1887	-465
6	"	1037	634	1671	-249
7	"	1007	624	1631	-209
8	"	999	462	1461	-39
9	"	1023	408	1431	-9
10	"	997	591	1588	-164
11	"	989	525	1514	-92
12	"	1017	392	1409	+13
13	"	960	587	1547	-125
14	"	984	553	1537	-115
15	"	926	590	1516	-94
16	"	961	578	1539	-117
17	"	971	326	1297	+125
18	"	911	735	1646	-224
19	"	910	658	1568	-146
20	"	920	542	1462	-40
21	"	937	441	1378	+44
22	"	951	479	1430	-8
23	"	931	316	1247	+175
24	"	996	144	1140	+282
25	"	959	866	1825	-403
26	"	929	336	1265	+157
27	"	964	621	1585	-163
28	"	966	282	1248	+174
29	"	990	322	1312	+110
30	"	920	510	1430	-8
31	"	981	757	1738	-316
32	"	920	838	1758	-336
33	"	926	745	1671	-249
34	"	896	485	1381	+41
35	"	1003	530	1533	-111
36	"	959	536	1495	-73
Mean	"	966	524	1490	-68

TABLE 7 (continued)

Phosphorus Metabolism (mg/day)
Subject R.R.

Week	Intake	Output			Balance
		Urine	Feces	Total	
Reamb 1	1422	744	620	1364	+58
2	"	698	531	1229	+193
3	"	756	634	1390	+32
4	"	673	372	1045	+377
5	"	724	430	1154	+268
Mean	"	719	517	1236	+186

The weeks shown are all those in which complete collections in subject R.R. were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 5 weeks of reambulation (Reamb).

TABLE 8 Phosphorus Metabolism (mg/day)
Subject G.B.

Week	Intake	Output			Balance
		Urine	Feces	Total	
Amb 1	1422	1121	430	1551	-129
2	"	1009	521	1530	-108
3	"	979	367	1346	+76
4	"	931	503	1434	-12
5	"	979	272	1251	+171
6	"	929	506	1435	-13
Mean	"	991	433	1424	-2
Bed 1	"	890	330	1220	+202
2	"	941	520	1462	-40
3	"	966	284	1250	+172
4	"	1007	355	1362	+60
5	"	991	490	1481	-59
6	"	1037	490	1527	-105
7	"	1040	393	1433	-11
8	"	1103	456	1559	-137
9	"	1021	366	1387	+35
10	"	1031	340	1371	+51
11	"	987	452	1439	-17
12	"	1031	460	1491	-69
13	"	1001	319	1320	+102
14	"	1063	419	1482	-60
15	"	1053	449	1502	-80
16	"	1079	330	1409	+13
17	"	1076	400	1476	-54
18	"	987	503	1490	-68
19	"	1027	434	1461	-39
20	"	984	410	1394	+28
21	"	1000	340	1340	+82
22	"	1019	477	1496	-74
23	"	1019	417	1436	-14
24	"	1004	296	1300	+122
25	"	1023	367	1390	+32
26	"	987	531	1518	-96
27	"	989	380	1369	+53
28	"	1054	272	1326	+96
29	"	997	437	1434	-12
30	"	969	428	1397	+25
Mean	"	1013	405	1418	+4
Reamb 1	"	886	244	1130	+292
2	"	(851)	(342)	(1193)	(+229)
3	"	816	441	1257	+165
4	"	780	244	1024	+398
Mean	"	833	318	1151	+271

TABLE 8 (continued)

Phosphorus Metabolism (mg/day)
Subject G.B.

Values in parentheses are extrapolated values.

The weeks shown are all those in which complete collections in subject G.B. were obtained; the last 6 weeks of the baseline period (Amb), the 30 weeks of bed rest (Bed), and the 1st 4 weeks of reambulation (Reamb). Data from the 2nd week for reambulation are extrapolated from the 1st and 3rd week values, since the subject left the hospital for 3 days during this period.

TABLE 9 Phosphorus Metabolism (mg/day)
Subject C.S.

Week	Intake	Output			Balance
		Urine	Feces	Total	
Amb 1	1422	871	431	1302	+120
2	"	863	540	1403	+19
3	"	837	929	1766	-344
4	"	716	731	1447	-25
5	"	889	425	1314	+108
6	"	874	623	1497	-75
Mean	"	842	613	1455	-33
Bed 1	"	923	425	1348	+74
2	"	1023	338	1361	+61
3	"	984	579	1563	-141
4	"	961	572	1533	-111
5	"	977	430	1407	+15
6	"	1043	334	1377	+45
7	"	963	838	1801	-379
8	"	993	254	1247	+175
9	"	1021	446	1467	-45
10	"	964	534	1498	-76
11	"	1033	723	1756	-334
12	"	937	324	1261	+161
13	"	956	659	1615	-193
14	"	937	582	1519	-97
15	"	910	392	1302	+120
16	"	1019	706	1725	-303
17	"	931	611	1542	-120
18	"	1026	519	1545	-123
19	"	944	709	1653	-231
20	"	940	529	1469	-47
21	"	913	340	1253	+169
22	"	930	300	1230	+192
23	"	937	619	1556	-134
24	"	914	516	1430	-8
25	"	970	443	1413	+9
26	"	949	337	1286	+136
27	"	903	744	1647	-225
28	"	947	629	1576	-155
29	"	921	206	1127	+295
30	"	933	746	1679	-257
31	"	891	631	1522	-100
32	"	910	468	1378	+44
33	"	889	527	1416	+6
34	"	903	527	1430	-8
35	"	901	522	1423	-1
36	"	917	418	1335	+87
Mean	"	950	513	1463	-41

TABLE 9 (continued) Phosphorus Metabolism (mg/day)
Subject C.S.

Week	Intake	Output			Balance
		Urine	Feces	Total	
Reamb 1	1422	713	431	1144	+278
2	"	757	626	1383	+39
3	"	776	426	1202	+220
Mean	"	749	494	1243	+179

The weeks shown are all those in which complete collections in subject C.S. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 3 weeks of reambulation (Reamb).

TABLE 10 Serum Phosphorus Concentrations (mg/100ml)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	3.73	3.86	4.07	3.89
	2	4.04	4.08	3.80	3.97
Bed	1	4.11	3.94	3.96	4.00
	2	4.41	4.09	4.07	4.19
	3	4.11	4.19	3.82	4.04
	4	4.27	4.24	3.63	4.05
	5	4.30	4.32	3.94	4.19
	6	4.25	4.03	4.03	4.10
	7	4.15	4.10	4.06	4.10
	8	3.80	3.53	4.22	3.85
	9	4.15	3.88	4.23	4.09
	10	4.13	3.95	4.13	4.07
	11	4.18	3.42	4.27	3.96
	12	4.07	3.72	4.23	4.01
	13	4.40	3.51	3.97	3.96
	14	3.93	3.76	4.23	3.97
	15	3.88	4.02	3.93	3.94
	16	3.76	3.49	4.00	3.75
	17	3.88	3.93	4.02	3.94
	18	3.72	4.07	3.95	3.91
	19	4.00	3.95	3.95	3.97
	20	3.95	3.90	4.05	3.97
	21	4.13	4.00	4.07	4.07
	22	3.78	4.00	3.95	3.91
	23	3.78	3.95	3.87	3.87
	24	3.88	3.32	3.68	3.63
	25	3.57	3.76	4.08	3.80
	26	3.61	4.00	3.63	3.75
	27	3.93	4.05	4.17	4.05
	28	4.18	4.18	3.87	4.08
	29	3.78	4.02	4.15	3.98
	30	4.17	4.21	4.22	4.20
	31		4.27	3.47	
	32		4.42	4.08	
	33		4.19	4.05	
	34		4.39	3.87	
	35		4.06	3.75	
	36		3.47	3.84	
Reamb	1	3.35	3.86	3.87	3.69
	2	(3.53)	3.65	3.67	3.62
	3	3.19	3.08	3.65	3.31
	4	3.63	2.91	3.50	3.35
	5		3.30		
	6		3.28		

Value in parentheses is an extrapolated value.

Table 11
Serum Parathyroid Hormone Concentration
ul Equivalents Standard Serum/ml

	Time	G.B.	R.R.	C.S.	Mean
Bed	3 weeks	50	30	29	36
	4 "	44	36	24	34
Bed	1 "	78	36	43	52
	6 "	56	72	95	74
	10 "	107	112	73	97
	19 "	120	140	174	144
	27 "	122	183	137	147
Reamb	1 day		60	37	48
	2 weeks	51	35	30	39

TABLE 12 Urine Hydroxyproline (mg/day)

Week	G.B.	R.R.	C.S.	Mean
Amb 1	46.17		40.98	
2	42.05		42.84	
3	47.07	45.04	39.66	43.92
4	47.09	41.26	39.93	42.76
5	46.92	40.40	41.95	43.09
6	47.44	39.48	40.41	42.44
Bed 1	45.41	40.71	44.65	43.59
2	47.26	41.12	43.76	44.05
3	51.33	46.11	47.77	48.40
4	47.29	43.99	42.55	44.61
5	48.44	45.15	47.22	46.94
6	49.04	47.54	44.82	47.13
7	50.03	51.71	49.18	50.31
8	49.17	49.89	49.89	49.65
9	49.25	50.34	47.43	49.01
10	48.59	51.00	47.23	48.94
11	43.07	44.18	46.50	44.58
12	48.35	48.28	47.66	48.10
13	50.03	49.06	43.10	47.40
14	45.84	48.43	46.90	47.06
15	48.50	46.65	46.41	47.19
16	46.78	43.76	47.27	45.94
17	46.01	45.01	45.91	45.64
18	44.21	48.43	49.59	47.41
19	45.09	45.08	42.73	44.30
20	47.35	46.62	46.85	46.94
21	45.85	48.11	44.92	46.29
22	45.66	47.57	46.20	46.48
23	45.60	46.96	47.38	46.65
24	45.84	43.11	47.21	45.39
25	46.45	47.30	46.83	46.86
26	45.00	48.29	47.73	47.01
27	47.95	45.55	48.23	47.24
28	44.40	46.38	44.31	45.03
29	46.06	49.03	48.24	47.78
30	39.65	46.11	46.49	44.08
31		47.70	43.94	
32		45.98	45.91	
33		43.84	44.94	
34		44.91	43.22	
35		45.60	44.23	
36		43.15	44.41	
Reamb 1	41.91	38.88	34.31	38.37
2	(39.97)	39.67	40.15	39.93
3	38.02	42.00	43.39	41.14
4	38.09	42.59	44.51	41.73
5	40.59	43.38		
6		43.89		

TABLE 12 (continued) Urine Hydroxyproline (mg/day)

Value in parentheses is an extrapolated value.

TABLE 13 Urine Pyrophosphate (mg/day)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	4.14		3.11	
	2	2.71		5.21	
	3	2.41	4.12	2.06	2.86
	4	2.51	3.40	1.92	2.61
	5	2.40	3.46	2.81	2.89
	6	3.09	3.02	1.58	2.56
Bed	1	2.45	1.99	3.09	2.51
	2	3.11	4.24	3.36	3.57
	3	3.13	4.35	4.23	3.90
	4	3.71	3.95	3.03	3.56
	5	3.50	4.24	3.58	3.77
	6	3.46	6.12	3.91	4.50
	7	3.75	6.16	4.01	4.64
	8	3.44	4.71	4.06	4.07
	9	2.99	5.08	3.98	4.02
	10	3.52	4.53	4.16	4.07
	11	3.15	5.79	3.81	4.25
	12	2.92	4.81	3.74	3.82
	13	2.69	4.40	3.57	3.55
	14	3.46	4.89	3.38	3.91
	15	3.40	3.79	3.05	3.41
	16	2.97	3.94	2.81	3.24
	17	3.11	4.42	2.96	3.50
	18	3.19	4.12	3.28	3.53
	19	4.62	4.10	3.21	3.98
	20	3.52	4.87	3.89	4.09
	21	3.14	4.13	3.78	3.68
	22	3.29	5.13	3.36	3.93
	23	3.14	4.45	3.03	3.54
	24	3.12	4.43	3.42	3.66
	25	3.49	3.64	3.59	3.57
	26	3.19		3.77	
	27	.78	1.16	1.33	1.09
	28	2.66	1.41	1.52	1.86
	29	1.40	2.29	2.30	2.00
	30	2.95	4.13	3.33	3.47
	31		3.71	2.95	
	32		3.95	2.98	
	33		3.82	2.70	
	34		4.05	3.27	
	35		4.58	2.87	
	36		3.84	3.09	
Reamb	1	2.12	2.91	2.88	2.64
	2	(1.93)	3.07	2.99	2.66
	3	1.32	2.91	1.99	2.07
	4	1.94	2.57	2.73	2.41
	5		1.96		
	6		2.30		

TABLE 13
(continued)

Urine Pyrophosphate (mg/day)

Value in parentheses is an extrapolated value.

TABLE 14 Nitrogen Metabolism (gm/day)
Mean Values for Three Subjects

Week	Intake	Output			Balance
		Urine	Stool	Total	
Amb 1	14.10	12.32	1.12	13.44	+0.66
2	"	12.29	0.71	13.00	+1.10
3	"	12.04	0.80	12.84	+1.26
Mean		12.22	0.88	13.10	+1.00
Bed 1	14.10	13.03	0.91	13.94	+0.16
2	"	13.72	1.06	14.78	-0.68
3	"	13.90	0.55	14.45	-0.35
4	"	13.92	0.86	14.78	-0.68
5	"	14.03	0.93	14.96	-0.86
6	"	13.77	0.84	14.61	-0.51
7	"	12.81	0.93	13.74	+0.36
8	"	13.19	0.72	13.91	+0.19
9	"	13.37	0.68	14.05	+0.05
10	"	12.94	0.78	13.72	+0.38
11	"	12.57	0.86	13.43	+0.67
12	"	12.99	0.63	13.62	+0.48
13	"	12.47	0.80	13.27	+0.83
14	"	12.98	0.71	13.69	+0.41
15	"	11.67	0.85	12.52	+1.58
16	"	12.17	0.86	13.03	+1.07
17	"	12.70	0.59	13.29	+0.81
18	"	12.69	1.02	13.71	+0.39
19	"	11.89	0.89	12.78	+1.32
20	"	12.73	0.74	13.47	+0.63
21	"	12.59	0.69	13.28	+0.82
22	"	12.61	0.51	13.12	+0.98
23	"	11.94	0.79	12.73	+1.37
24	"	12.75	0.48	13.23	+0.87
25	"	12.88	0.78	13.66	+0.44
26	"	12.50	0.64	13.14	+0.96
27	"	11.65	1.01	12.66	+1.44
28	"	12.87	0.51	13.38	+0.72
29	"	12.07	0.46	12.53	+1.57
30	"	11.18	0.91	12.09	+2.01
Mean		12.75	0.77	13.52	+0.58
Reamb 1	14.10	14.35	0.94	15.29	-1.19
2	"	10.16	1.14	11.30	+2.80
3	"	9.62	1.10	10.72	+3.38
Mean		11.38	1.06	12.44	+1.66

TABLE 14
(continued)

Nitrogen Metabolism (gm/day)
Mean Values for Three Subjects

The weeks shown are all those in which complete collections for all three subjects were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the first 30 weeks of bed rest (Bed), and the first 3 weeks of reambulation (Reamb).

TABLE 15 Nitrogen Metabolism (gm/day)
Subject R.R.

Week	Intake	Output			Balance
		Urine	Stool	Total	
Amb 1	14.10	12.71	1.03	13.74	+0.36
2	"	12.82	.76	13.58	+0.52
3	"	12.07	.77	12.84	+1.26
Mean		12.53	0.85	13.38	+0.72
Bed 1	14.10	12.75	1.33	14.08	+0.02
2	"	14.18	1.54	15.72	-1.62
3	"	13.89	.21	14.10	0
4	"	13.91	1.22	15.13	-1.03
5	"	13.98	1.25	15.23	-1.13
6	"	13.72	1.19	14.91	-0.81
7	"	13.34	.98	14.32	-0.22
8	"	12.69	.89	13.58	+0.52
9	"	12.91	.60	13.51	+0.59
10	"	12.94	1.06	14.00	+0.10
11	"	11.75	.93	12.68	+1.42
12	"	13.34	.54	13.88	+0.22
13	"	13.34	.78	14.12	-0.02
14	"	13.50	.92	14.42	-0.32
15	"	10.56	.92	11.48	+2.62
16	"	10.24	.95	11.19	+2.91
17	"	12.77	.45	13.22	+0.88
18	"	14.05	1.23	15.28	-1.18
19	"	12.82	.93	13.75	+0.35
20	"	12.77	.83	13.60	+0.50
21	"	12.73	.69	13.42	+0.68
22	"	13.01	.72	13.73	+0.37
23	"	11.34	.51	11.85	+2.25
24	"	12.38	.20	12.58	+1.52
25	"	12.92	1.03	13.95	+0.15
26	"	10.97	.47	11.44	+2.66
27	"	9.58	.76	10.34	+3.76
28	"	12.96	.32	13.28	+0.82
29	"	13.24	.34	13.58	+0.52
30	"	11.83	.56	12.39	+1.71
31	"	13.17	.96	14.13	-0.03
32	"	12.34	1.05	13.39	+0.71
33	"	12.70	1.16	13.86	+0.24
34	"	11.44	.65	12.09	+2.01
35	"	12.66	.72	13.38	+0.72
36	"	12.73	.88	13.61	+0.49
Mean		12.65	0.83	13.48	+0.62

TABLE 15 (continued) Nitrogen Metabolism (gm/day)
Subject R.R.

Week	Intake	Output			Balance
		Urine	Stool	Total	
Reamb 1	14.10	10.74	1.22	11.96	+2.14
2	"	9.60	1.11	10.71	+3.39
3	"	9.73	1.29	11.02	+3.08
4	"	9.04	.74	9.78	+4.32
5	"	9.92	.97	10.89	+3.21
Mean		9.81	1.07	10.88	+3.22

The weeks shown are all those in which complete collections in subject R.R. were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the last 5 weeks of reambulation (Reamb).

TABLE 16 Nitrogen Metabolism (gm/day)
Subject G.B.

Week	Intake	Output			Balance
		Urine	Stool	Total	
Amb 1	14.10	14.31	1.30	15.61	-1.51
2	"	12.86	1.20	14.06	+0.04
3	"	13.02	.83	13.85	+0.25
4	"	12.41	1.20	13.61	+0.49
5	"	12.24	.68	12.92	+1.18
6	"	12.12	1.00	13.12	+0.98
Mean		12.83	1.03	13.86	+0.24
Bed 1	14.10	12.74	.67	13.41	+0.69
2	"	13.04	1.10	14.14	-0.04
3	"	13.01	.70	13.71	+0.39
4	"	13.23	.67	13.90	+0.20
5	"	13.05	1.10	14.15	-0.05
6	"	13.17	1.00	14.17	-0.07
7	"	12.07	.99	13.06	+1.04
8	"	12.88	1.00	13.88	+0.22
9	"	12.81	.95	13.76	+0.34
10	"	12.40	.73	13.13	+0.97
11	"	12.28	.81	13.09	+1.01
12	"	12.62	1.00	13.62	+0.48
13	"	12.26	.87	13.13	+0.97
14	"	12.71	.54	13.25	+0.85
15	"	12.43	1.20	13.63	+0.47
16	"	12.22	.91	13.13	+0.97
17	"	12.30	.61	12.91	+1.19
18	"	11.35	1.10	12.45	+1.65
19	"	10.77	1.00	11.77	+2.33
20	"	11.91	.83	12.74	+1.36
21	"	12.18	1.00	13.18	+0.92
22	"	12.41	.55	12.96	+1.14
23	"	12.67	1.30	13.97	+0.13
24	"	12.84	.74	13.58	+0.52
25	"	12.39	.85	13.24	+0.86
26	"	11.89	1.10	12.99	+1.11
27	"	12.52	1.50	14.02	+0.08
28	"	13.19	.42	13.61	+0.49
29	"	12.76	.82	13.58	+0.52
30	"	10.31	1.20	11.51	+2.59
Mean		12.41	0.91	13.32	+0.78
Reamb 1	14.10	11.29	1.00	12.29	+1.81
2	"	(10.40)	(1.13)	(11.53)	+2.57
3	14.10	9.51	1.30	10.81	+3.29
4	"	9.26	.79	10.05	+4.05
Mean		10.12	1.06	11.18	+2.92

Values in parentheses are extrapolated values.

TABLE 16
(continued)

Nitrogen Metabolism (gm/day)
Subject G.B.

The weeks shown are all those in which complete collections in subject G.B. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 30 weeks of bed rest (Bed), and the 1st 4 weeks of reambulation (Reamb). Data from the 2nd week for reambulation are extrapolated from the 1st and 3rd week values, since the subject left the hospital for 3 days during this period.

TABLE 17 Nitrogen Metabolism (gm/day)
Subject C.S.

Week	Intake	Output			Balance
		Urine	Stool	Total	
Amb 1	14.10	12.89	.82	13.71	+0.39
2	"	12.21	.75	12.96	+1.14
3	"	11.47	1.56	13.03	+1.07
4	"	11.83	1.12	12.95	+1.15
5	"	11.82	.68	12.50	+1.60
6	"	11.93	.63	12.56	+1.54
Mean		12.02	0.93	12.95	+1.15
Bed 1	14.10	13.59	.74	14.33	-0.23
2	"	13.95	.53	14.48	-0.38
3	"	14.79	.74	15.53	-1.43
4	"	14.63	.68	15.31	-1.21
5	"	15.07	.44	15.51	-1.41
6	"	14.43	.33	14.76	-0.66
7	"	13.03	.81	13.84	+0.26
8	"	13.99	.27	14.26	-0.16
9	"	14.40	.50	14.90	-0.80
10	"	13.47	.56	14.03	+0.07
11	"	13.67	.84	14.51	-0.41
12	"	13.00	.35	13.35	+0.75
13	"	11.82	.75	12.57	+1.53
14	"	12.74	.66	13.40	+0.70
15	"	12.03	.42	12.45	+1.65
16	"	14.05	.71	14.76	-0.66
17	"	13.02	.72	13.74	+0.36
18	"	12.66	.73	13.39	+0.71
19	"	12.08	.75	12.83	+1.27
20	"	13.51	.56	14.07	+0.03
21	"	12.86	.38	13.24	+0.86
22	"	12.42	.26	12.68	+1.42
23	"	11.81	.55	12.36	+1.74
24	"	13.03	.50	13.53	+0.57
25	"	13.33	.46	13.79	+0.31
26	"	14.65	.34	14.99	-0.89
27	"	12.85	.78	13.63	+0.47
28	"	12.45	.78	13.23	+0.87
29	"	10.21	.21	10.42	+3.68
30	"	11.40	.96	12.36	+1.74
31	"	11.35	.71	12.06	+2.04
32	"	12.08	.58	12.66	+1.44
33	"	12.16	.67	12.83	+1.27
34	"	11.95	.63	12.58	+1.52
35	"	12.18	.63	12.81	+1.29
36	"	12.29	.60	12.89	+1.21
Mean		12.97	0.59	13.56	+0.54

TABLE 17 (continued) Nitrogen Metabolism (gm/day) Subject C.S.

Week	Intake	Output			Balance
		Urine	Stool	Total	
Reamb 1	14.10	21.03	.60	21.63	-7.53
2	"	10.47	1.17	11.64	+2.46
3	"	9.61	.72	10.33	+3.77
Mean		13.70	0.83	14.53	-0.43

The weeks shown are all those in which complete collections in subject C.S. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the lst 3 weeks of reambulation (Reamb).

TABLE 18 Magnesium Metabolism (mg/day)
Mean Values for Three Subjects

Week	Intake	Output				Balance
		Sweat	Urine	Stool	Total	
Amb 1	219	7	106	124	237	-18
2	"	8	111	93	212	+7
3	"	7	107	136	250	-31
Mean		7	108	118	233	-14
Bed 1	219	5	122	73	200	+19
2	"	6	135	110	251	-32
3	"	15	131	99	245	-26
4	"	5	123	152	280	-61
5	"	5	124	133	262	-43
6	"	4	120	104	228	-9
7	"	6	143	165	314	-95
8	"	6	121	89	216	+3
9	"	6	119	95	220	-1
10	"	6	117	103	226	-7
11	"	8	119	117	244	-25
12	"	10	117	94	221	-2
13	"	6	115	120	241	-22
14	"	8	111	105	224	-5
15	"	7	116	117	240	-21
16	"	8	114	116	238	-19
17	"	9	112	81	202	+17
18	"	8	110	135	253	-34
19	"	9	101	123	233	-14
20	"	10	109	105	224	-5
21	"	6	116	91	213	+6
22	"	7	124	85	216	+3
23	"	8	118	108	234	-15
24	"	8	112	84	204	+15
25	"	10	108	108	226	-7
26	"	10	111	86	207	+12
27	"	8	117	145	270	-51
28	"	8	115	81	204	+15
29	"	7	114	67	188	+31
30	"	7	111	131	249	-30
Mean		8	118	107	233	-14
Reamb 1	219	10	93	109	212	+7
2	"	10	90	129	229	-10
3	"	14	86	125	225	-6
Mean		11	90	121	222	-3

TABLE 18 (continued)

Magnesium Metabolism (mg/day)
Mean Values for Three Subjects

The weeks shown are all those in which complete collections for all three subjects were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the first 30 weeks of bed rest (Bed), and the first 3 weeks of reambulation (Reamb).

TABLE 19 Magnesium Metabolism (mg/day)
Subject R.R.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	219	(5)	108	44	157	+62
2	"	5	109	91	205	+14
3	"	6	105	107	218	+1
Mean		5	107	81	193	+26
Bed 1	219	5	119	15	139	+80
2	"	12	127	21	160	+59
3	"	37	128	84	249	-30
4	"	3	131	230	364	-145
5	"	5	133	184	322	-103
6	"	4	122	128	254	-35
7	"	7	128	118	253	-34
8	"	(7)	119	94	220	-1
9	"	7	122	78	207	+12
10	"	6	120	119	245	-26
11	"	7	112	101	220	-1
12	"	14	121	81	216	+3
13	"	8	115	127	250	-31
14	"	8	111	111	230	-11
15	"	8	113	122	243	-24
16	"	10	106	118	234	-15
17	"	9	104	67	180	+39
18	"	9	104	148	261	-42
19	"	8	112	134	254	-35
20	"	10	100	115	225	-6
21	"	6	118	84	208	+11
22	"	(6)	116	97	219	0
23	"	(6)	112	57	175	+44
24	"	(6)	118	28	152	+67
25	"	11	115	151	277	-58
26	"	(11)	119	66	196	+23
27	"	(11)	121	122	254	-35
28	"	(11)	119	57	187	+32
29	"	7	119	64	190	+29
30	"	(7)	111	102	220	-1
31	"	(7)	110	145	262	-43
32	"	(7)	116	169	292	-73
33	"	8	109	158	275	-56
34	"	(8)	136	207	351	-132
35	"	(8)	131	118	257	-38
36	"	(8)	123	113	244	-25
Mean		9	118	109	236	-17

TABLE 19 (continued)

Magnesium Metabolism (mg/day)
Subject R.R.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	219	15	85	146	246	-27
2	"	(15)	87	121	224	-5
3	"	17	84	147	248	-29
4	"	(17)	45	92	153	+66
5	"	(17)	48	99	163	+56
Mean		16	70	121	207	+12

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject R.R. were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 5 weeks of reambulation (Reamb).

TABLE 20 Magnesium Metabolism (mg/day)
Subject G.B.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	219	(9)	140	115	264	-45
2	"	(9)	125	116	250	-31
3	"	(9)	125	82	216	+3
4	"	9	117	118	244	-25
5	"	10	117	72	199	+20
6	"	9	122	116	247	-28
Mean		9	124	103	236	-17
Bed 1	219	2	122	86	210	+9
2	"	4	128	123	255	-36
3	"	4	128	63	195	+24
4	"	8	129	86	223	-4
5	"	6	126	120	252	-33
6	"	6	126	113	245	-26
7	"	5	129	186	320	-101
8	"	5	130	104	239	-20
9	"	7	121	99	227	-8
10	"	7	124	78	209	+10
11	"	12	137	83	232	-13
12	"	11	126	127	264	-45
13	"	7	127	78	212	+7
14	"	9	123	66	198	+21
15	"	8	127	132	267	-48
16	"	8	127	93	228	-9
17	"	10	128	66	204	+15
18	"	9	98	122	229	-10
19	"	7	91	124	222	-3
20	"	15	120	90	225	-6
21	"	8	129	111	248	-29
22	"	(8)	150	92	250	-31
23	"	10	122	126	258	-39
24	"	(10)	116	78	204	+15
25	"	(10)	107	66	183	+36
26	"	(10)	108	114	232	-13
27	"	9	127	146	282	-63
28	"	(9)	120	44	173	+46
29	"	(9)	118	89	216	+3
30	"	(9)	122	120	251	-32
Mean		8	123	101	232	-13

TABLE 20 (continued)

Magnesium Metabolism (mg/day)
Subject G.B.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	219	9	107	76	192	+27
2	"	(9)	(98)	(97)	(204)	(+15)
3		19	88	118	225	-6
4	"	(19)	96	65	180	+39
Mean		14	97	89	200	+19

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject G.B. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 30 weeks of bed rest (Bed), and the 1st 4 weeks of reambulation (Reamb). Data from the 2nd week for reambulation are extrapolated from the 1st and 3rd week values, since the subject left the hospital for 3 days during this period.

TABLE 21 Magnesium Metabolism (mg/day)
Subject C.S.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	219	(7)	108	106	221	-2
2	"	(7)	108	173	288	-69
3	"	(7)	119	118	244	-25
4	"	(7)	117	134	258	-39
5	"	(7)	101	304	412	-193
6	"	7	92	210	309	-90
7	"	9	107	117	233	-14
8	"	5	93	185	283	-64
Mean		7	106	168	281	-62
Bed 1	219	9	125	117	251	-32
2	"	3	150	185	338	-119
3	"	3	138	151	292	-73
4	"	3	110	141	254	-35
5	"	3	113	94	210	+9
6	"	3	113	71	187	+32
7	"	6	173	192	371	-152
8	"	6	114	68	188	+31
9	"	5	113	107	225	-6
10	"	5	106	113	224	-5
11	"	5	109	166	280	-61
12	"	5	105	75	185	+34
13	"	4	104	155	263	-44
14	"	6	100	138	244	-25
15	"	6	107	96	209	+10
16	"	6	108	136	250	-31
17	"	7	104	111	222	-3
18	"	7	129	136	272	-53
19	"	12	100	112	224	-5
20	"	5	106	111	222	-3
21	"	5	102	78	185	+34
22	"	8	107	66	181	+38
23	"	(8)	120	140	268	-49
24	"	(8)	103	145	256	-37
25	"	(8)	101	107	216	+3
26	"	(8)	105	77	190	+29
27	"	4	102	168	274	-55
28	"	(4)	106	143	253	-34
29	"	(4)	104	47	155	+64
30	"	5	99	170	274	-55
31	"	(5)	100	139	244	-25
32	"	(5)	110	108	223	-4
33	"	(5)	97	123	225	-6
34	"	2	107	121	230	-11
35	"	(2)	102	125	229	-10
36	"	(2)	108	99	209	+10
Mean		5	111	120	236	-17

TABLE 21 (continued)

Magnesium Metabolism (mg/day)
Subject C.S.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	219	6	88	105	199	+20
2	"	(6)	85	169	260	-41
3	"	(6)	87	110	203	+16
Mean		6	87	128	221	-2

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject C.S. were obtained; the last 8 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 3 weeks of reambulation (Reamb).

TABLE 22 Serum Magnesium Concentrations (mg/100ml)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	2.16	2.23	2.03	2.14
	2	2.24	2.25	1.92	2.14
Bed	1	2.14	2.21	1.90	2.08
	2	2.08	2.18	1.91	2.06
	3	2.08	2.16	1.90	2.05
	4	1.97	2.01	1.74	1.91
	5	1.95	2.07	1.76	1.93
	6	1.97	1.91	2.01	1.96
	7	2.08	2.04	1.86	1.99
	8	2.12	2.10	1.82	2.01
	9	2.07	2.12	1.86	2.02
	10	2.00	2.09	1.80	1.96
	11	1.98	2.16	1.79	1.98
	12	2.04	2.09	1.86	2.00
	13	2.12	2.14	1.88	2.05
	14	2.07	2.04	1.84	1.98
	15	2.02	2.10	1.81	1.98
	16	1.97	2.16	1.84	1.99
	17	2.01	2.12	1.85	1.99
	18	1.97	2.07	1.85	1.96
	19	2.04	2.06	1.90	2.00
	20	2.03	2.10	1.87	2.00
	21	2.09	2.14	1.85	2.02
	22	2.03	2.03	1.82	1.96
	23	2.01	2.06	1.78	1.95
	24	2.05	2.06	1.90	2.00
	25	1.96	2.03	1.80	1.93
	26	1.99	2.01	1.80	1.93
	27	2.06	2.06	1.88	2.00
	28	2.00	2.06	1.87	1.98
	29	2.07	2.04	1.84	1.98
	30	2.13	2.15	1.97	2.08
	31		2.03	1.85	
	32		2.13	1.82	
	33		2.11	1.88	
	34		2.09	1.94	
	35		2.17	1.90	
	36		2.11	1.96	
Reamb	1	2.10	2.21	1.90	2.07
	2	(2.04)	2.19	1.97	2.07
	3	2.25	2.17	2.04	2.15
	4	2.30	2.19	2.02	2.17
	5		2.19		
	6		2.28		

Value in parentheses is an extrapolated value.

TABLE 23 Sodium Metabolism (mEq/day)
Mean Values for Three Subjects

Week	Intake	Output				Balance
		Sweat	Urine	Stool	Total	
Amb 1	158.6	9.0	139.3	2.2	150.5	+8.1
2	"	8.0	143.0	2.4	153.4	+5.2
3	"	7.4	152.5	2.3	162.2	-3.6
Mean		8.1	144.9	2.3	155.3	+3.3
Bed 1	158.6	3.3	164.1	1.2	168.6	-10.0
2	"	3.9	156.6	1.8	162.3	-3.7
3	"	5.3	155.1	1.6	162.0	-3.4
4	"	2.1	154.8	2.7	159.6	-1.0
5	"	3.9	157.1	2.5	163.5	-4.9
6	"	2.5	151.9	2.2	156.6	+2.0
7	"	2.4	152.0	2.9	157.3	+1.3
8	"	2.8	156.4	3.8	163.0	-4.4
9	"	3.2	151.6	1.6	156.4	+2.2
10	"	3.1	161.3	2.2	166.6	-8.0
11	"	3.4	151.3	2.0	156.7	+1.9
12	"	3.8	156.2	1.4	161.4	-2.8
13	"	4.4	156.8	1.9	163.1	-4.5
14	"	6.7	152.6	2.0	161.3	-2.7
15	"	5.0	167.7	1.8	174.5	-15.9
16	"	4.9	152.4	2.1	159.4	-0.8
17	"	7.4	153.3	1.5	162.2	-3.6
18	"	5.5	145.9	2.2	153.6	+5.0
19	"	5.2	153.3	2.4	160.9	-2.3
20	"	3.2	151.1	1.7	156.0	+2.6
21	"	4.3	154.0	1.4	159.7	-1.1
22	"	6.9	150.8	1.8	159.5	-0.9
23	"	6.8	148.7	1.7	157.2	+1.4
24	"	6.8	158.7	0.9	166.4	-7.8
25	"	6.8	146.1	1.6	154.5	+4.1
26	"	6.8	151.2	1.4	159.4	-0.8
27	"	2.8	159.7	2.5	165.0	-6.4
28	"	2.8	160.0	1.4	164.2	-5.6
29	"	2.3	139.3	1.1	142.7	+15.9
30	"	5.4	150.9	2.5	158.8	-0.2
Mean		4.5	154.0	1.9	160.4	-1.8
Reamb 1	158.6	4.0	119.7	2.2	125.9	+32.7
2	"	4.0	137.6	2.4	144.0	+14.6
3	"	8.3	140.7	2.8	151.8	+6.8
Mean		5.4	132.7	2.5	140.8	+18.0

TABLE 23 (continued)

Sodium Metabolism (mEq/day)
Mean Values for Three Subjects

The weeks shown are all those in which complete collections for all three subjects were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the first 30 weeks of bed rest (Bed), and the first 3 weeks of reambulation (Reamb).

TABLE 24 Sodium Metabolism (mEq/day)
Subject R.R.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	158.6	15.7	143.0	1.5	160.2	-1.6
2	"	13.9	140.9	2.9	157.6	+1.0
3	"	11.2	139.1	3.5	153.8	+4.8
Mean		13.6	141.0	2.6	157.2	+1.4
Bed 1	158.6	5.7	156.5	0.5	162.7	-4.1
2	"	6.2	145.2	0.7	152.1	+6.5
3	"	9.9	152.2	2.4	164.4	-5.8
4	"	2.7	150.9	5.4	158.9	-0.3
5	"	5.8	147.4	3.2	156.3	+2.3
6	"	2.7	148.3	3.6	154.6	+4.0
7	"	4.4	140.4	3.1	147.9	+10.7
8	"	(4.4)	146.5	6.8	157.7	+0.9
9	"	4.9	138.3	1.8	144.9	+13.7
10	"	3.7	161.7	3.0	168.4	-9.8
11	"	5.5	129.7	3.0	138.2	+20.4
12	"	4.8	160.4	1.5	166.8	-8.2
13	"	6.1	159.1	2.4	167.6	-9.0
14	"	5.1	139.6	2.3	146.9	+11.7
15	"	6.0	157.0	2.6	165.6	-7.0
16	"	6.2	141.7	2.8	150.8	+7.8
17	"	5.0	152.6	1.6	159.2	-0.6
18	"	3.8	138.3	3.2	145.3	+13.3
19	"	5.7	148.7	2.9	157.3	+1.3
20	"	3.7	150.5	1.9	156.1	+2.5
21	"	4.0	151.3	1.8	157.1	+1.5
22	"	(4.0)	154.4	2.4	160.8	-2.2
23	"	(4.0)	141.7	1.7	147.4	+11.2
24	"	(4.0)	158.7	1.1	163.8	-5.2
25	"	4.0	145.3	3.5	152.9	+5.7
26	"	(4.0)	150.4	2.2	156.6	+2.0
27	"	(4.0)	152.1	3.0	159.1	-0.5
28	"	(4.0)	153.8	1.6	159.4	-0.8
29	"	2.6	147.2	1.7	151.5	+7.1
30	"	(2.6)	144.4	3.1	150.1	+8.5
31	"	(2.6)	158.5	3.9	165.0	-6.4
32	"	(2.6)	154.4	3.2	160.2	-1.6
33	"	5.2	143.2	2.7	151.1	+7.5
34	"	(5.2)	155.4	2.0	162.6	-4.0
35	"	(5.2)	144.0	2.8	152.0	+6.6
36	"	(5.2)	159.3	2.3	166.8	-8.2
Mean		4.6	149.4	2.6	156.6	+2.0

TABLE 24 (continued)

Sodium Metabolism (mEq/day)
Subject R.R.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	158.6	6.4	122.1	3.0	131.5	+27.1
2	"	(6.4)	140.0	3.0	149.4	+9.2
3	"	6.4	133.6	3.4	143.4	+15.2
4	"	(6.4)	124.0	1.9	132.3	+26.3
5	"	(6.4)	137.6	2.4	146.4	+12.2
Mean		6.4	131.5	2.7	140.6	+18.0

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject R.R. were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 5 weeks of reambulation (Reamb).

TABLE 25 Sodium Metabolism (mEq/day)
Subject G.B.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	158.6	(6.6)	146.5	1.7	154.8	+3.8
2	"	(6.6)	155.6	1.9	164.1	-5.5
3	"	(6.6)	147.4	1.7	155.7	+2.9
4	"	6.6	143.5	1.8	151.9	+6.7
5	"	6.6	150.4	1.7	158.7	-0.1
6	"	7.1	154.4	1.8	163.3	-4.7
Mean		6.7	149.6	1.8	158.1	+0.5
Bed 1	158.6	1.3	159.6	1.7	162.6	-4.0
2	"	2.4	151.7	4.0	158.2	+0.4
3	"	2.5	152.2	0.7	155.3	+3.3
4	"	2.1	149.6	0.7	152.4	+6.2
5	"	2.5	160.9	1.9	165.3	-6.7
6	"	2.5	152.6	1.6	156.7	+1.9
7	"	1.1	161.3	3.0	165.4	-6.8
8	"	1.7	160.4	3.7	165.9	-7.3
9	"	2.7	158.3	2.0	162.9	-4.3
10	"	3.0	164.8	1.7	169.5	-10.9
11	"	2.8	160.3	0.9	164.0	-5.4
12	"	2.7	160.9	1.2	164.8	-6.2
13	"	2.6	165.2	1.3	169.0	-10.4
14	"	5.2	153.9	0.8	159.9	-1.3
15	"	3.7	169.1	1.4	174.3	-15.7
16	"	3.2	151.7	1.4	156.3	+2.3
17	"	4.0	156.5	0.6	161.1	-2.5
18	"	3.6	143.2	1.1	147.9	+10.7
19	"	3.2	158.7	1.0	162.9	-4.3
20	"	2.8	151.1	1.1	154.9	+3.7
21	"	4.1	159.1	1.5	164.7	-6.1
22	"	(4.1)	153.0	2.2	159.3	-0.7
23	"	3.8	158.3	1.8	163.9	-5.3
24	"	(3.8)	169.6	0.3	173.7	-15.3
25	"	(3.8)	144.2	0.2	148.2	+10.4
26	"	(3.8)	151.7	0.9	156.4	+2.2
27	"	2.9	161.9	1.4	166.2	-7.6
28	"	(2.9)	159.9	0.7	163.5	-4.9
29	"	(2.9)	139.4	0.9	143.2	+15.4
30	"	(2.9)	157.0	1.3	161.2	-2.6
Mean		3.0	156.5	1.4	160.9	-2.3

TABLE 25 (continued)

Sodium Metabolism (mEq/day)
Subject G.B.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	158.6	3.0	126.5	2.1	131.5	+27.1
2	"	(3.0)	(133.2)	(2.8)	(139.0)	(+19.6)
3	"	15.9	139.8	3.4	159.1	-0.5
4	"	(15.9)	133.0	1.2	150.1	+8.5
Mean		9.4	133.1	2.4	144.9	+13.7

Values in parentheses are extrapolated values.

The weeks shown are all those in which complete collections in subject G.B. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 30 weeks of bed rest (Bed), and the 1st 4 weeks of reambulation (Reamb). Data from the 2nd week for reambulation are extrapolated from the 1st and 3rd week values, since the subject left the hospital for 3 days during this period.

TABLE 26 Sodium Metabolism (mEq/day)
Subject C.S.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	158.6	(4.8)	153.0	2.6	160.4	-1.8
2	"	(4.8)	150.9	2.8	158.5	+0.1
3	"	(4.8)	141.3	5.8	151.9	+6.7
4	"	4.8	131.3	3.3	139.4	+19.2
5	"	3.4	137.8	2.6	143.8	+14.8
6	"	3.9	163.9	1.7	169.5	-10.9
Mean		4.4	146.4	3.1	153.9	+4.7
Bed 1	158.6	3.0	176.1	1.4	180.5	-21.9
2	"	3.2	173.0	0.8	177.0	-18.4
3	"	3.6	160.9	1.7	166.2	-7.6
4	"	1.5	163.9	1.9	167.3	-8.7
5	"	3.3	163.0	2.4	168.7	-10.1
6	"	2.4	154.8	1.5	158.7	-0.1
7	"	1.8	154.4	2.5	158.7	-0.1
8	"	2.4	162.2	0.8	165.4	-6.8
9	"	2.0	158.3	1.1	161.4	-2.8
10	"	2.5	157.4	1.9	161.8	-3.2
11	"	1.9	163.9	2.0	167.8	-9.2
12	"	3.8	147.4	1.4	152.6	+6.0
13	"	4.5	146.1	2.1	152.7	+5.9
14	"	9.9	164.4	2.8	177.1	-18.5
15	"	5.3	177.0	1.4	183.7	-25.1
16	"	5.2	163.9	2.2	171.3	-12.7
17	"	13.1	150.9	2.4	166.4	-7.8
18	"	9.1	156.1	2.3	167.5	-8.9
19	"	6.8	152.4	3.4	162.6	-4.0
20	"	3.2	151.7	2.2	157.1	+1.5
21	"	4.9	151.7	0.9	157.5	+1.1
22	"	12.5	145.2	0.7	158.4	+0.2
23	"	(12.5)	146.1	1.7	160.3	-1.7
24	"	(12.5)	147.8	1.2	161.5	-2.9
25	"	(12.5)	148.8	1.2	162.5	-3.9
26	"	(12.5)	151.4	1.0	164.9	-6.3
27	"	1.4	165.0	3.0	169.4	-10.8
28	"	(1.4)	166.4	1.8	169.6	-11.0
29	"	(1.4)	131.3	0.8	133.5	+25.1
30	"	10.8	151.2	3.0	165.0	-6.4
31	"	(10.8)	148.1	2.2	161.1	-2.5
32	"	(10.8)	159.9	1.2	171.9	-13.3
33	"	(10.8)	142.9	1.9	155.6	+3.0
34	"	1.1	153.5	1.0	155.6	+3.0
35	"	(1.1)	153.7	1.1	155.9	+2.7
36	"	(1.1)	159.4	1.0	161.5	-2.9
Mean		5.7	156.1	1.7	163.5	-4.9

TABLE 26 (continued)

Sodium Metabolism (mEq/day)
Subject C.S.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	158.6	2.5	110.4	1.4	114.4	+44.2
2	"	(2.5)	139.6	1.5	143.6	+15.0
3	"	(2.5)	148.7	1.5	152.7	+5.9
Mean		2.5	132.9	1.5	136.9	+21.7

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject C.S. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 3 weeks of reambulation (Reamb).

TABLE 27 Serum Sodium Concentrations (mEq/l)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	146	145	146	146
	2	142	141	142	142
Bed	1	143	143	141	142
	2	142	145	144	144
	3	143	143	145	144
	4	142	146	145	144
	5	141	143	142	142
	6	142	141	143	142
	7	142	141	143	142
	8	143	141	145	143
	9	142	141	144	142
	10	144	144	145	144
	11	141	142	141	141
	12	144	145	146	145
	13	145	144	146	145
	14	144	142	146	144
	15	142	144	145	144
	16	142	143	147	144
	17	142	143	145	143
	18	142	143	142	142
	19	143	144	145	144
	20	141	143	145	143
	21	143	142	144	143
	22	140	142	144	142
	23	143	143	143	143
	24	141	145	146	144
	25	142	143	148	144
	26	144	142	147	144
	27	142	142	145	143
	28	143	146	148	146
	29	142	143	146	144
	30	142	145	146	144
	31		143	145	
	32		143	143	
	33		144	148	
	34		142	146	
	35		144	144	
	36		143	148	
Reamb	1	144	143	144	144
	2	(140)	146	148	145
	3	141	138	141	140
	4	142	140	129	137
	5		134		
	6		146		

Value in parentheses is an extrapolated value.

TABLE 28 Potassium Metabolism (mEq/day)
Mean Values for Three Subjects

Week	Intake	Output				Balance
		Sweat	Urine	Stool	Total	
Amb 1	68.7	3.4	56.0	4.9	64.3	+4.4
2	"	2.9	57.9	3.1	63.9	+4.8
3	"	2.6	60.3	4.5	67.4	+1.3
Mean		3.0	58.1	4.2	65.3	+3.4
Bed 1	68.7	1.7	63.1	2.6	67.4	+1.3
2	"	2.4	67.8	1.9	72.1	-3.4
3	"	2.9	65.5	3.9	72.3	-3.6
4	"	1.8	69.0	5.3	76.1	-7.4
5	"	2.6	66.4	5.2	74.2	-5.5
6	"	2.1	65.1	3.4	70.6	-1.9
7	"	1.4	63.0	5.5	69.9	-1.2
8	"	1.9	63.6	3.6	69.1	-0.4
9	"	2.5	62.0	3.7	68.2	+0.5
10	"	2.6	63.8	3.8	70.2	-1.5
11	"	2.2	62.6	5.0	69.8	-1.1
12	"	2.6	62.1	3.5	68.2	+0.5
13	"	3.0	59.9	4.3	67.2	+1.5
14	"	4.3	64.1	4.5	72.9	-4.2
15	"	4.0	63.9	4.1	72.0	-3.3
16	"	4.0	60.7	4.2	68.9	-0.2
17	"	3.8	58.5	4.0	66.3	+2.4
18	"	3.2	58.6	4.7	66.5	+2.2
19	"	3.2	58.4	5.4	67.0	+1.7
20	"	2.6	58.5	3.8	64.9	+3.8
21	"	3.2	59.4	3.8	66.4	+2.3
22	"	3.8	59.6	3.7	67.1	+1.6
23	"	3.8	59.1	3.9	66.8	+1.9
24	"	3.8	60.7	2.6	67.1	+1.6
25	"	3.7	60.0	3.6	67.3	+1.4
26	"	3.7	58.2	2.8	64.7	+4.0
27	"	1.9	61.7	5.6	69.2	-0.5
28	"	1.9	62.2	2.9	67.0	+1.7
29	"	2.8	61.1	1.8	65.7	+3.0
30	"	3.9	58.9	3.6	66.4	+2.3
Mean		2.9	61.9	3.9	68.7	0
Reamb 1	68.7	2.7	48.6	3.9	55.2	+13.5
2	"	2.7	49.9	5.2	57.8	+10.9
3	"	4.2	47.0	4.8	56.0	+12.7
Mean		3.2	48.5	4.6	56.3	+12.4

TABLE 28
(continued)

Potassium Metabolism (mEq/day)
Mean Values for Three Subjects

The weeks shown are all those in which complete collections for all three subjects were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the first 30 weeks of bed rest (Bed), and the first 3 weeks of reambulation (Reamb).

TABLE 29 Potassium Metabolism (mEq/day)
Subject R.R.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	68.7	3.6	55.2	1.0	59.8	+8.9
2	"	2.7	60.9	2.6	66.2	+2.5
3	"	2.2	59.6	2.4	64.2	+4.5
Mean		2.8	58.6	2.0	63.4	+5.3
Bed 1	68.7	1.3	61.4	0.5	63.2	+5.5
2	"	1.9	68.5	0.8	71.3	-2.6
3	"	2.6	65.7	4.0	72.4	-3.7
4	"	0.9	71.9	7.4	80.1	-11.4
5	"	1.7	68.5	8.7	79.0	-10.3
6	"	0.9	68.5	4.8	74.2	-5.5
7	"	1.7	64.2	5.3	71.1	-2.4
8	"	(1.7)	58.6	4.3	64.6	+4.1
9	"	2.4	63.7	3.4	69.4	-0.7
10	"	2.0	62.7	4.8	69.4	-0.7
11	"	2.2	60.0	4.2	66.5	+2.2
12	"	1.7	63.2	3.2	68.1	+0.6
13	"	2.4	62.9	5.1	70.5	-1.8
14	"	3.1	62.2	5.0	70.2	-1.5
15	"	3.0	63.2	5.1	71.3	-2.6
16	"	3.5	61.4	4.8	69.6	-0.9
17	"	2.5	56.8	3.2	62.5	+6.2
18	"	1.5	59.6	5.7	66.9	+1.8
19	"	2.1	56.5	5.2	63.8	+4.9
20	"	1.6	60.8	4.8	67.2	+1.5
21	"	1.8	59.6	3.5	64.9	+3.8
22	"	(1.8)	63.2	3.6	68.6	+0.1
23	"	(1.8)	60.9	2.1	64.8	+3.9
24	"	(1.8)	63.9	0.6	66.3	+2.4
25	"	1.6	61.0	5.3	67.9	+0.8
26	"	(1.6)	58.8	1.6	62.0	+6.7
27	"	(1.6)	64.5	4.4	70.5	-1.8
28	"	(1.6)	64.1	1.8	67.5	+1.2
29	"	4.3	65.8	1.9	72.0	-3.3
30	"	(4.3)	60.4	2.5	67.2	+1.5
31	"	(4.3)	66.3	4.4	75.0	-6.3
32	"	(4.3)	63.9	6.0	74.2	-5.5
33	"	(4.3)	61.7	6.5	72.5	-3.8
34	"	1.5	64.1	2.4	68.0	+0.7
35	"	(1.5)	62.1	3.3	66.9	+1.8
36	"	(1.5)	61.0	3.7	66.2	+2.5
Mean		2.2	62.8	4.0	69.0	-0.3

TABLE 29 (continued)

Potassium Metabolism (mEq/day)
Subject R.R.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	68.7	2.1	51.2	5.6	58.9	+9.8
2	"	(2.1)	51.7	3.9	57.7	+11.0
3	"	(2.1)	53.4	4.6	60.1	+8.6
4	"	(2.1)	47.6	2.5	52.2	+16.5
5	"	(2.1)	51.4	3.1	56.6	+12.1
Mean		2.1	51.1	3.9	57.1	+11.6

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject R.R. were obtained; the last 3 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 5 weeks of reambulation (Reamb).

TABLE 30 Potassium Metabolism (mEq/day)
Subject G.B.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	68.7	(3.7)	68.0	4.0	75.7	-7.0
2	"	(3.7)	54.0	5.1	62.8	+5.9
3	"	(3.7)	60.1	2.3	66.1	+2.6
4	"	3.7	55.0	5.0	63.7	+5.0
5	"	4.0	57.3	1.8	63.0	+5.7
6	"	3.4	61.9	3.8	69.1	-0.4
Mean		3.7	59.4	3.7	66.8	+1.9
Bed 1	68.7	1.7	58.1	1.6	61.4	+7.3
2	"	2.9	66.0	3.0	71.9	-3.2
3	"	3.4	62.4	2.5	68.3	+0.4
4	"	3.0	65.0	2.6	70.5	-1.8
5	"	3.6	65.2	4.3	73.1	-4.4
6	"	3.4	61.6	3.2	68.2	+0.5
7	"	1.5	62.4	2.5	66.4	+2.3
8	"	2.4	65.5	4.2	72.0	-3.3
9	"	3.6	57.0	3.0	63.6	+5.1
10	"	3.9	65.0	1.9	70.8	-2.1
11	"	3.1	62.2	3.2	68.5	+0.2
12	"	4.0	63.0	4.9	72.0	-3.3
13	"	3.7	60.1	2.1	65.9	+2.8
14	"	6.0	63.2	2.2	71.4	-2.7
15	"	5.5	61.4	3.0	69.9	-1.2
16	"	5.1	60.1	2.6	67.8	+0.9
17	"	5.1	58.1	2.2	65.4	+3.3
18	"	5.0	54.8	4.7	64.5	+4.2
19	"	4.9	58.0	4.1	67.0	+1.7
20	"	4.1	56.0	2.2	62.3	+6.4
21	"	5.2	60.9	4.2	70.3	-1.6
22	"	(5.2)	58.8	5.0	69.0	-0.3
23	"	5.2	61.1	3.3	69.6	-0.9
24	"	(5.2)	62.4	2.0	69.6	-0.9
25	"	(5.2)	55.7	1.5	62.4	+6.3
26	"	(5.2)	57.4	3.6	66.2	+2.5
27	"	3.2	59.9	5.6	68.7	0
28	"	(3.2)	60.8	1.0	65.0	+3.7
29	"	(3.2)	58.5	2.0	63.7	+5.0
30	"	(3.2)	59.9	2.2	65.3	+3.4
Mean		4.0	60.7	3.0	67.7	+1.0

TABLE 30 (continued) Potassium Metabolism (mEq/day)
Subject G.B.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	68.7	3.8	50.5	2.2	56.6	+12.1
2	"	(3.8)	(44.7)	(3.8)	(52.3)	(+16.4)
3	68.7	8.5	38.9	5.5	52.9	+15.8
4	"	(8.5)	48.4	2.4	59.3	+9.4
Mean		6.2	45.6	3.5	55.3	+13.4

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject G.B. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 30 weeks of bed rest (Bed), and the 1st 4 weeks of reambulation (Reamb). Data from the 2nd week for reambulation are extrapolated from the 1st and 3rd week values, since the subject left the hospital for 3 days during this period.

TABLE 31 Potassium Metabolism (mEq/day)
Subject C.S.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Amb 1	68.7	(3.0)	56.5	4.8	64.3	+4.4
2	"	(3.0)	56.8	5.5	65.3	+3.4
3	"	(3.0)	56.8	11.4	71.2	-2.5
4	"	3.0	57.8	8.8	69.6	-0.9
5	"	2.1	55.5	4.8	62.4	+6.3
6	"	2.3	59.3	7.4	69.0	-0.3
Mean		2.7	57.1	7.1	66.9	+1.8
Bed 1	68.7	2.2	69.8	5.7	77.7	-9.0
2	"	2.4	69.0	1.8	73.2	-4.5
3	"	2.8	68.5	5.2	76.6	-7.9
4	"	1.4	70.3	5.8	77.5	-8.8
5	"	2.5	65.5	2.6	70.5	-1.8
6	"	2.0	65.2	2.3	69.5	-0.8
7	"	1.1	62.4	8.8	72.2	-3.5
8	"	1.7	66.8	2.4	70.9	-2.2
9	"	1.6	65.2	4.8	71.6	-2.9
10	"	1.9	63.7	4.8	70.3	-1.6
11	"	1.4	65.5	7.5	74.3	-5.6
12	"	2.1	60.1	2.5	64.6	+4.1
13	"	3.0	56.8	5.8	65.6	+3.1
14	"	3.9	66.8	6.3	76.9	-8.2
15	"	3.4	67.3	4.1	74.7	-6.0
16	"	3.4	60.6	5.1	69.1	-0.4
17	"	3.9	60.6	6.7	71.2	-2.5
18	"	3.1	61.4	3.8	68.3	+0.4
19	"	2.6	60.7	6.9	70.2	-1.5
20	"	2.1	58.6	4.4	65.0	+3.7
21	"	2.5	57.8	3.7	64.0	+4.7
22	"	4.4	56.8	2.6	63.8	+4.9
23	"	(4.4)	55.2	6.2	65.8	+2.9
24	"	(4.4)	55.8	5.1	65.3	+3.4
25	"	(4.4)	63.3	4.1	71.8	-3.1
26	"	(4.4)	58.3	3.2	65.9	+2.8
27	"	1.0	60.6	6.7	68.3	+0.4
28	"	(1.0)	61.6	5.8	68.4	+0.3
29	"	(1.0)	59.0	1.4	61.4	+7.3
30	"	4.3	56.4	6.0	66.7	+2.0
31	"	(4.3)	58.0	5.2	67.5	+1.2
32	"	(4.3)	60.2	4.3	68.8	-0.1
33	"	(4.3)	58.5	4.4	67.2	+1.5
34	"	1.5	58.5	5.5	65.5	+3.2
35	"	(1.5)	61.1	5.2	67.8	+0.9
36	"	(1.5)	56.5	5.3	63.3	+5.4
Mean		2.7	61.7	4.8	69.2	-0.5

TABLE 31 (continued) Potassium Metabolism (mEq/day)
Subject C.S.

Week	Intake	Output				Balance
		Sweat	Urine	Feces	Total	
Reamb 1	68.7	2.1	44.0	3.8	49.9	+18.8
2	"	(2.1)	53.2	7.9	63.2	+5.5
3	"	(2.1)	48.6	4.2	54.9	+13.8
Mean		2.1	48.6	5.3	56.0	+12.7

Values in parentheses are extrapolated values

The weeks shown are all those in which complete collections in subject C.S. were obtained; the last 6 weeks of the baseline ambulatory period (Amb), the 36 weeks of bed rest (Bed), and the 1st 3 weeks of reambulation (Reamb).

TABLE 32 Serum Potassium Concentrations (mEq/l)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	4.5	4.3	4.3	4.4
	2	4.4	4.6	4.2	4.4
Bed	1	4.6	4.7	4.3	4.5
	2	4.6	4.5	4.3	4.5
	3	4.7	4.5	4.6	4.6
	4	4.8	4.2	4.4	4.5
	5	4.9	4.7	4.5	4.7
	6	4.4	4.6	4.6	4.5
	7	4.7	4.4	4.7	4.6
	8	4.3	4.3	5.0	4.5
	9	4.6	4.4	4.7	4.6
	10	4.5	4.3	4.5	4.4
	11	4.7	5.?	4.5	4.8
	12	4.4	4.4	4.6	4.5
	13	4.6	3.9	4.3	4.3
	14	4.8	4.2	4.7	4.6
	15	4.6	5.0	4.2	4.6
	16	4.2	4.4	4.5	4.4
	17	4.6	4.4	4.4	4.5
	18	4.4	4.1	4.3	4.3
	19	4.5	4.0	4.3	4.3
	20	4.7	5.1	4.5	4.8
	21	4.2	4.4	4.3	4.3
	22	4.6	4.2	4.4	4.4
	23	4.6	4.7	4.4	4.6
	24	4.3	3.9	4.3	4.2
	25	4.6	4.4	4.5	4.5
	26	4.3	4.2	5.0	4.5
	27	4.4	4.5	4.6	4.5
	28	4.3	4.5	4.4	4.4
	29	4.4	4.3	4.3	4.3
	30	4.3	4.8	4.9	4.7
	31		4.0	4.2	
	32		4.6	4.4	
	33		4.8	4.7	
	34		4.0	5.1	
	35		4.7	4.4	
	36		4.6	4.8	
Reamb	1	4.0	4.7	4.5	4.4
	2	(3.8)	4.8	4.7	4.4
	3	4.7	4.3	4.8	4.6
	4	4.6	4.5	3.7	4.3
	5		4.1		
	6		4.3		

Value in parentheses is an extrapolated value.

TABLE 33 Body Weight (kg)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	60.7	72.2	63.0	65.3
	2	60.3	71.2	63.5	65.0
	3	60.0	70.4	63.6	64.7
	4	59.6	69.6	63.9	64.4
Bed	1	59.2	68.8	63.8	63.9
	2	59.1	68.2	63.2	63.5
	3	59.2	67.9	63.0	63.4
	4	59.1	67.6	62.9	63.2
	5	59.1	66.9	62.6	62.9
	6	58.9	66.0	62.4	62.4
	7	59.0	65.6	62.3	62.3
	8	58.6	65.3	62.0	62.0
	9	58.7	65.2	61.6	61.8
	10	58.7	65.0	61.5	61.7
	11	58.7	64.2	61.4	61.4
	12	58.8	64.1	60.9	61.3
	13	58.9	64.0	60.9	61.3
	14	58.7	63.6	60.8	61.0
	15	59.0	63.7	60.8	61.2
	16	59.0	63.4	60.7	61.0
	17	59.0	63.6	60.7	61.1
	18	59.0	63.4	60.6	61.0
	19	59.0	63.4	60.6	61.0
	20	59.1	63.4	60.7	61.1
	21	59.2	63.5	60.7	61.1
	22	59.2	63.4	60.6	61.1
	23	59.2	63.4	60.9	61.2
	24	59.4	63.3	60.6	61.1
	25	59.3	63.5	60.4	61.1
	26	59.5	63.5	60.6	61.2
	27	59.7	63.5	60.7	61.3
	28	59.7	63.4	60.7	61.3
	29	59.5	63.4	60.3	61.1
	30	59.6	63.7	60.6	61.3
	31		63.6	60.5	
	32		63.4	60.4	
	33		63.2	60.4	
	34		63.3	60.5	
	35		63.4	60.6	
	36		63.4	60.5	
Reamb	1	60.2	64.2	61.1	61.8
	2	(60.6)	64.8	62.0	62.5
	3	60.8	65.4	62.0	62.7
	4	61.1	66.2	62.3	63.2
	5	61.0	66.7		
	6		66.9		

Value in parentheses is an extrapolated value.

TABLE 34 Fluid Intake (ml/day)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	2097	1882	2292	2090
	2	2281	1966	2196	2148
	3	2247	1934	2071	2084
	4	2634	2321	2105	2353
Bed	1	2399	1959	2397	2252
	2	2525	2262	2647	2478
	3	2608	2464	2249	2440
	4	2570	2754	2585	2636
	5	2617	2711	2306	2545
	6	2699	2755	2585	2680
	7	2614	2843	2529	2662
	8	2744	2687	2863	2765
	9	2516	2762	2701	2660
	10	2577	2907	2657	2714
	11	2634	2896	2820	2783
	12	2627	2780	2771	2726
	13	2692	3085	2709	2829
	14	2581	2981	3062	2875
	15	3433	2998	2827	3086
	16	3506	3033	3154	3231
	17	3162	3244	3085	3164
	18	3036	3507	3329	3224
	19	3111	3344	2836	3097
	20	3007	3476	2964	3149
	21	3073	3429	3106	3203
	22	2941	3514	3020	3158
	23	3037	3397	2979	3138
	24	2732	3434	2919	3028
	25	2942	3413	3070	3142
	26	2883	3002	2964	2950
	27	3069	2779	3105	2984
	28	3115	2713	3051	2960
	29	2968	2488	2808	2755
	30	2846	2360	2982	2729
	31		2141	2711	
	32		2279	3070	
	33		2434	2630	
	34		2492	2541	
	35		2322	2515	
	36		2313	3005	
Reamb	1	3097	2159	2381	2546
	2	(3303)	2107	2431	2641
	3	3450	2125	2374	2650
	4	3215	2187	2386	2596
	5	3107	2087		
	6		2060		

Value in parentheses is an extrapolated value.

TABLE 35 Urine Volume (ml/day)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	1523	1114	1664	1434
	2	1498	1142	1622	1421
	3	1518	1200	1483	1400
	4	2039	1525	1689	1751
Bed	1	2179	1633	2093	1968
	2	2123	1770	2254	2049
	3	2220	1881	1874	1992
	4	2199	2303	2192	2231
	5	2319	2218	2038	2192
	6	2347	2276	2265	2296
	7	2338	2401	2244	2328
	8	2563	2240	2596	2466
	9	2197	2301	2456	2318
	10	2050	2718	2286	2351
	11	2345	2253	2541	2380
	12	2319	2456	2446	2410
	13	2388	2591	2218	2399
	14	2033	2298	2496	2276
	15	3004	2444	2189	2546
	16	3055	2467	2622	2715
	17	2741	2892	2453	2695
	18	2531	2996	2668	2732
	19	2797	2941	2482	2740
	20	2574	2978	2473	2675
	21	2619	2934	2509	2687
	22	2511	3095	2293	2633
	23	2483	2894	2303	2560
	24	2409	3148	2732	2763
	25	2467	2884	2513	2621
	26	2406	2624	2535	2522
	27	2685	2421	2710	2605
	28	2769	2516	2776	2687
	29	2429	2204	2311	2315
	30	2381	1991	2196	2189
	31		2006	2418	
	32		2070	2721	
	33		2069	2072	
	34		2194	2245	
	35		2134	2024	
	36		2049	2390	
Reamb	1	2394	1405	1531	1777
	2	(1940)	1444	1792	1725
	3	2049	1342	1527	1639
	4	1900	1129	1533	1521
	5	1881	1195		
	6		1046		

Value in parentheses is an extrapolated value.

TABLE 36 Creatinine Clearance (cc/min)

Week		G.B.	R.R.	C.S.	Mean
Amb	1	102.8	114.1	109.6	108.8
	2	126.8	107.9	100.8	111.8
Bed	1	101.4	101.1	106.1	102.9
	2	95.1	110.9	121.0	109.0
	3	109.5	111.0	115.4	112.0
	4	109.7	113.7	113.9	112.4
	5	108.6	111.[illegible]	119.3	113.2
	6	123.3	112.1	124.9	120.1
	7	110.0	121.5	110.7	114.1
	8	115.9	134.9	112.2	121.0
	9	117.2	12[illegible].9	121.4	120.5
	10	120.2	118.5	112.4	117.0
	11	101.0	107.7	113.1	107.3
	12	115.6	107.8	100.5	108.0
	13	103.1	105.2	108.9	105.7
	14	119.0	117.4	112.2	116.2
	15	110.6	110.4	113.3	108.1
	16	112.4	115.7	116.5	114.9
	17	114.2	105.6	106.7	108.8
	18	103.3	102.1	111.8	105.7
	19	103.3	101.8	102.9	102.7
	20	104.4	105.9	112.7	107.7
	21	99.2	104.1	109.0	104.1
	22	97.8	103.8	106.2	102.6
	23	104.7	103.3	111.1	106.4
	24	112.4	121.1	121.6	118.4
	25	106.2	111.8	107.1	108.4
	26	117.8	108.3	104.6	110.2
	27	112.4	112.7	118.0	114.4
	28	112.5	99.1	104.7	105.4
	29	101.3	107.4	109.8	106.2
	30	103.4	102.2	108.0	104.5
	31		117.3	113.4	
	32		107.2	109.0	
	33		111.7	117.9	
	34		111.0	110.8	
	35		113.1	117.1	
	36		124.7	116.5	
Reamb	1	129.4	118.9	103.3	117.2
	2	(126.1)	114.4	103.3	114.6
	3	122.8	122.1	113.9	119.6
	4	132.6	111.6	113.2	119.1
	5		121.7		
	6		110.0		

Value in parentheses is an extrapolated value.

Table 37
Total Blood Volume
(ml)

	Week	G.B.	R.R.	C.S.	Mean
Amb	1	4796	4788	5416	5000
Bed	9	4117	4447	4120	4228
	14	3532	3730	3783	3682
	20	4402	4452	4441	4432
	24	3870	4190	4140	4067
	28	3800	3970	3530	3767
	33		4350	3892	
Reamb	2	5050	5280	4830	5053

Table 38
Red Blood Cell Volume
(ml)

	Week	G.B.	R.R.	C.S.	Mean
Amb	1	1984	1547	1984	1838
Bed	9	1684	1551	1720	1652
	14	1452	1180	1623	1418
	20	1872	1442	1831	1715
	24	1570	1490	1670	1577
	28	1880	1470	1560	1637
	33		1550	1682	
Reamb	2	2240	1450	1800	1830

Table 39
Plasma Volume
(ml)

	Week	G.B.	R.R.	C.S.	Mean
Amb	1	2846	3241	3432	3173
Bed	5	2508	3187	2632	2775
	9	2433	2896	2400	2576
	14	2080	2550	2160	2263
	20	2530	3010	2610	2717
	24	2300	2700	2470	2490
	28	1920	2500	1970	2130
	33		2800	2210	
Reamb	2	2810	3830	3030	3223

Table 40
Extracellular Fluid Volume (Bromine Space)
(Liters)

	Week	G.B.	R.R.	C.S.	Mean
Bed	5	15.0	15.5	14.3	14.9
	9	15.1	15.6	15.2	15.3
	14	14.2	14.5	15.0	14.6
	20	16.2	16.5	17.1	16.6
	24	14.7	15.3	14.6	14.9
	28	13.4	13.9	13.7	13.7
	33		14.7	14.9	
Reamb	2	15.0	15.7	14.8	15.2

Table 41
Thoracic Girth
(cm)

	Week	G.B.	R.R.	C.S.	Mean
Bed	0	85.7	89.2	89.4	88.1
	4	83.8	90.5	87.6	87.3
	16	84.1	88.9	88.9	87.3
	29	84.5	89.2	88.6	87.4
Reamb	0		88.9	87.3	
	4	84.5	87.6	90.2	87.4

The measurements were made at the nipple line.

Table 42
Abdominal Girth
(cm)

	Week	G.B.	R.R.	C.S.	Mean
Bed	0	66.0	75.6	63.8	68.5
	4	66.4	73.7	64.8	68.3
	16	69.2	75.9	64.1	69.7
	29	68.6	73.0	63.8	68.5
Reamb	0		71.1	66.0	
	4	66.0	74.0	63.5	67.8

The measurements were made at the umbilicus.

Table 43
Right Upper Arm Girth
(cm)

	Week	G.B.	R.R.	C.S.	Mean
Bed	0	25.1	24.4	25.1	24.5
	4	24.0	24.8	25.4	24.7
	16	25.9	24.8	24.8	25.2
	29	25.9	24.4	24.8	25.0
Reamb	0		25.1	24.8	
	4	27.0	24.4	26.0	25.8

The measurements were made at midbiceps, 15 cm above the olecranon.

Table 44
Right Forearm Girth
(cm)

	Week	G.B.	R.R.	C.S.	Mean
Bed	0	24.0	22.9	24.1	23.7
	4	24.0	21.9	23.8	23.2
	16	23.5	22.9	23.5	23.3
	29	23.6	21.6	23.8	23.0
Reamb	0		22.2	23.8	
	4	23.8	21.9	24.4	23.4

The measurements were made 10 cm below the olecranon.

Table 45
Right Thigh Girth
(cm)

	Week	G.B.	R.R.	C.S.	Mean
Bed	0	45.7	49.0	45.7	46.8
	4	44.6	47.9	46.0	46.2
	16	45.7	45.4	41.9	44.3
	29	43.8	44.9	43.5	44.1
Reamb	0		40.0	43.2	
	4	45.1	48.3	43.2	45.5

The measurements were made 20 cm above the upper border of the patella.

Table 46
Right Calf Girth
(cm)

	Week	G.B.	R.R.	C.S.	Mean
Bed	0	34.1	35.9	34.8	34.9
	4	32.9	32.7	31.1	32.2
	16	31.3	29.8	28.6	29.9
	29	30.2	28.9	28.9	29.3
Reamb	0		29.5	30.2	
	4	34.0	30.5	31.8	32.1

The measurements were made at the calf, 20 cm below the upper border of the patella.

Table 47
Thoracic Skin Thickness
(mm)

	Week	G.B.	R.R.	C.S.	Mean
Bed	1	8.3	11.0	7.2	8.8
	2	9.8	11.6	7.2	9.5
	4	10.0	10.3	9.9	10.0
	8		9.1		
	29	10.0	9.0	8.0	9.0
Reamb	0		9.0	7.0	
	4	10.0	11.0	8.0	9.6

The measurements were made in the right subscapular region.

Table 48
Arm Skin Thickness
(mm)

	Week	G.B.	R.R.	C.S.	Mean
Bed	1	7.0	7.3	7.5	7.2
	2	6.3	7.3	6.3	6.6
	4	6.3	10.4	7.2	7.9
	8		5.6		
	29	8.0	7.5	5.0	6.8
Reamb	0		7.0	6.0	
	4	8.0	6.0	4.0	6.0

The measurements were made over the triceps, 12.7 cm above the olecranon.

Table 49
Leg Skin Thickness

	Week	G.B.	R.R.	C.S.	Mean
Bed	1	10.0	13.2	8.9	10.7
	2	9.4	12.0	10.0	10.4
	4	11.1	13.4	9.2	11.2
	8		11.7		
	29	14.0	9.5	14.0	12.5
Reamb	0		10.0	8.0	
	4	9.0	11.0	10.0	10.0

The measurements were made anteriorly, 15.2 cm above the upper border of the patella.

Appendix i -- The Metabolic Unit Physical Plant

The Metabolic Unit is located in the southeast wing of the P.H.S. Hospital in San Francisco. The ten-bed ward is divided into five double rooms. Each room is equipped with a sink, refrigerator for urine specimens, television, radio and stereo record player, and three rooms have air conditioners and toilets. A centrally located nursing station contains adequate desk space and a medicine closet with a refrigerator. The utility room contains a washer and drier and a refrigerator. The Metabolic Kitchen is completely equipped for preparing measured diets with balances, a freezer, a refrigerator, a stove, a dishwasher, and distilled water. The Metabolic Laboratory consists of two rooms with facilities for balance studies including two freezers, a muffle furnace, an atomic absorption spectrophotometer, a Technicon autoanalyzer, distilled water, and miscellaneous equipment. In addition to adequate storage space, there are individual offices for the director, the dietitian, the head nurse, the fellow, and the secretary.

APPENDIX ii

TABLE A

Menu #1

Total Food Intake

Grams	Food
150	Blended juice
50	Eggs, bud 26
69	White bread
40	Butter
15	Jelly
2.5	Instant coffee
450	Whole milk, cnd.
14	Sugar
75	Chicken breast, ckd.
20	Rice, dry
100	Asparagus, cnd.
125	Applesauce, cnd.
100	Ground beef, ckd.
20	Inst. potatoes, dry
75	W.K. corn, cnd.
66	Orange sherbet
12	Premium crackers, unsalted tops
30	Proc. Amer. cheese
360	Seven Up
4	NaCl

Meal Pattern	
Breakfast:	Blended juice
	Scrambled eggs
	Toast
	Butter
	Jelly
	Milk
	Coffee
	Sugar
Lunch:	Chicken breast
	Rice
	Asparagus
	Bread & butter
	Applesauce
	Milk
Dinner:	Gound beef patty
	Mashed potatoes
	Corn
	Bread & butter
	Orange sherbet
	Milk
Evening Snack:	Cheese & crackers
	Seven Up

4 grams NaCl

APPENDIX ii
TABLE B

Menu #2

Total Food Intake			
Grams	Food		Meal Pattern
125	Orange juice	Breakfast:	Orange juice
50	Eggs, Bud 26		Cornflakes
25	Cornflakes		Scrambled eggs
92	Bread		Toast
30	Butter		Butter
600	Whole milk, cnd.		Milk
2.5	Instant coffee		Coffee
14	Sugar		Sugar
120	Apple juice		
60	Tuna, dietetic	Lunch:	Apple juice
20	Mayonnaise		Tuna sandwich
100	Pineapple, cnd.		Pineapple
100	Beef tenderloin, raw		Milk
30	Macaroni, dry		
75	Peas, cnd.	Dinner:	Beef tenderloin
51	Chocolate ice cream		Macaroni
100	Pears, cnd.		Peas
16	Vanilla wafers		Bread & butter
4	NaCl		Chocolate ice cream
			Milk
		Evening Snack:	Pears
			Vanilla wafers
			4 grams NaCl

APPENDIX ii
TABLE C

Menu #3

Total Food Intake

Grams		Meal Pattern	
125	Pineapple juice	Breakfast:	Pineapple juice
80	Eggs, Bud 26		French toast
115	Bread		Cinnamon & sugar
30	Butter		Butter
450	Whole milk, cnd.		Milk
2.5	Instant coffee		Coffee
21	Sugar		Plain sugar
100	Tomato soup, cond.		
30	Proc. Amer. cheese	Lunch:	Tomato soup
45	Sponge cake		Grilled cheese sandwich
100	Ground beef, raw		Sponge cake
100	Potatoes, cnd.		Gingerale
75	Carrots, cnd.		
115	Grapefruit sect., cnd.	Dinner:	Ground beef patty
15	Peanut butter		Whole new potatoes
12	Premium crackers, unsalted tops		Carrots
360	Coca Cola		Bread & butter
360	Gingerale		Grapefruit sections
			Milk
NO SALT			
		Evening Snack:	Peanut butter & crackers
			Coca Cola

NO SALT

APPENDIX ii
TABLE D

Menu #4

Total Food Intake

Grams	Food		Meal Pattern
150	Grapefruit juice	Breakfast:	Grapefruit juice
100	Eggs, bud 26		Omelet
92	Bread		Toast
25	Butter		Butter
15	Jelly		Jelly
600	Whole milk, cnd.		Milk
2.5	Instant coffee		Coffee
14	Sugar		Sugar
100	Beef tenderloin, raw		
100	W.K. corn, cnd.	Lunch:	Tomato juice
150	Peaches, cnd.		Chicken sandwich
120	Tomato juice		Peaches
50	Chicken breast, ckd.		Milk
15	Mayonnaise		
51	Vanilla ice cream	Dinner:	Beef tenderloin
14	Graham crackers		Corn
100	Applesauce, cnd.		Bread & butter
4	NaCl		Vanilla ice cream
			Milk
		Evening Snack:	Graham crackers
			Applesauce
			4 grams NaCl

APPENDIX ii
TABLE E

Menu #5

Total Food Intake

Grams	Food
125	Orange juice
30	Quaker oats, dry
100	Eggs, bud 26
69	Bread
30	Butter
425	Whole milk, cnd.
2.5	Instant coffee
14	Sugar
75	Macaroni, ckd.
30	Proc. Amer. cheese
100	Green beans, cnd.
100	R. A. cheeries, cnd.
100	Beef tenderloin, raw
100	Potatoes, cnd.
100	Beets, cnd.
100	Apricots, cnd.
20	Vanilla wafers
240	Lemonade
360	Coca Cola
4	NaCl

Meal Pattern	
Breakfast:	Orange juice
	Oatmeal
	Scrambled eggs
	Toast
	Butter
	Milk
	Coffee
	Sugar
Lunch:	Macaroni & Cheese
	Green beans
	Bread & butter
	R. A. cherries
	Lemonade
Dinner:	Beef tenderloin
	Whole new potatoes
	Beets
	Bread & butter
	Apricots
	Milk
Evening Snack:	Vanilla wafers
	Coca Cola
	4 grams NaCl

APPENDIX ii
TABLE F

Menu #6

Total Food Intake

Grams	Food
125	Grape juice
50	Eggs, Bud 26
7	Bac-o-chips
69	Bread
40	Butter
560	Whole milk, cnd.
2.5	Instant coffee
14	Sugar
65	Shrimp
20	Rice, dry
100	Tomatoes, cnd.
100	Pineapple, cnd.
100	Ground beef, raw
30	Tomato juice
5	Onion, dehydrated
5	Bread crumbs
20	Inst. potatoes, dry
75	Peas, cnd.
100	Pears, cnd.
150	Cranberry juice
45	Sponge cake
4	NaCl

Meal Pattern	
Breakfast:	Grape juice
	Scrambled eggs w/Bac-o-chips
	Toast
	Butter
	Milk
	Coffee
	Sugar
Lunch:	Shrimp, rice, & tomato casserole
	Bread & butter
	Pineapple
	Milk
Dinner:	Meatloaf
	Mashed potatoes
	Peas
	Bread & butter
	Pears
	Milk
Evening Snack:	Cranberry juice
	Sponge cake
	4 grams NaCl

APPENDIX ii
TABLE G

Menu #7

Total Food Intake

Grams	Food
125	Orange juice
25	Wheaties
50	Eggs, bud 26
69	Bread
40	Butter
610	Whole milk, cnd.
2.5	Instant coffee
14	Sugar
100	Chicken breast, ckd.
100	Potatoes, cnd.
100	Green beans, cnd.
150	Peaches, cnd.
100	Beef tenderloin, raw
20	Rice, dry
100	Carrots, cnd.
66	Raspberry sherbet
14	Graham crackers
360	Root Beer
4	NaCl

Meal Pattern	
Breakfast:	Orange juice
	Wheaties
	Scrambled eggs
	Toast
	Butter
	Milk
	Coffee
	Sugar
Lunch:	Chicken breast
	Whole new potatoes
	Carrots
	Bread & butter
	Rasberry sherbet
	Milk
Dinner:	Beef tenderloin
	Rice
	Green beans
	Bread & butter
	Peaches
	Milk
Evening Snack:	Graham crackers
	Root Beer
	4 grams NaCl

APPENDIX ii

TABLE H

Measured and Predicted Values for Dietary Composition

	Date Aliquoted	Diet 1	Diet 2	Diet 3	Diet 4	Diet 5	Diet 6	Diet 7	Mean/Day	Mean/Day of all Assays
Calcium, mg	12-67	902	857	974	940	886	892	957	915)	
	6-68	889	923	986	856	761	885	930	890)	908
	10-68	908	955	953	885	938	879	926	920)	
	Predicted	953	940	960	950	948	951	950	950	
Magnesium, mg	12-67	207	228	214	229	235	230	239	226)	
	6-68	195.5	222.9	204.7	205.9	230.2	229.5	216.4	215.1)	219
	10-68	204.5	227.4	204.2	204.2	226.6	222.6	232.5	217.4)	
	Predicted	228	213	248	229	274	260	344	256	
Phosphorus, mg	12-67	1392	1351	1545	1450	1556	1330	1486	1444)	
	6-68	1390	1397	1440	1388	1486	1358	1470	1418)	1422
	10-68	1272	1336	1530	1408	1492	1320	1472	1404)	
	Predicted	1462	1303	1356	1386	1415	1336	1474	1390	
Potassium, mEq	12-67	71.86	62.95	66.67	75.79	69.01	80.69	77.53	72.07)	
	6-68	70.40	68.50	64.59	73.24	64.13	73.39	78.04	70.32)	68.71
	10-68	62.46	63.05	60.24	68.09	59.27	67.88	65.22	63.74)	
	Predicted	67.44	63.46	65.87	71.18	71.56	70.41	76.26	69.45	
Sodium, mEq	12-67	164.7	152.6	149.7	163.0	163.4	159.3	180.3	161.8)	
	6-68	154.2	140.8	140.5	138.4	160.1	152.8	168.5	150.7)	158.6
	10-68	157.6	150.0	160.0	169.1	172.5	154.7	179.3	163.3)	
	Predicted	157.3	148.8	135.1	153.0	162.5	155.8	175.0	155.3	
Nitrogen, gm	12-67	15.8	14.9	12.9	15.4	13.6	13.6	16.7	14.7)	
	6-68	13.7	14.6	12.5	14.2	12.8	13.9	15.6	13.9)	14.1
	10-68	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8)	
	Predicted	14.5	14.1	12.5	14.0	12.5	14.2	15.5	13.9	

APPENDIX ii
TABLE I

Mean Values for Dietary Composition

	Measured								Predicted
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	7-Day Mean	7-Day Mean
Calcium, mg	899 (10)	911 (50)	971 (17)	893 (43)	861 (91)	885 (6)	937 (17)	908 (16)	950
Phosphorus, mg	1351 (69)	136[illegible] (32)	1505 (57)	1415 (32)	1511 (39)	1336 (20)	1476 (9)	1422 (20)	1390
Magnesium, mg	202 (6)	226 (3)	208 (6)	213 (14)	231 (4)	227 (4)	229 (12)	219 (6)	256
Nitrogen, mg	14.4 (1.2)	14.4 (0.6)	13.0 (0.7)	14.4 (0.8)	13.4 (0.5)	13.7 (0.2)	15.3 (1.5)	14.1 (0.5)	13.9
Potassium, mEq	68.2 (5.1)	64.8 (3.2)	63.8 (3.3)	72.4 (3.9)	64.1 (4.9)	74.0 (6.4)	73.6 (7.3)	68.7 (4.4)	69.4
Sodium, mEq	158.8 (5.4)	147.8 (6.2)	150.0 (9.8)	156.8 (16.2)	165.3 (6.4)	155.6 (3.3)	176.0 (6.5)	158.6 (6.9)	155.3
Calories	—	—	—	—	—	—	—	—	2108

The mean values from 3 duplicate determinations tabulated in table H are shown with standard deviation in parentheses.

APPENDIX ii
TABLE J

Calculated Nutrient Content of the Seven Menus

Nutrient	Unit	Menu Number 1	2	3	4	5	6	7	7-Day Mean
Calories	-	2113	2118	2190	2047	2158	2026	2103	2108
Protein	gm	90.4	87.1	76.5	86.9	77.1	87.8	96.2	86.0
Fat	gm	82.6	90.7	87.2	90.0	81.3	78.3	80.3	84.3
Carbohydrate	gm	251.9	238.2	274.8	222.4	279.5	242.6	248.9	251.2
Iron	mg	12.4	12.4	11.6	12.7	13.0	13.9	12.5	12.6
Vitamin A*	IU	9288	8559	20,424	10,173	10,717	10,109	24,249	13,360
Thiamine*	mg	2.83	3.24	2.87	2.84	3.06	3.01	3.00	2.98
Riboflavin*	mg	4.97	5.00	4.76	5.07	4.78	5.09	5.12	4.97
Niacin*	mg	40.2	40.8	34.3	37.9	31.7	33.6	44.6	37.6
Ascorbic Acid*	mg	161	153	157	165	179	182	162	166
Vitamin D*	IU	577	717	594	641	640	645	587	629
Vitamin B_6	mcg	1533	1699	1838	1661	1694	1668	1442	1648
Pantothenate	mg	5.4	4.9	5.8	6.0	5.4	5.4	6.4	5.6
Biotin	mcg	56	53	53	67	56	53	65	58
Folate	mcg	83	58	77	61	72	74	90	74
Choline	mg	448	499	602	663	745	511	487	565
Inositol	mg	448	403	449	511	374	314	491	427
Vitamin B_{12}	mcg	23	30	23	30	23	27	29	26
Copper	mg	1.32	1.14	1.20	1.66	1.56	1.86	1.21	1.42
Iodine	mcg	82	107	84	113	121	151	96	108
Cholesterol	mg	638	502	444	824	805	640	556	630

*Values include nutrients in one Hexavitamin tablet, which was administered daily beginning 11 days prior to bed rest.

SODIUM AND POTASSIUM

GENERAL DESCRIPTION

On the two channel module...Na^+ and K^+ are determined simultaneously from the same sample. On the one channel module...Na^+ and K^+ are run separately and in sequence. The samples are not diluted or otherwise prepared before start of test. The proportioning pump automatically makes the correct dilution. Lithium is used for both Na^+ and K^+ as an internal standard. Two light-sensitive cells, located in a detector assembly, measure Na^+ or K^+ on one side, Li on the other, their ratio is charted on the recorder.

In this procedure the undiluted stream supplied by the sampler, merges with an air segmented stream of acid lithium nitrate diluent, mixes and enters the dialyzer. The dialyzed portion of the sample enters into an air segmented distilled water stream flowing through the lower half of the dialyzer. This segmented recipient stream enters a glass "T" where the segmenting air exits to waste, and the solid stream enters the burner.

REAGENTS

LITHIUM NITRATE

A - STOCK SOLUTION (1000 meq. $LiNO_3$/L.- 2N H_2SO_4) - Technicon Formula AR-82-61

Chemical Composition

1 - Lithium Nitrate	69.0	gm.
2 - Sulfuric Acid, Conc.	98.0	gm.
3 - Distilled Water, q.s.	1000	ml.

Preparation

1 - Place the lithium nitrate in a one liter volumetric flask, add approximately 500 ml. of distilled water, and mix until dissolved.

2 - Slowly add the sulfuric acid with mixing, and allow to cool to room temperature.

3 - Dilute to volume with distilled water.

B - WORKING SOLUTION (125 meq. $LiNO_3$/L. - 0.25 N H_2SO_4)

Dilute 125 ml. of stock lithium nitrate to one liter with distilled water. Add 0.5 ml. Brij-35, mix.

STANDARDS

STOCK SODIUM STANDARD (1000 meq. Na^+/L.) - Technicon Formula AR-80-61

Chemical Composition

1 - Sodium Chloride	58.45	gm.
2 - Distilled Water, q.s.	1000	ml.

Preparation

1 - Weigh out sodium chloride on analytical balance and transfer to a 1000 ml. volumetric flask.

2 - Dissolve, and dilute to volume with distilled water.

STOCK POTASSIUM STANDARD (100 meq. K^+/L.) - Technicon Formula AR-125-62

Chemical Composition

1 - Potassium Chloride	7.456	gm.
2 - Distilled Water, q.s.	1000	ml.

Preparation

1 - Weigh out potassium chloride on analytical balance and transfer to a one liter volumetric flask.

2 - Dissolve and dilute to volume with distilled water.

WORKING SODIUM-POTASSIUM STANDARDS

Dilute stock sodium and potassium standards with distilled water.

ml. of stock Na^+	+ ml. of stock K^+	dilute to:	meq.Na^+/L.	meq.K^+/L.
10	8	100 ml.	100	8
11	8	100 ml.	110	8
12	8	100 ml.	120	8
13	2	100 ml.	130	2
14	4	100 ml.	140	4
15	6	100 ml.	150	6
16	8	100 ml.	160	8

Appendix iii

OPERATING PROCEDURE NOTES

1 - The procedure for sodium and potassium in biological specimens can be run at 40 determinations per hour.

2 - The standards range from 100 to 160 meq. Na^+ per liter and 2 to 8 meq. K^+ per liter. The K^+ and Na^+ standards are mixed together. The various combinations do not influence each other. There is a definite order of preference for running the standards. It is as follows:

Fill the first three sampler cups with 160 meq. Na^+ per liter + 8 meq. K^+ per liter standard. The next seven cups (in sequence) as follows:

100	meq.	Na^+	per	liter	+ 8	meq.	K^+	per	liter
110	"	"	"	"	+ 8	"	"	"	"
120	"	"	"	"	+ 8	"	"	"	"
130	"	"	"	"	+ 2	"	"	"	"
140	"	"	"	"	+ 4	"	"	"	"
150	"	"	"	"	+ 6	"	"	"	"
160	"	"	"	"	+ 8	"	"	"	"

Put a 140 meq. Na^+ per liter + 4 meq. K^+ per liter standard in every 10th cup, then fill the remaining cups with unknowns to be analyzed.

NOTE: Do not leave a blank space in sampler. Always fill in with a standard.

Whether running a continuous sample or sampling repetitively, the 160 meq. Na^+ per liter or the 8 meq. K^+ per liter standard should be positioned between 90-95% on the Recorder scale. This will give proper sensitivity and range for both procedures.

If for experimental purposes it is necessary to run Na^+ levels lower than 100 meq. per liter, use the Na^+ filters and the K position on the control panel. Adjust the highest standard used to read 99% on the scale. This will give proper range and sensitivity.

3 - Noise level on both Na^+ and K^+ should not exceed $\pm$ 0.75 lines. Noise greater than this may be due to:

a) worn manifold
b) aged membrane
c) dirty or uncentered capillary
d) improper flow into capillary

(See Flame Photometer Instruction Manual)

4 - For optimal bubble pattern and low noise be sure to use 0.5 ml. Brij-35 per liter of lithium nitrate working solution and distilled water recipient.

5 - Na^+ is reproducible to $\pm$ 1 meq. Na^+ per liter while the K^+ is reproducible to $\pm$ 0.1 meq. K^+ per liter.

# # #

Appendix iv -- The Method for Determining Urinary Pyrophosphate

A fresh sample of the 24-hour urine was diluted 1:2 with distilled water, acidified with 4 N HCl to pH 5.0, and boiled for 2 minutes to destroy pyrophosphatase. Five ml were placed on a column containing 10 ml of Dowex 1-X10, 1-200 mesh, chloride form (resin height 22 cm; passage rate 0.5-1 ml/minute). The column was rinsed with 10 ml of water and the eluate checked to assure a negative reaction for orthophosphate. The orthophosphate was then eluted with 100 ml of 0.05 N HCl and 10 ml of water. Pyrophosphate was eluted with 0.5 N HCl and recovered in 6 fractions of 3 ml each. To each fraction was added 3 ml of a reagent containing 25% 4 N HCl, 35% distilled water, 20% of a 2.5% ammonium molybdate solution, and 20% of a 10% ascorbic acid solution. The mixture was placed in a boiling water bath for 10 minutes. Pyrophosphate phosphorus was then determined using a spectrophotometer at 820 mu, with an 0.02 slit, and KH_2PO_4 standards made up in 0.02 N HCl.

Appendix v -- Staff Participating in Study

Charles L. Donaldson, M.D., Principal Investigator

Stephen B. Hulley, M.D., Co-Principal Investigator

Donald E. McMillan, M.D., former Principal Investigator

Robert S. Hattner, M.D., Research Associate

Jon H. Bayers, M.D., Research Associate

Kenneth H. Hyatt, M.D., Co-Investigator

Milton Z. Nichaman, M.D., Co-Investigator

William M. Smith, M.D., Co-Investigator

Audrey Cathrell, Secretary

Suzanne Thornley, B.S., R.N., Head Nurse

Carole Bibeau, B.S., R.N., Staff Nurse

Eileen Borge, B.A., R.N., Staff Nurse

Carmen Adams, R.N., Staff Nurse

Hazel Pernet, R.N., Staff Nurse

Helen Maliszewski, R.N., Staff Nurse

Grace Stoll, L.V.N., Nursing Assistant

James Stephens, Nursing Assistant

Mary Marsh, R.N., former Staff Nurse

Kathleen Jo, B.S., Sr. Medical Technologist

Barbara Gregory, Laboratory Technician

Roy Hovey, Laboratory Worker

Beverly Sharpe, former Sr. Technologist

Appendix v (cont.) -- Staff Participating in Study

Janet Mooney, B.S., Metabolic Dietitian

Margaret Babin, Cook

Ernestine Clay, Food Service Worker

Blanche McCoy, Food Service Worker

Charlene Richardson, Food Service Worker

See also Appendix vi and Exhibit B.