TABLE OF THE STEREOGRAPHIC POLAR PROJECTION BETWEEN LATITUDES 39° TO 51°.

by

INGENIEUR HYDROGRAPHE GENERAL P. DE VANSSAY DE BLAVOUS,
DIRECTOR.

In volume XVI N° 1 of the Hydrographic Review we have given formulae (1,3,4) which permit the deduction from the meridional parts of all stereographic projections of the ellipsoid.

In volumes XVI N° 1 and XVII N° 2, we have given formulae which permit the calculation by means of these same meridional parts of the various conformal projections of the ellipsoid generally employed in the calculation of the geodetic coordinates.

But we have also noted in Volume XVII, N° 2, page 12, that the use of the meridional parts for latitudes exceeding a certain value, offered some disadvantages and that it was better for such latitudes to substitute for the meridional parts the radii (D) of the parallels of the stereographic polar projection.

We have, in fact,

$$e^{\zeta} = \frac{D_o}{D} e^{iG} \qquad l - l_o = v = \operatorname{Log} \frac{D_o}{D},$$

$$\tau = \left(1 - \frac{D}{D_o} e^{-iG} \right) \cos L_o.$$

In order to make use of these, or at least to try out the procedure, we have calculated the following table of the values of D/a (D radius of the parallel of the stereographic polar projection for latitude L, *a* radius of the terrestrial equator) for the international ellipsoid. These values are given to 9 decimals of which the last may be in error by one unit, which allows one to obtain the radius of the parallel with an error of less than one centimeter; an accuracy which is generally sufficient for hydrographic work.

The International Conference of Geodesy and Geophysics convened at Washington in 1939 requested that a Table of Meridional Parts be calculated to a greater number of decimals than those given in our Special Publication N° 21, which was prepared especially for the needs of the Hydrographic Services.

It would be desirable that a similar table be calculated at the same time analogous to that reproduced here and containing one more decimal place.

Min.	39°		40°		41°		Min.
	$\frac{D}{a}$	Diff.	$\frac{D}{a}$	Diff.	$\frac{D}{a}$	Diff.	
0	0,954780756		0,933511193		0,912409690		0
		0,000355900		0,000353055		0,000350298	
1	4424856	851	3158138	007	2059392	253	1
2	4069005	802	2805131	0,000352960	1709139	207	2
3	3713203	753	2452171	914	1358932	162	3
4	3357450	706	2099257	867	1008770	116	4
5	3001744	658	1746390	821	0658654	071	5
6	2646086	610	1393569	776	0308583	027	6
7	2290476	562	1040793	730	0,909958556	0,000349983	7
8	1934914	515	0688063	681	9608573	936	8
9	1579399	466	0335382	635	9258637	890	9
10	1223933	418	0,929982747	589	8908747	846	10
11	0868515	371	9630158	542	8558901	802	11
12	0513144	323	9277616	496	8209099	758	12
13	0157821	275	8925120	450	7859341	710	13
14	0,949802546	228	8572670	403	7509631	665	14
15	9447318	179	8220267	357	7159966	621	15
16	9092139	130	7867910	311	6810345	577	16
17	8737009	083	7515599	265	6460768	533	17
18	8381926	035	7163334	218	6111235	487	18
19	8026891	0,000354988	6811116	172	5761748	442	19
20	7671903	940	6458944	125	5412306	399	20
21	7316963	893	6106818	079	5062907	353	21
22	6962070	846	5754739	035	4713554	308	22
23	6607224	798	5402704	0,000351987	4364246	263	23
24	6252426	750	5050717	941	4014983	219	24
25	5897676	703	4698776	896	3665764	175	25
26	5542973	655	4346880	849	3316589	129	26
27	5188318	608	3995031	803	2967460	085	27
28	4833710	560	3643228	756	2618375	040	28
29	4479150	513	3291472	711	2269335	0,000348996	29
30	4124637	465	2939761	664	1920339	951	30
31	3770172	418	2588097	620	1571388	907	31
32	3415754	370	2236477	574	1222481	864	32
33	3061384	324	1884903	526	0873617	817	33
34	2707060	276	1533377	481	0524800	773	34
35	2352784	229	1181896	436	0176027	730	35
36	1998555	181	0830460	390	0,899827297	685	36
37	1644374	135	0479070	345	9478612	640	37
38	1290239	087	0127725	298	9129972	596	38
39	0936152	040	0,919776427	253	8781376	551	39
40	0582112	0,000353992	9425174	208	8432825	507	40
41	0228120	945	9073966	162	8084318	463	41
42	0,939874175	899	8722804	116	7735855	420	42
43	9520276	851	8371688	069	7387435	373	43
44	9166425	804	8020619	024	7039062	330	44
45	8812621	757	7669595	0,000350979	6690732	286	45
46	8458864	710	7318616	933	6342446	241	46
47	8105154	663	6967683	887	5994205	197	47
48	7751491	617	6616796	842	5646008	153	48
49	7397874	568	6265954	797	5297855	110	49
50	7044306	521	5915157	751	4949745	067	50
51	6690785	476	5564406	706	4601678	022	51
52	6337309	428	5213700	659	4253656	0,000347977	52
53	5983881	382	4863041	615	3905679	933	53
54	5630499	335	4512426	570	3557746	889	54
55	5277164	287	4161856	522	3209857	846	55
56	4923877	241	3811334	480	2862011	802	56
57	4570636	194	3460854	434	2514209	756	57
58	4217442	147	3110420	387	2166453	714	58
59	3864295	102	2760033	343	1818739	671	59
60	3511193		2409690		1471068		60

Min.	42°		43°		44°		Min.
	$\frac{D}{a}$	Diff.	$\frac{D}{a}$	Diff.	$\frac{D}{a}$	Diff.	
0	0,891471068	0,000347625	0,870690280	0,000345038	0,850062406	0,000342530	0
1	1123443	582	0345242	0,000344995	0,849719876	489	1
2	0775861	538	0000247	952	9377387	447	2
3	0428323	494	0,869655295	910	9034940	406	3
4	0080829	451	9310385	867	8692534	366	4
5	0,889733378	407	8965518	826	8350168	325	5
6	9385971	364	8620692	782	8007843	282	6
7	9038607	320	8275910	741	7665561	243	7
8	8691287	276	7931169	698	7323318	202	8
9	8344011	232	7586471	657	6981116	160	9
10	7996779	189	7241814	614	6638956	120	10
11	7649590	146	6897200	572	6296836	079	11
12	7302444	101	6552628	529	5954757	038	12
13	6955343	059	6208099	486	5612719	0,000341997	13
14	6608284	015	5863613	446	5270722	956	14
15	6261269	0,000346971	5519167	403	4928766	916	15
16	5914298	928	5174764	361	4586850	874	16
17	5567370	884	4830403	318	4244976	833	17
18	5220486	840	4486085	277	3903143	793	18
19	4873646	799	4141808	235	3561350	753	19
20	4526847	754	3797573	193	3219597	712	20
21	4180093	710	3453380	151	2877885	670	21
22	3833383	667	3109229	109	2536215	631	22
23	3486716	624	2765120	067	2194584	589	23
24	3140092	580	2421053	025	1852995	549	24
25	2793512	538	2077028	0,000343982	1511446	507	25
26	2446974	495	1733046	940	1169939	468	26
27	2100479	451	1389106	899	0828471	427	27
28	1754028	408	1045207	857	0487044	388	28
29	1407620	365	0701349	816	0145656	347	29
30	1061255	322	0357533	774	0,839804309	306	30
31	0714933	278	0013759	732	9463003	265	31
32	0368655	235	0,859670027	690	9121738	224	32
33	0022420	191	9326337	647	8780514	184	33
34	0,879676229	149	8982690	607	8439330	144	34
35	9330080	106	8639083	565	8098186	105	35
36	8983974	062	8295518	525	7757081	064	36
37	8637912	020	7951993	482	7416017	023	37
38	8291892	0,000345978	7608511	440	7074994	0,000340983	38
39	7945914	934	7265071	398	6734011	941	39
40	7599980	891	6921673	357	6393070	902	40
41	7254089	847	6578316	316	6052168	862	41
42	6908242	806	6235000	272	5711306	821	42
43	6562436	762	5891728	231	5370485	781	43
44	6216674	720	5548496	192	5029704	742	44
45	5870954	678	5205305	150	4688962	701	45
46	5525276	634	4862155	107	4348261	661	46
47	5179642	591	4519048	067	4007600	622	47
48	4834051	548	4175981	026	3666978	581	48
49	4488503	507	3832955	0,000342985	3326397	540	49
50	4142996	465	3489970	942	2985857	500	50
51	3797531	421	3147028	899	2645357	460	51
52	3452110	378	2804129	859	2304897	421	52
53	3106732	335	2461270	819	1964476	380	53
54	2761397	293	2118451	776	1624096	339	54
55	2416104	249	1775675	736	1283757	300	55
56	2070855	206	1432939	695	0943457	261	56
57	1725648	164	1090244	653	0603196	222	57
58	1380484	123	0747591	613	0262974	181	58
59	1035361	081	0404978	572	0,829922793	142	59
60	0690280		0062406		9582651		60

Min.	45°		46°		47°		Min.
	$\frac{D}{a}$	Diff.	$\frac{D}{a}$	Diff.	$\frac{D}{a}$	Diff.	
0	0,829582651	0,000340100	0,809246334	0,000337748	0,789048894	0,000335473	0
1	9242551	064	8908586	711	8713421	435	1
2	8902488	022	8570875	672	8377986	398	2
3	8562466	0,000339982	8233203	634	8042588	361	3
4	8222484	941	7895569	595	7707227	324	4
5	7882543	902	7557974	557	7371903	288	5
6	7542641	863	7220417	518	7036615	250	6
7	7202778	823	6882899	481	6701365	212	7
8	6862955	784	6545418	441	6366153	174	8
9	6523171	744	6207977	403	6030979	137	9
10	6183427	703	5870574	366	5695841	100	10
11	5843724	665	5533208	326	5360741	064	11
12	5504059	625	5195882	288	5025677	025	12
13	5164434	586	4858594	250	4690652	0,000334990	13
14	4824848	546	4521344	212	4355662	953	14
15	4485302	506	4184132	173	4020709	915	15
16	4145796	465	3846959	135	3685794	879	16
17	3806331	427	3509824	098	3350915	840	17
18	3466904	387	3172726	059	3016075	805	18
19	3127517	349	2835667	020	2681270	769	19
20	2788168	309	2498647	0,000336981	2346501	730	20
21	2448859	269	2161666	944	2011771	694	21
22	2109590	230	1824722	907	1677077	657	22
23	1770360	191	1487815	869	1342420	619	23
24	1431169	153	1150946	831	1007801	584	24
25	1092016	110	0814115	791	0673217	545	25
26	0752905	073	0477324	754	0338672	510	26
27	0413833	034	0140570	715	0004162	473	27
28	0074799	0,000338995	0,799803855	678	0,779669689	437	28
29	0,819735804	955	9467177	641	9335252	398	29
30	9396849	916	9130537	603	9000854	362	30
31	9057933	877	8793934	564	8666492	325	31
32	8719056	837	8457370	527	8332167	290	32
33	8380219	798	8120843	487	7997877	251	33
34	8041421	758	7784356	450	7663626	216	34
35	7702663	719	7447906	414	7329410	179	35
36	7363944	681	7111492	374	6995231	142	36
37	7025263	642	6775118	337	6661089	105	37
38	6686621	604	6438781	300	6326984	069	38
39	6348017	564	6102481	261	5992915	033	39
40	6009453	525	5766220	223	5658882	0,000333995	40
41	5670928	486	5429997	186	5324887	960	41
42	5332442	447	5093811	149	4990927	924	42
43	4993995	419	4757662	110	4657003	887	43
44	4655586	368	4421552	074	4323116	851	44
45	4317218	330	4085478	035	3989265	813	45
46	3978888	293	3749443	0,000335997	3655452	777	46
47	3640595	254	3413446	960	3321675	741	47
48	3302341	213	3077486	922	2987934	705	48
49	2964128	175	2741564	884	2654229	668	49
50	2625955	136	2405680	846	2320561	632	50
51	2287819	099	2069834	810	1986929	595	51
52	1949720	059	1734024	773	1653334	560	52
53	1611661	019	1398251	735	1319774	523	53
54	1273642	0,000337981	1062516	697	0986251	487	54
55	0935661	944	0726819	660	0652764	451	55
56	0597717	904	0391159	622	0319313	414	56
57	0259813	865	0055537	585	0,769985899	379	57
58	0,809921948	826	0,789719952	547	9652520	343	58
59	9584122	788	9384405	511	9319177	305	59
60	9246334		9048894		8985872		60

Min.	48°		49°		50°		Min.
	$\frac{D}{a}$	Diff.	$\frac{D}{a}$	Diff.	$\frac{D}{a}$	Diff.	
0	0,768985872	0,000333270	0,749052917	0,000331138	0,729245771	0,000329076	0
1	8652602	233	8721779	104	8916695	043	1
2	8319369	198	8390675	068	8587652	010	2
3	7986171	161	8059607	033	8258642	0,000328976	3
4	7653010	126	7728574	0,000330999	7929666	943	4
5	7319884	089	7397575	963	7600723	908	5
6	6986795	054	7066612	929	7271815	874	6
7	6653741	018	6735683	896	6942941	840	7
8	6320723	0,000332981	6404787	859	6614101	807	8
9	5987742	946	6073928	825	6285294	774	9
10	5654796	909	5743103	790	5956520	741	10
11	5321887	874	5412313	756	5627779	707	11
12	4989013	837	5081557	720	5299072	673	12
13	4656176	802	4750837	685	4970399	639	13
14	4323374	767	4420152	652	4641760	606	14
15	3990607	729	4089500	616	4313154	572	15
16	3657878	695	3758884	582	3984582	538	16
17	3325183	661	3428302	548	3656044	505	17
18	2992522	623	3097754	513	3327539	472	18
19	2659899	586	2767241	478	2999067	439	19
20	2327313	551	2436763	443	2670628	404	20
21	1994762	516	2106320	410	2342224	371	21
22	1662246	480	1775910	374	2013853	338	22
23	1329766	445	1445536	340	1685515	306	23
24	0997321	409	1115196	305	1357209	273	24
25	0664912	373	0784891	272	1028936	239	25
26	0332540	337	0454619	237	0700697	204	26
27	0000203	303	0124382	202	0372493	171	27
28	0,759667900	265	0,739794180	167	0044322	138	28
29	9335635	231	9464013	134	0,719716184	106	29
30	9003404	195	9133879	099	9388078	073	30
31	8671209	160	8803780	065	9060005	039	31
32	8339049	124	8473715	030	8731966	005	32
33	8006925	089	8143685	0,000329996	8403961	0,000327973	33
34	7674836	053	7813689	961	8075988	939	34
35	7342783	018	7483728	927	7748049	906	35
36	7010765	0,000331984	7153801	893	7420143	873	36
37	6678781	947	6823908	859	7092270	840	37
38	6346834	911	6494049	825	6764430	807	38
39	6014923	876	6164224	791	6436623	773	39
40	5683047	841	5834433	756	6108850	740	40
41	5351206	806	5504677	722	5781110	708	41
42	5019400	769	5174955	688	5453402	675	42
43	4687631	735	4845267	654	5125727	643	43
44	4355896	700	4515613	619	4798084	608	44
45	4024196	664	4185994	587	4470476	575	45
46	3692532	629	3856407	553	4142901	543	46
47	3360903	595	3526854	518	3815358	511	47
48	3029308	559	3197336	483	3487847	479	48
49	2697749	524	2867853	449	3160368	445	49
50	2366225	489	2538404	416	2832923	410	50
51	2034736	453	2208988	382	2505513	378	51
52	1703283	418	1879606	347	2178135	346	52
53	1371865	383	1550259	314	1850789	313	53
54	1040482	348	1220945	280	1523476	281	54
55	0709134	314	0891665	246	1196195	247	55
56	0377820	278	0562419	213	0868948	215	56
57	0046542	244	0233206	179	0541733	183	57
58	0,749715298	208	0,729904027	145	0214550	149	58
59	9384090	173	9574882	111	0,709887401	116	59
60	9052917		9245771		9560285		60