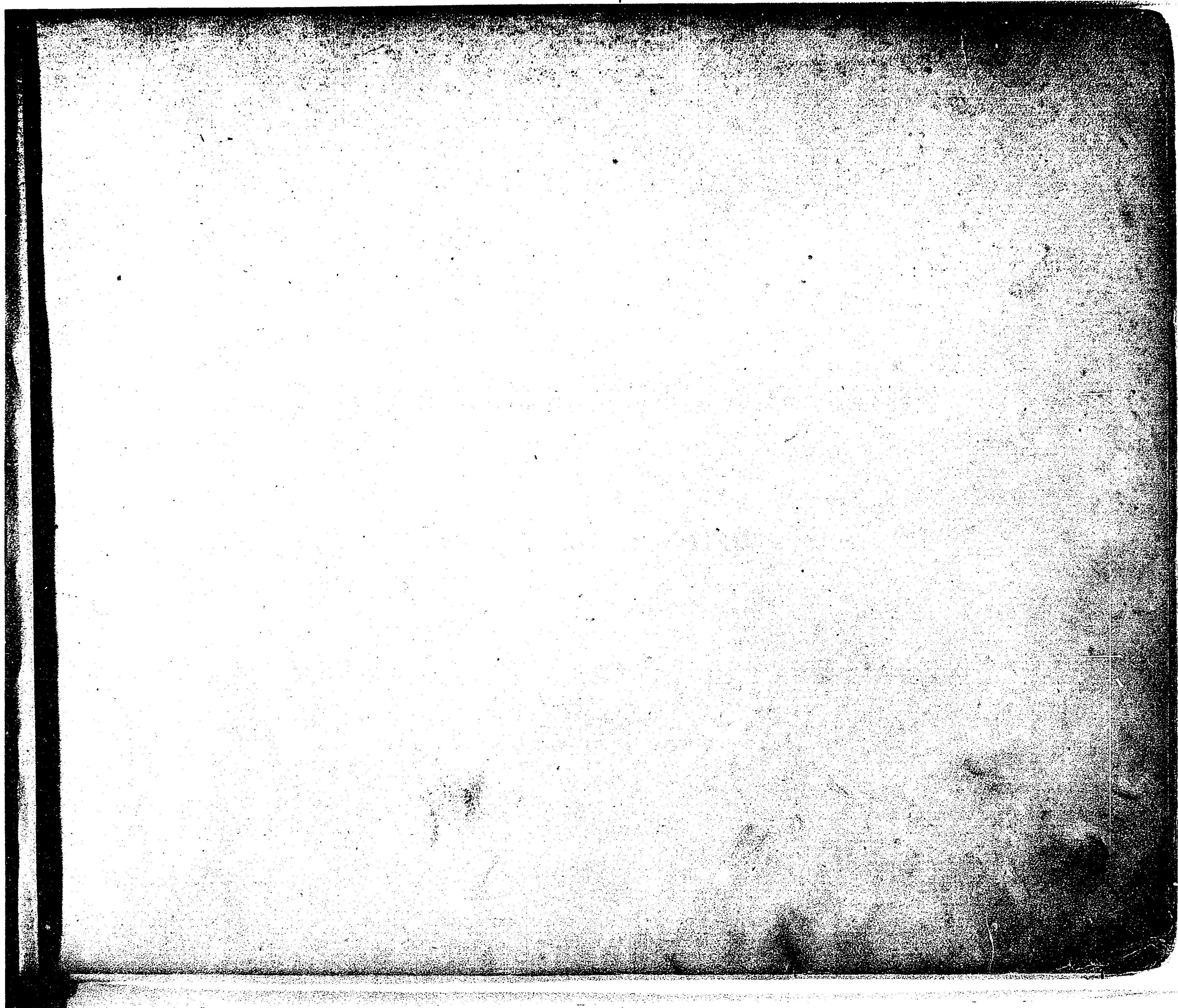


佛 英 日本

度量比較表

借					
東京圖書館					
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東京開成學校





TABLES

OF

COMPARISONS OF JAPANESE, ENGLISH & FRENCH MEASURES

AND OF

USEFUL PROPERTIES OF MATERIALS

COMPILED FOR THE

ENGINEERING CLASSES OF KAISEI-GAKKO.

BY PROF. R. H. SMITH.

1876.

明治九年四月廿五日
東京大学
工学部
図書
交付

TABLE OF MULTIPLIERS, AND THEIR LOGS. FOR THE MUTUAL CONVERSION OF JAPANESE,
FRENCH AND ENGLISH,
LINEAR MEASURES.

FRENCH.	ENGLISH.				JAPANESE.				
		In.s	Ft.	Yrds.	Mls.	Shaku.	Ken.	Cho.	Ri.
1 metre.	No	39.3708	3.28091	1.09364	.00062139	3.300	.5500	.0091666	.00025463
	Log.	1.595175	0.515994	0.038872	4.793360	0.518514	1.740363	3.962211	4.405909

ENGLISH.	FRENCH.		JAPANESE.			
		Metres.	Shaku.	Ken.	Cho.	Ri.
1 inch.	No	0.253995	.083818	.013970	.000023283	.0000064674
	Log.	2.4048252	2.923339	2.145188	4.367037	6.810734
1 foot.	No	0.304794	1.00582	.167637	.0027939	.000077609
	Log.	1.4840064	0.002520	1.224369	3.446218	5.889915
1 yard.	No	.914382	3.01746	.50291	.0088818	.00023282
	Log.	1.9611277	0.479641	1.701490	3.923339	4.367036
1 mile.	No	1609.305	5310.73	885.122	14.752	.409778
	Log.	3.2066404	3.725154	2.947003	1.168852	1.612549

JAPANESE.	FRENCH.		ENGLISH.			
		Metres.	In.s	Ft.	Yrds.	Mls.
1 shaku. 尺	No	.30303	11.9306	.994214	.331405	.000188298
	Log.	1.4814861	1.076661	1.997480	1.520359	4.274846
1 ken. 間	No	1.81818	71.5834	5.96521	1.98843	.00112979
	Log.	0.2596374	1.854812	9.775631	0.298510	3.052997
1 cho. 町	No	199.091	4295.	357.917	119.306	.067783
	Log.	2.0377887	3.632963	2.553782	2.076561	2.831148
1 ri. 里	No	3927.27	154620.	12885.	4295.01	2.44034
	Log.	3.5940912	5.189266	4.110085	3.632964	0.387451

TABLE OF MULTIPLIERS AND THEIR LOGS. FOR THE MUTUAL CONVERSION OF JAPANESE
FRENCH, AND ENGLISH,
SUPERFICIAL MEASURES.

FRENCH.	ENGLISH.					JAPANESE.					
	Sq. ins.	Sq. ft.	Sq. yards.	Acres.	Sq. mls.	Sq. shaku.	Tsubo or Bu.	Se.	Tan.	Cho.	
1 sq. metre.	No	1550.07	10.7643	1.19603	0.00024711	.0000003861	10.8900	.3025	.010083	.0010083	.00010083
	Log.	3.190350	1.031988	0.077744	4.392900	7.586720	1.037028	1.480736	2.003604	3.003604	4.003604

ENGLISH.	FRENCH.		JAPANESE.				
	Sq. metres.	Sq. shaku.	Tsubo or bu.	Se.	Tan.	Cho.	
1 sq. inch.	No	.000645134	.0070255	.000195153	.000065051	.00000065051	.00000006505
	Log.	4.809650	3.846678	4.290376	6.8132547	7.8132547	8.8132547
1 sq. foot.	No	.0928992	1.01167	.028102	.0009367	.00009367	.000009367
	Log.	2.968012	0.005040	2.448738	4.9716167	5.9716167	6.9716167
1 sq. yard.	No	.836094	9.10504	.252918	.0084306	.00084306	.000084306
	Log.	1.922255	0.959282	1.402980	3.9258587	4.9258587	5.9258587
1 acre.	No	4046.69	44068.4	1224.12	40.804	4.0804	0.40804
	Log.	3.607100	4.644127	3.087825	1.6107037	0.6107037	1.6107037
1 sq. mile.	No	2589880.	28203900.	783440.5	26114.7	2611.47	261.14
	Log.	6.413280	7.450308	5.894006	4.4168847	3.4168847	2.4168847

JAPANESE.	FRENCH.		ENGLISH.				
	Sq. metres.	Sq. ins.	Sq. ft.	Sq. yards.	Acres.	Sq. miles.	
1 sq. shaku. 尺	No	.0918273	142.338	.988462	.109829	.000022692	.000000035456
	Log.	2.962972	2.153322	1.994960	1.040718	5.355873	8.549692
1 tsubo or bu. 步	No	3.3058	5124.2	35.5846	3.9539	.00081691	.0000012764
	Log.	0.519274	3.709624	1.551262	0.597020	4.912175	6.105994
1 se. 畝	No	99.1740	153725	1067.54	118.615	.024507	.00003829
	Log.	1.996396	5.1867453	3.0283833	2.0741413	2.2892963	5.5831153
1 tan. 反	No	991.740	1537250.	10675.4	1186.15	.24507	.0003829
	Log.	2.996396	6.1867453	4.0283833	3.0741413	1.3892963	4.5831153
1 cho. 町	No	9917.40	15372503.	106754.0	11861.5	2.4507	.003829
	Log.	3.996396	7.1867453	5.0283833	4.0741413	0.3892963	3.5831153

TABLE OF MULTIPLIERS AND THEIR LOGS FOR THE MUTUAL CONVERSION OF JAPANESE,
FRENCH AND ENGLISH,
SOLID MEASURES.

FRENCH		ENGLISH			JAPANESE	
		Cub. inches	Cub. feet.	Cub. yards.	Cub. shaku	Cub. ken
1 cub. metre	No.	61027.4	35.3168	1.22072	35.937	.166375
	Log.	4.785525	1.547982	0.086616	1.555542	1.221089

ENGLISH		FRENCH	JAPANESE	
		Cub. metres	Cub. shaku	Cub. ken
1 cub. inch	No.	.0000163861	.000588867	.00000272624
	Log.	5.214475	4.770017	6.435564
1 cub. foot	No.	0.283151	1.01756	0.00471093
	Log.	2.452019	4.007560	3.673107
1 cub yard	No.	.76451	.274741	.127195
	Log.	1.883383	1.438923	1.104470

JAPANESE		FRENCH	ENGLISH		
		Cub. metres	Cub. inches	Cub. feet	Cub. yards.
1 cub. shaku 方一尺立	No.	.0278265	1698.175	.982743	.036398
	Log.	2.444458	3.229983	1.992440	2.561077
1 cub. ken 方六尺立	No.	6.01052	366805.5	212.272	7.861945
	Log.	0.778912	5.564436	2.326893	0.895530

TABLE OF MULTIPLIERS AND THEIR LOGS. FOR THE MUTUAL CONVERSION OF JAPANESE,
FRENCH AND ENGLISH,
WEIGHTS.

ENGLISH AVOIRDUPOIS.		FRENCH.		JAPANESE.		
		Kilogrammes.	Momme.	Kuam-mé.	Kin.	
1 oz.	No	0.02835003	7.5599	0.0075599	0.0472494	
	Log.	$\overline{2.452553}$	0.878522	$\overline{3.878522}$	$\overline{2.674402}$	
1 lb.	No	0.4536005	120.96	0.12096	0.755990	
	Log.	$\overline{1.656673}$	2.082642	$\overline{1.082642}$	$\overline{1.878522}$	
1 cwt.	No	50.80325	13547.	13.547	84.6725	
	Log.	1.705892	4.131861	1.131861	1.927741	
1 ton.	No	1016.065	270947.0	270.947	1693.45	
	Log.	3.006922	5.432891	3.432891	3.228771	

FRENCH.		AVOIRDUPOIS ENGLISH.				JAPANESE.		
		Oz.	lb	Cwt.	Ton.	Momme.	Kuamme.	Kin.
1 kilo.	No	35.27335	2.2046	0.019683	0.0009842	266.66	0.26666	1.6666
	Log.	1.547446	$\overline{0.3433265}$	$\overline{2.294108}$	$\overline{4.993078}$	2.425969	$\overline{1.425969}$	$\overline{0.221849}$

JAPANESE.		FRENCH.		AVOIRDUPOIS ENGLISH.			
		Kilo's.					
		Ozs.	lbs.	Cwt.	Tons.		
1 momme.	No	0.003750	0.132277	0.0082672	0.0000738	0.0000036908	
	Log.	$\overline{3.574031}$	$\overline{1.121478}$	$\overline{3.917358}$	$\overline{5.868139}$	$\overline{6.567109}$	
1 kuamme.	No	3.75000	132.277	8.2672	0.0738	0.0036908	
	Log.	$\overline{0.574031}$	$\overline{2.121478}$	$\overline{0.917358}$	$\overline{2.868139}$	$\overline{3.567109}$	
1 kin.	No	0.60000	21.1643	1.322770	0.0118104	0.00059052	
	Log.	$\overline{1.778151}$	$\overline{1.325598}$	$\overline{0.121478}$	$\overline{2.072259}$	$\overline{4.771229}$	

WEIGHT OF PLATES.

FRENCH.	ENGLISH.		JAPANESE.
	lbs per sq. ft. per in. thick.	Cwt. per sq. ft. per in. thick.	Kuwamme per sq. shaku. per sun thick.
1 kilo per sq. m. per m.m. thick.	No	5.2019	0.046446
	Log.	.716163	2.666945
			0.74204
			1.870427

ENGLISH.	FRENCH.		JAPANESE.
	Kilos per sq. m. per mm. thick.		Kuwamme per sq. shaku per sun thick.
1 lb per sq. ft. per in. thick.	No	0.19224	0.14364
	Log.	1.283837	1.154264
1 cwt. per sq. ft. per in. thick.	No	21.53044	15.9765
	Log.	1.333055	1.203482

JAPANESE.	FRENCH.	ENGLISH.	
	Kilos per sq. m. per mm. thick.	lbs per sq. ft. per in. thick.	Cwt. per sq. ft. per in. thick.
1 kuwamme per sq. shaku per sun thick.	No	1.34764	7.01029
	Log.	0.129573	0.845736
			.06959
			2.796518

WEIGHT OF BARS.

FRENCH.	ENGLISH.		JAPANESE.
	lbs per ft. length.		Kuwamme per shaku length.
1 kilo per m. length.	No	0.67194	0.080808
	Log.	1.827332	2.907455

ENGLISH.	FRENCH.		JAPANESE.
	Kilos per m. length.		Kuwamme per shaku length.
1 lb per ft. length.	No	1.48823	.12026
	Log.	0.172668	1.080123

JAPANESE.	FRENCH.	ENGLISH.	
	Kilos per m. length.	lbs per ft. length.	
1 kuwamme per shaku length.	No	.12375	8.31530
	Log.	1.092545	0.919877

TABLE OF MULTIPLIERS, AND THEIR LOGS. FOR THE MUTUAL CONVERSION OF JAPANESE,
FRENCH AND ENGLISH,
INTENSITIES OF PRESSURE.

FRENCH.		ENGLISH.			JAPANESE.	
		lbs. per sq. in.	Cwt. per sq. in.	Tons per sq. in.	Kuwamme per sq. in.	Kin. per sq. sun.
1 kilo per sq. mm.	No	1422.25	12.6987	0.634933	244.87	1530.4
	Log.	3.152976	1.103758	1.802728	2.388941	3.184821

ENGLISH.		FRENCH.	JAPANESE.	
		Kilo per sq. mm.	Kuwamme per sq. sun.	Kin per sq. sun.
1 lb per sq. in.	No	.00070311	0.17217	1.07605
	Log.	4.847023	1.235964	0.031844
1 cwt. per sq. in.	No	.0787484	19.283	120.52
	Log.	2.896242	1.285183	2.081063
1 ton per sq. in.	No	1.57497	385.67	2410.4
	Log.	0.197272	2.586213	3.382093

JAPANESE.		FRENCH.	ENGLISH.		
		Kilo per sq. in.	lbs per sq. ins.	Cwt. per sq. in.	Ton per sq. in.
1 kuwamme per sq. sun.	No	.0040838	5.8081	.051858	.0025929
	Log.	3.611059	0.764036	2.714817	3.413787
1 kin per sq. sun.	No	.0006534	0.9293	.0082973	.00041486
	Log.	4.815179	1.968156	3.918937	4.617907

DENSITIES OR WEIGHTS PER UNIT OF VOLUME.

FRENCH.	ENGLISH.		JAPANESE.
	lbs. per cub. in.		Kuwamme per cub. sun.
1 kilo per cub. m.	No	.000036125	.00000742
	Log.	$\bar{5}.557801$	$\bar{6}.870421$

ENGLISH.	FRENCH.		JAPANESE.
	Kilo per cub. m.		Kuwamme per cub. sun.
1 lb per cub. in.	No	27682	0.20541
	Log.	4.442199	$\bar{1}.312625$

JAPANESE.	FRENCH.		ENGLISH.
	Kilo per cub. m.		lbs per cub. in.
1 kuwamme per cub. sun.	No	134765.	4.8683
	Log.	5.129579	0.687375

RARETIES OR VOLUMES PER UNIT OF WEIGHT.

FRENCH.	ENGLISH.		JAPANESE.
	Cub. in. per lb.		Cub. sun per kuwamme.
1 cub. m. per Kilo.	No	27682	134765.
	Log.	4.442199	5.129579

ENGLISH.	FRENCH.		JAPANESE.
	Cub. m. per kilo.		Cub. sun per kuwamme.
1 cub. in. per lb.	No	.000036125	4.8683
	Log.	$\bar{5}.557801$	0.687375

JAPANESE.	FRENCH.		ENGLISH.
	Cub. m. per kilo.		Cub. in. per lb.
1 cub. sun per kuwamme.	No	0.00000742	0.20541
	Log.	$\bar{6}.870421$	$\bar{1}.312625$

Note.—1 Japanese Thermal Unit = Heat required to raise 1 kuwamme 1°C.

QUANTITIES OF ENERGY.

FRENCH.	ENGLISH.		JAPANESE.
	ft. lbs.		Shaku-kuwamme.
1 Kilo-grammetre.	No	7.23303	0.8800
	Log.	0.859320	1.944483

QUANTITIES OF HEAT ENERGY.

FRENCH.	ENGLISH.		JAPANESE.
	English Thermal units.		Japanese Thermal units.
1 French Thermal unit = 424 Kilo-grammetre.	No	3.9683	.26666
	Log.	.598599	1.425969

RATES OF DOING WORK.

FRENCH.	ENGLISH.		JAPANESE.
	English Horse-power.		Japanese Horse-power.
1 French Horse-power = 4500 Kilo-grammetre per min.	No	0.986323	0.99000
	Log.	1.994019	1.995634

ENGLISH.	FRENCH.		JAPANESE.
	Kilo-grammetre.		Shaku-kuwamme.
1 foot lb.	No	0.138254	0.121664
	Log.	1.140679	1.085162

ENGLISH.	FRENCH.		JAPANESE.
	French Thermal units.		Japanese Thermal units.
1 English Thermal unit = 772 ft. lbs.	No	.251996	.067199
	Log.	1.401393	2.827362

ENGLISH.	FRENCH.		JAPANESE.
	French Horse-power.		Japanese Horse-power.
1 English Horse-power = 33,000 ft. lbs. per min.	No	1.01620	1.003725
	Log.	0.005981	0.001615

JAPANESE.	FRENCH.		ENGLISH.
	Kilo-grammetre.		Feet lbs.
1 Shaku-kuwamme.	No	1.13639	8.21938
	Log.	0.055517	.914838

JAPANESE.	FRENCH.		ENGLISH.
	French Thermal units.		English Thermal units.
1 Japanese Thermal unit = 1399.2 shaku-kuwamme.	No	3.75	14.8812
	Log.	0.574031	1.172638

JAPANESE.	FRENCH.		ENGLISH.
	French Horse-power.		English Horse-power.
1 Japanese Horse-power = 4000 shaku-kuwamme per min.	No	1.01012	.99629
	Log.	.004366	1.998385

NAME.	W. I.	C. I.	STEEL.	COPPER.				BRASS.			LEAD.	TIN.	ZINC.					
Melting points	Fahr.	> 4000	2780	4000	1990				1830	617	442	773						
	Cent.	> 2200	1530	2200	1090				1000	325	228	412						
Linear expansion per 1° Temp.	Fahr.	.000006	.000006	.000006	.00001				.000011	.000016	.000012	.000016						
	Cent.	.000011	.000011	.000011	.000018				.00002	.000029	.000021	.000029						
Spec. Grav.					Bolts.	Cast.	Sheet.	Wire.	Cast.	Sheet.	Wire.	Cast.	Cast.					
		7.6	7.78	7.8	7	7.23	7.6	8	8.85	8.6	8.8	8.9	8.4	8.44	8.54	11.36	11.4	7.29
Weight per c. ft. in lbs.		485.6	451.0	499	552	537	548	555	524	527	533	708.5	711.6	455	437			
" " " in. " "		.28	2.6	2.88	.318	.31	.316	.32	.3	.301	.307	.408	.41	262.	.252			
Vol. in. c. in. per lb.		3.571	3.846	3.472	3.145	3.226	3.165	3.125	3.333	3.322	3.257	2.451	24.39	3.817	3.969			
Thermal Capacity.	per lb. { ft. lb.	94.2	98.0	94.2	78.4				72.5	24.24	42.5	78.7						
	per 1°F { H. units.	.122	.127	.122	.1015				.094	.0314	0.55	.102						
	per kilo. { kgr. m.	51.8	54.0	51.8	43.1				39.9	13.33	23.3	43.2						
	per 1°C. { H. units.	.122	.127	.122	.1015				.094	.0314	.055	.102						
	per c. { ft. lbs.	26.4	25.48	26.4	24.77				21.9185	9.91416	11.1350	19.8224						
	inch. { H. units.	.0342	.03302	.0342	.03207				.028444	.0128416	.014410	8.0274						
	per c. { kgr. m.	402400	390000	402400	379280.0				337554.	151695.4	169857	302400						
	mtr. { H. units.	949	918	949.0	893.20				789.24	357.532	400.95	714.						
Thermal Expansion.	Stress produced by	For lbs, per sq. in. & Fahr Temp.	Plate.	Bar.		Plate.	Bar.	Hammerd plate.	Cast.									
			150	174	102	150	210	150	100									
	For kilogr. per mm. & Cent. Temp.		.193	.22	.132	.192	.27	.18	.128									

TABLE OF THE STRENGTHS OF IRON, STEEL, &C.

		JAPANESE.							
		Kuwamme per sq. Sun.							
NAME.		TENACITY.			CRUSHING STRENGTH.		SHEARING STRENGTH.		
		<i>f</i> Ultimate.	<i>f'</i> At Limit of Elas.	<i>E</i> Modulus of Elas.	<i>k</i> Ultimate.	<i>k'</i> At Limit of Elas.	<i>g</i> Ultimate.	<i>g'</i> At Limit of Elas.	<i>G</i> Modulus of Elas.
Cast Iron Gusseisen Fonte	No.	2816.03	1714.1	2938470	17141.	3428.2	4897.4	1469.2	685643
	Log.	3.4496377	3.2340379	6.4681211	4.2340379	3.5350679	3.6899699	3.1670912	5.8360979
Plate Iron Blecheisen Tôle	No.	7591	3428.2	4285266.7	6856.4	2938.47	7346.2	2693.6	1542690
	Log.	3.8803016	3.5350679	6.6319779	3.8360979	3.4681211	3.8660612	3.4303326	6.1882804
Bar Iron Stabeisen Fer en barres	No.	8570.5	3917.96	4897450	7835.9	3428.2	8570.5	2693.6	1714100
	Log.	3.9330079	3.5930599	6.6899699	3.8940899	3.5350679	3.9330079	3.4303326	6.2340379
Wire & wire rope Eisend raht Til de Fer	No.	15919	5876.9	4285267 6.6319779					
	Log.	4.2019201	3.7691511	2571160 6.4101292					
Steel Plate Blech Stahl Tôle d'acier	No.	15427	7346.2	4285267	34282		11019.2	4897.4	2448725
	Log.	4.1882804	3.8660612	6.6319779	4.5350679		4.0421527	3.6899699	6.3889399
Steel Bar Cement Stahl Acier poule	No.	18855.2	7346.2	5999370	61218		11019.2	4897.4	2448725
	Log.	4.2754306	3.8660612	6.7781060	4.7868799		4.0421527	3.6999699	6.3889399
Cast Steel Guss-stahl Acier Fondu	No.	22283.4	13712.8	6856430			17141	9794.9	2938470
	Log.	4.3479813	4.1371279	6.8360979			4.2340379	3.990999	6.4681211
Copper } Cast Kupfer } Hamd. Plate	No.	3183.34							
	Log.	3.5028833							
Bolts	No.	5142.4	3428.2	2448725	9794.9	3428.2		2448.725	979490
	Log.	3.7111592	3.535069	6.3889399	3.990999	3.535069		3.000000	3.99099
Wire.	No.	6121.8					3526.2		
	Log.	3.7868799					3.5473024		
Gun-metal Kanonen-metal Bronz	No.	10284.6	2938.47	2938470					
	Log.	4.0121892	3.4681211	6.4681211					
Brass } Cast. Messing } Sheet. Laiton } Wire.	No.	6121.8	1714.1	1714100				808.08	636670
	Log.	3.7868799	3.2340379	6.2340379				2.9074538	5.8039132
Cast.	No.	3085.4	1199.87	1567183.6	1714.1			881.54	3085400
	Log.	3.4893106	3.0791360	6.1951199	3.2340379			2.9452424	6.2340379
Sheet.	No.	5387.7							
	Log.	3.7313626							
Wire.	No.	8570.5	3256.9	241681.1					
	Log.	3.9330079	3.5127915	5.383257					

TABLE OF THE STRENGTHS OF IRON, STEEL & C.

NAME.		ENGLISH.							
		lbs per sq. inches.							
		SHEARING STRENGTH.			CRUSHING STRENGTH.		TENACITY.		
	<i>G</i>	<i>g'</i>	<i>g</i>	<i>k'</i>	<i>k</i>	<i>E</i>	<i>f'</i>	<i>f</i>	
	Modulus of Elas.	At Limit of Elas.	Ultimate.	At Limit of Elas.	Ultimate.	Modulus of Elas.	At Limit of Elas.	Ultimate.	
Cast Iron Guss-eisen Fonte	No.	4,000,000	8,500	29,000	20,000	100,000	17,000,000	10,000	16,500
	Log.	6.6020600	3.9294189	4.4623980	4.301300	5.000000	7.2304489	4.000000	4.2174839
Plate Iron Blech-eisen Tôle	No.	9,000,000	16,000	43,000	17,000	40,000	25,000,000	20,000	45,000
	Log.	6.9542425	4.2041200	4.6334685	4.2304489	4.6020600	7.3979400	4.3010300	4.6532125
Bar Iron Stabeisen Fer en barres	No.	10,000,000	16,000	50,000	20,000	45,500	29,000,000	23,000	50,000
	Log.	7.000000	4.2041200	4.6989700	4.3010300	4.6580114	7.4623980	4.3617278	4.6989700
Wire & wire rope Eisendraht Fil de Fer	No.						25,000,000	34,000	92,500
	Log.						7.3979400		
Steel plate Blech Stahl Tôle d'acier	No.	14,500,000	29,000	64,000		200,000	25,000,000	43,000	90,500
	Log.	7.1613680	4.4623980	4.8061800		5.3010300	7.3979400	4.6334685	4.9566486
Steel Bar Cement Stahl Acier poule	No.	14,500,000	29,000	64,000		355,000	35,000,000	43,000	110,000
	Log.	7.1613680	4.4623980	4.8061800		5.5502284	7.5440680	4.6334685	5.0413927
Cast steel Guss-stahl Acier Fondu	No.	17,000,000	57,000	100,000			40,000,000	80,000	130,000
	Log.	7.2304489	4.7558749	5.000000			6.6020600	4.9030900	5.1139434
Copper } Cast Kupfer } Hamd. Cuivre } Plate	No.								19,000
	Log.								4.2787536
Copper } Plate Kupfer } Bolts Cuivre } Wire	No.	5,700,000	15,000		20,000	57,000	15,000,000	20,000	30,000
	Log.	6.7558749	4.1760913		4.3010300	4.7558749	7.1760913	4.3010300	4.4771213
Copper } Wire Cuivre } Wire	No.			20,500					36,000
	Log.			4.3117539					4.5563025
Gun-metal Kanonen-metal Bronz	No.	3,700,000	4,700				17,000,000	17,000	60,000
	Log.	6.5682017	3.6720979				7.2304489	4.2304489	4.7781513
Brass } Cast Messing } Sheet Laiton } Wire	No.	3,550,000	5,100			10,000	9,100,000	7,000	18,000
	Log.	6.5502284	3.7075702			4.000000	6.9590414	3.8450980	4.2552725
Brass } Sheet Messing } Wire Laiton } Wire	No.								31,000
	Log.								4.4913617
Brass } Wire Messing } Wire Laiton } Wire	No.						14,000,000	19,000	5,000
	Log.						7.1461280	4.2787536	4.6989700

TABLE OF THE STRENGTHS OF IRON, STEEL, &C.

NAME.		FRENCH.								
		Kilos per sq. mm.								
		TENACITY.			CRUSHING STRENGTH.			SHEARING STRENGTH		
		<i>f</i> Ultimate.	<i>f'</i> At Limit of Elas.	<i>E</i> Modulus of Elas.	<i>k</i> Ultimate.	<i>k'</i> At Limit of Elas.	<i>g</i> Ultimate.	<i>g'</i> At Limit of Elas.	<i>G</i> Modulus of Elas.	
Cast Iron Guss-eisen Fonte	No.	11,5	7	12,000	70	14	20	6	2,800	
	Log.	1.0606978	0.8450980	4.07918181	1.8450980	1.1461280	1.3010300	0.7781513	3.4471580	
Plate Iron Blech-eisen Tôle	No.	31	14	17,500	28	12	30	11	6,300	
	Log.	1.4913617	1.1461280	4.2430380	1.4471580	1.0791812	1.4771213	1.0413927	3.7993405	
Bar Iron Stabeisen Fer en barres	No.	35	16	2,0000	32	14	35	11	7,000	
	Log.	1.5440680	1.2041200	4.3010300	1.5051500	2.1461280	1.5440680	1.0413927	3.8450980	
Wire & wire rope Eisend raht Fil de Fer	No.	65	24	17,500 4.2430380						
	Log.	1.8129802	1.3802112	10500 4.0211893						
Steel plate Blech Stahl Tôle d'acier	No.	63	30	17,500	140		45	20	1,0000	
	Log.	1.7993405	1.4771213	4.2430380	2.1461280		1.6532125	1.3010300		
Steel Bar Cement Stahl Acier poule	No.	77	30	24,500	250		45	20	10,000	
	Log.	1.8864907	1.4771213	4.3891661	2.3979400		1.6532125	1.3010300		
Cast steel Guss-stahl Acier Fondu	No.	91	56	28,000			70	40	12,000	
	Log.	1.9590414	1.7481880	4.4471580			1.8450980	1.6020600	4.0791812	
Copper } Cast	No.	13								
	Log.	1.1139434								
Kupfer } Hamd. Plate	No.	21	14	10,000	40	14		10	4,0000	
	Log.	1.3222193	1.1461280	4.000000	1.6020600	1.1461280	14.4	1.000000	1.6020600	
Cuivre } Bolts	No.	25								
	Log.	1.3979400					1.1583625			
Wire	No.	42	12	12,000						
	Log.	1.6232493	1.0791812	4.0791812						
Gun-metal Kanonen-metal Bronz	No.	25	7	7,000				3.3	2,600	
	Log.	1.3979400	0.8450980	7.8450980				0.5185139	3.4149733	
Brass } Cast	No.	12.6	4.9	6,400	7			3.6	2,500	
	Log.	1.1003707	0.6901961	3.8061800	0.8450980			0.5563025	3.3979400	
Messing } Sheet	No.	22								
	Log.	1.3424227								
Laiton } Wire	No.	35	13.3	9,870						
	Log.	1.5440680	1.1238516	3.9943172						

STRENGTH AND WEIGHT OF TIMBER.

JAPANESE.				
Kuwamme on sq. Sun.				
Names of	Tenacity across the Fible of wood is in pine-wood from $\frac{1}{10}$ to $\frac{1}{20}$ the Tenacity in direction of Fible. in Leaf-wood from $\frac{1}{6}$ to $\frac{1}{4}$. Tenacity in direction of Fible.	Crushing Strength in direction of Fible. <i>and Crushing Strength in accross the Fible.</i> <i>(much less than in other direction)</i>	Shearing Strength on Longitudinal Planes. <i>(This is usually from $\frac{1}{12}$ to $\frac{1}{8}$ the Tenacity)</i> <i>and on Transverse Planes.</i> <i>(This is about $\frac{2}{3}$ Tenacitu.)</i>	Weight varies much with the degree of dryness, wood loses $\frac{1}{6}$ to $\frac{1}{2}$ its weight while

STRENGTH AND WEIGHT OF TIMBER.

ENGLISH.			
lbs. on Sq. inches.			
Names of the	Tenacity across the Fible of wood is in pine-wood from $\frac{1}{10}$ to $\frac{1}{20}$ the Tenacity in direction of Fible. in Leafwood from $\frac{1}{6}$ to $\frac{1}{4}$ the Tenacity in direction of Fible.	Crushing strength in direc. of Fible. <i>and Crushing strength in across the Fible.</i>	Shearing Strength on Longitudinal planes. (This is usually from $\frac{1}{12}$ to $\frac{1}{8}$ the Tenacity) <i>and on Transverse planes.</i>
			Weight varies much with the degree of dryness; wood lases $\frac{1}{6}$ to $\frac{1}{2}$ its weight

Names of the Woods.		in direction of Fibre. in Leafwood from $\frac{1}{8}$ to $\frac{1}{4}$ the Tenacity in direction of Fibre.				and Crushing strength in across the Fibre.				(This is usually from $\frac{1}{12}$ to $\frac{1}{8}$ the Tenacity) and on Transverse Planes. (This is about $\frac{1}{20}$ the Tenacity).				dryness, wood lases $\frac{1}{8}$ to $\frac{1}{4}$ its weight.	
		Ultimate.	Modulus of Elasticity.	Limit of Elasticity.	Ordinary Working Stress.	Ultimate.	Modulus of Elasticity.	Limit of Elasticity.	Ordinary Working Stress.	Ultimate.	Modulus of Elasticity.	Limit of Elasticity.	Ordinary Working Stress.	Weight of 1. Cu. ft. in lbs.	Weight of 1. Cu. in. in lbs.
Pine (silvestries). 松	No.	13,000	1,800,000	4,200	1,700	7000			600	500 900	62000 to 116,000	35 80	35	0.02	
	Log.	4.113943	6.255272	3.623249	3.230449	3.845098			2.778151	2.698970 2.954242	4.792392 5.064458	1.544068 1.903090	1.544068	2.301030	
Spruce fir (abies) 檜	No.	11,000	1,600,000	3,600	1,100	6000 3000			500 350	600	100,000	40 80	82	0.018	
	Log.	4.041393	6.204120	3.556303	3.041393	3.778151 3.477121			2.698970 2.544068	2.778151	5.000000	1.60206 1.903090	1.505150	2.255273	
Larch. 落葉松	No.	10,000	1,100,000	2,000	1,200	5000			500	1400		50 120	33	0.019	
	Log.	4.0000	6.041393	3.301030	3.079181	3.698970			2.698970	3.146128		1.698970 2.079181	1.518514	2.278754	
Ash. 秦皮	No.	17,000	1,600,000	3,500	2,500	9000 5000			1000	700 1400		60 140	45	0.026	
	Log.	4.230449	6.204120	3.544068	3.397940	3.954242 3.698970			3.000000	2.845098 3.146128		1.778151 2.146128	1.653213	2.414973	
Elm. 榆	No.	14,000	1,200,000	3,200	1,700	10 000			1,100	700 1400		60 140	36	0.021	
	Log.	4.146128	6.079181	3.505150	3.230449	4.000000			3.041393	2.845098 3.146128		1.778151 2.146128	1.556303	2.322219	
Beach. 山毛櫸	No.	11,000 to 22,000	1,350,000	2,300	2000 to 3000	9,300 5500			1150 700	940	170,000	80 160	43.5	0.025	
	Log.	4.041393 4.342423	6.130334	3.361728	3.301030 3.477121	3.968483 3.740363			3.060698 2.845098	2.973128	5.230449	1.90309 2.204120	1.638489	2.397940	
Oak. 櫟	No.	10,000 20,000	1,340,000	3,900	2,000 to 3,000	10,000 6,000			1300 900	1150 2,300	80,000 110,000	100 230	50	0.029	
	Log.	4.00000 4.301030	6.127105	3.591065	3.301030 3.477121	4.000000 3.778151			3.113943 2.954242	3.060698 3.361728	4.903090 5.041393	2.000000 2.361728	1.698970	2.462398	
Horn-beam.	No.	20,000				5,500			860				47	0.027	
	Log.	4.301030				3.740363			2.934498				1.672098	2.431364	
Teak.	No.	17,000	2,300,000			12,000			1,500				50	0.029	
	Log.	4.230449	6.361728			4.079181			3.176091				1.698970	2.462398	
Signum Vitae.	No.	11,800				10,000			1,400				83	0.048	
	Log.	4.071882				4.000000			3.146128				1.919078	2.681241	
Bamboo. 竹	No.	6,300											25	0.014	
	Log.	3.799340											1.397940	2.146128	

STRENGTH AND WEIGHT OF TIMBER.

FRENCH.				
Kilogramme on sq. m.m.				
Names of	Tenacity across the Fible of the wood is in Pine-wood from $\frac{1}{10}$ to $\frac{1}{20}$ the tenacity in direction of Fible. in Leaf-wood from $\frac{1}{6}$ to $\frac{1}{4}$ the tenacity of fible. <small>Tenacity in dirdetion of fible</small>	Crushing Strength in direction of Fible. <i>and crushing accross the Fible.</i> <i>(much lese than in other direction)</i>	Shearing Strength on Longitudinal planes, (This is usually from $\frac{1}{12}$ to $\frac{1}{8}$ the Tenacity) <i>and on Transverse Planes.</i> <i>(This is about $\frac{1}{20}$ Tenacity.)</i>	Weight varies much with the degree of dryness, wood loses $\frac{1}{6}$ to $\frac{1}{2}$ its weight while.

Names of the Woods.		Fine-wood from $\frac{1}{16}$ to $\frac{3}{16}$ the tenacity in direction of Fible. in Leaf-wood from $\frac{1}{8}$ to $\frac{1}{4}$ the tenacity of fible.				and crushing accross the Fible. (Much less than in other direction)				(This is usually from $\frac{1}{12}$ to $\frac{1}{8}$ the Tenacity) and on Transverse Planes. (This is about $\frac{1}{4}$ Tenacity)				Weight of 1 cub. m. in kilos.
		Ultimate.	Modulus of Elasticity.	Limit of Elasticity.	Ordinary Working Stress.	Ultimate.	Modulus of Elasticity.	Limit of Elasticity.	Ordinary Working Stress.	Ultimate.	Modulus of Elasticity.	Limit of Elasticity.	Ordinary Working Stress.	
Pine (silvestris) Kiefern Pin	No.	9.1	1260	2.95	1.2	4.9			.42	.35 .63	43.6 to 80		.024 .06	.56
	Log.	0.959041	3.100370	0.469822	0.079181	0.690196			1.623249	1.544068 1.79934	1.639486 1.903090		2.380211 2.778151	1.748188
Spruce fir (abies) Fichte Sapin	No.	7.7	1120	2.53	.77	4.2 2.1			.35 .24	.42	70		.028 .06	.51
	Log.	0.886491	3.049218	0.403121	1.886490	0.623249 0.322219			1.544068 1.380211	1.623249	1.845098		2.447158 2.778151	1.707570
Larch Lärche Mélèze	No.	7	770	1.4	.84	3.5			.35	.98			.035 .084	.53
	Log.	0.845098	2.886491	0.146128	1.924279	0.544068			1.544068	1.991226			2.544068 2.92427	1.724276
Ash Eschenholy Fiêne	No.	12	1120	2.46	1.7	6.3 3.5			.7	.5 .98			.04 0.1	.73
	Log.	1.079181	3.049218	0.390935	0.230448	0.799340 0.544068			1.845098	1.69897 1.991226			2.60206 1.00000	1.863323
Elm Ulme Orme	No.	9.8	840	2.25	1.2	7			.77	.5 .98			.04 .1	.58
	Log.	0.991226	2.924279	0.352182	0.079181	0.845098			1.886490	1.69897 1.991226			2.60206 1.	1.763428
Beach Buchenholy Hêtre	No.	7.7 to 15.5	920	1.62	1.4 to 2.1	6.5 3.8			.8 .49	.66	120		.06 .11	.7
	Log.	0.886491 1.190332	2.963788	0.209515	0.146128 0.322219	0.812913 0.579783			1.90309 1.690196	1.819543	2.079181		2.778223 1.041392	1.845098
Oak Eichenholy Chêne	No.	7 to 14	920	2.74	1.4 to 2.4	7 4.2			.9 .63	.8 1.6	56 77		.07 .16	.8
	Log.	0.845098 1.146128	2.963788	0.437751	0.146128 0.380211	0.845098 0.623249			1.954242 1.79934	1.90309 0.845098	1.748188 1.886490		2.845098 1.204120	1.903090
Horn-beam	No.	14				3.8			.6					.76
	Log.	1.146128				0.579783			1.778223					1.880814
Teak	No.	12	1620			8.4			1					.8
	Log.	1.079181	3.209515			0.924279			0.000000					1.903090
Lignum Vitae	No.	8				7			.98					1.3
	Log.	0.90309				0.849098			1.991226					0.113943
Bamboo	No.	4.43												.4
	Log.	0.646404												1.602060

varies much with the degree of dryness, wood loses $\frac{1}{6}$ to $\frac{1}{4}$ its weight with

TABLE OF EXTENSION AND COMPRESSION AT LIMIT OF ELASTICITY.

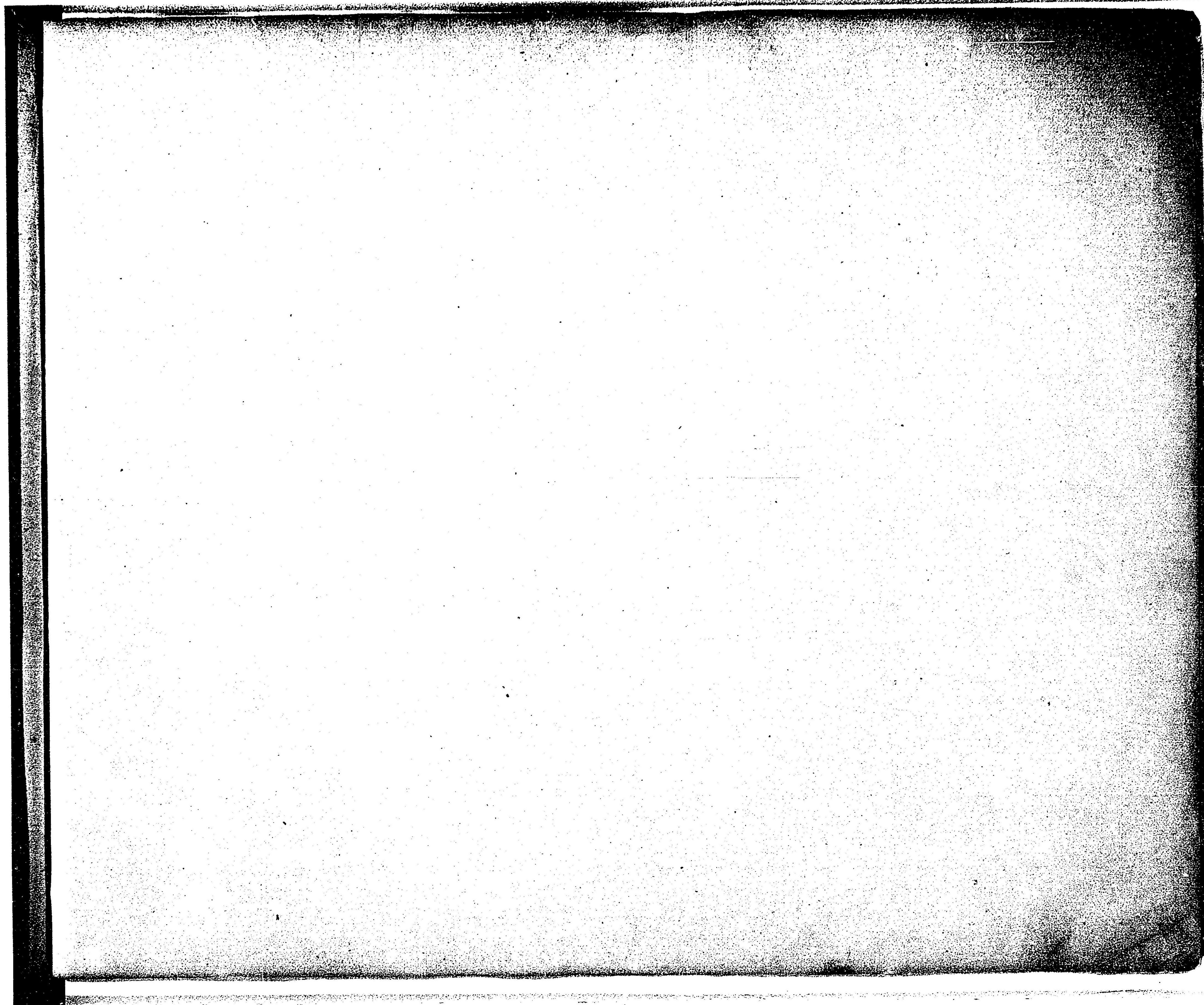
NAME.	$\frac{f'}{E}$	$\frac{k'}{E}$	$\frac{f}{E}$	$\frac{k}{E}$
Cast Iron.	.0006	.00117	.0096	.0058
Plate Iron.	.0008	.0007	.0017	.0016
Bar Iron.	.0008	.0007	.00175	.0016
Iron wire.	.0014		.0037	
Iron Rope.	.0023		.0062	
Steel Plate.	.0017		.003	.008
Steel Bar.	.0012		.00314	.0102
Cast Steel.	.002		.00325	
Copper Plate.	.0014	.0014	.0021	.004
Copper Wire.	.001		.0035	
Gun Metal.	.001		.0036	
Cast Brass.	.00076		.00197	.0011

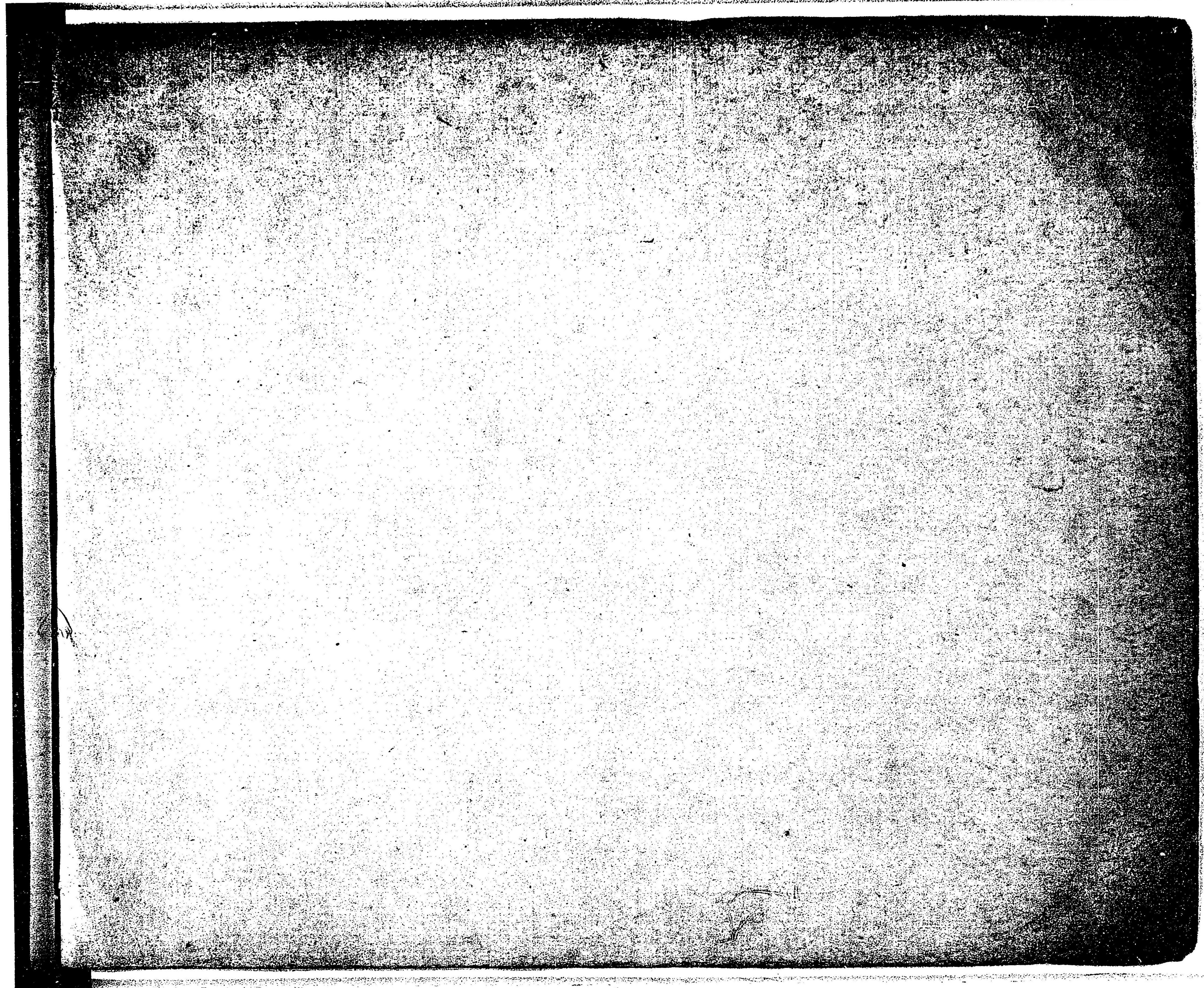
TABLE OF WORK DONE IN CRUSHING UNIT VOLUME OF MATERIALS.

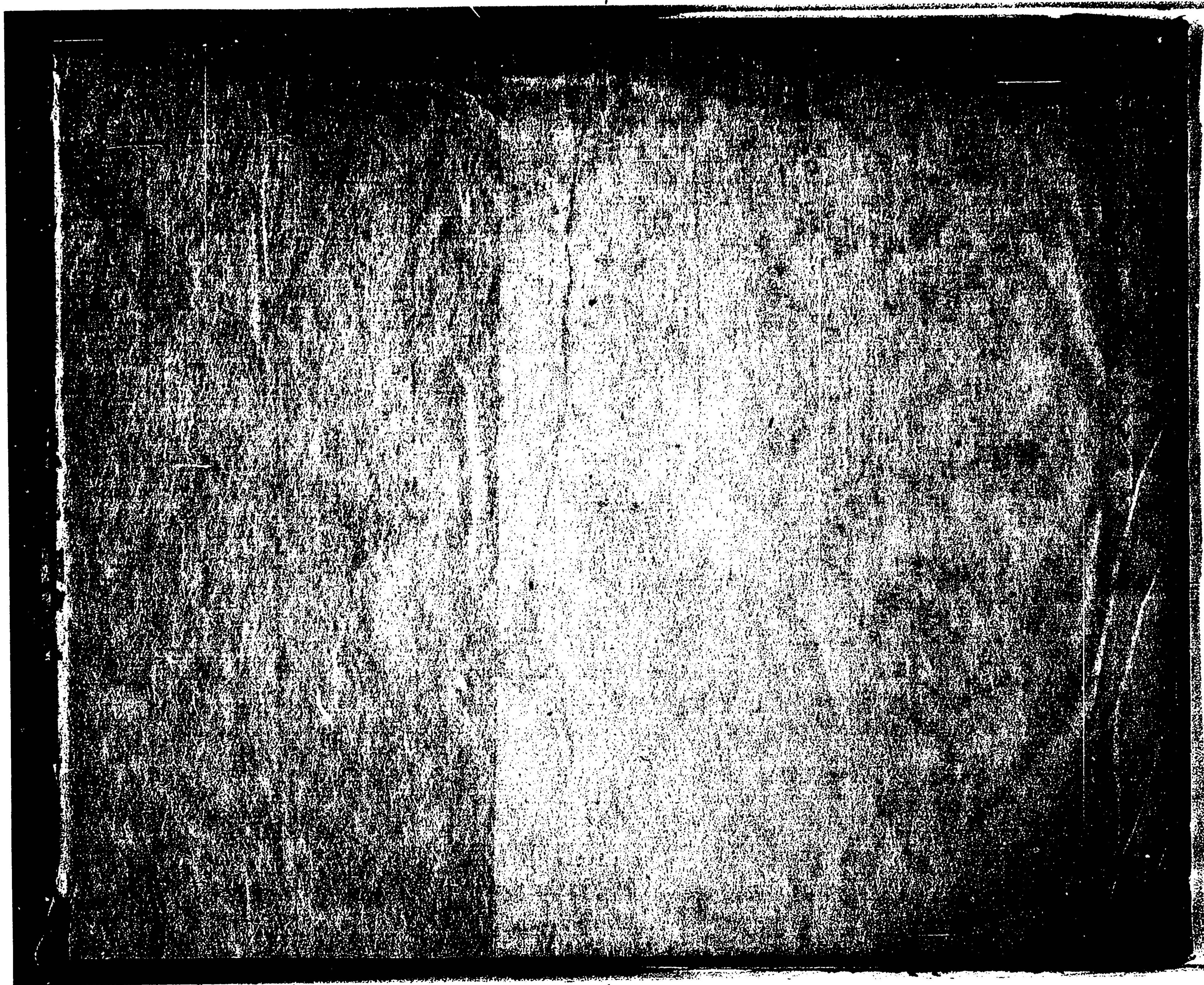
ENGLISH.		NAME.	FRENCH.		JAPANESE.	
lbs. and sq. inches.			Kilos and sq. m.m.		Kuwamme and sq. Sun.	
$\frac{1}{2} \frac{k^2}{E}$	$\frac{1}{2} \frac{k'^2}{E}$		$\frac{1}{2} \frac{k'^2}{E}$	$\frac{1}{2} \frac{k^2}{E}$	$\frac{1}{2} \frac{k'^2}{E}$	$\frac{1}{2} \frac{k^2}{E}$
290.4	11.62	Cast Iron.	0.00817	0.2042	2	50.
36.4	6.97	Bar Iron.	0.0049	0.0256	1.2	6.27
1813.		Steel Bar.		1.275		312.2
113.8	13.94	Copper Plate.	0.0098	0.08	2.4	19.59
5.4		Cast Brass.		0.0038		0.93

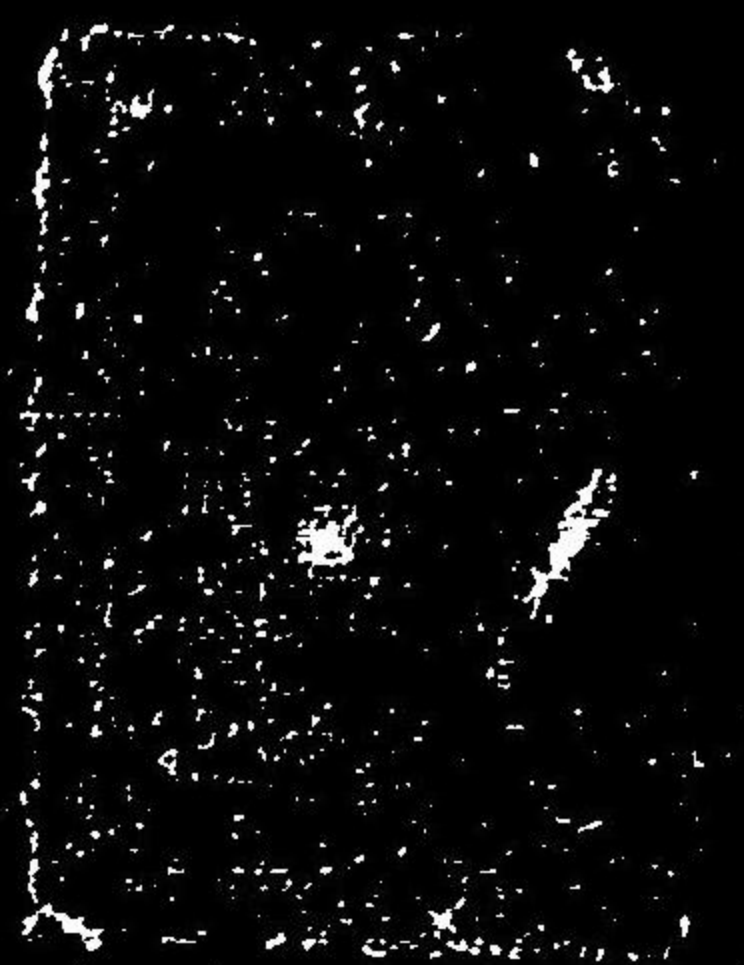
TABLE OF WORK DONE IN PULLING ASSUNDER OF MATERIALS.

ENGLISH.		NAME.	FRENCH.		JAPANESE.	
lbs and sq. inches.			Kilos and sq. m.m.		Kuwamme and sq. Sun.	
$\frac{1}{2} \frac{f^2}{E}$	$\frac{1}{2} \frac{f'^2}{E}$		$\frac{1}{2} \frac{f'^2}{E}$	$\frac{1}{2} \frac{f^2}{E}$	$\frac{1}{2} \frac{f'^2}{E}$	$\frac{1}{2} \frac{f^2}{E}$
7.82	2.84	Cast Iron.	0.002	0.0055	0.49	1.346
43.5	9.1	Bar Iron.	0.0064	0.0306	0.1567	7.49
170.6	23.32	Iron wir.	0.0164	0.1200	4.016	29.4
172.1	25.6	Steel Bar.	0.018	0.1210	4.4	29.6
210.	79.6	Cast Steel.	0.056	0.1478	13.7	36.2
31.3	13.94	Plate Copper.	0.0098	0.0220	2.4	53.9
62.6	49.8	Gun metal.	0.0035	0.0440	0.857	10.77
17.64	2.56	Cast Brass.	0.0018	0.0124	0.44	3.04









M

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日本英仏度量比較表

R. H. Smith / 著

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