



*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*

## **Historic, archived document**

Do not assume content reflects current scientific knowledge, policies, or practices.



1.9  
F 761 Ec

U. S. Department of Agriculture, Forest Service

# FOREST PRODUCTS LABORATORY

In cooperation with the University of Wisconsin

MADISON, WISCONSIN



## ECONOMIC AND SOCIAL IMPORTANCE OF A SUSTAINED SUPPLY OF RAW MATERIAL FOR THE WOOD-USING INDUSTRIES IN THE LAKE STATES

By R. D. GARVER  
Senior Forester

April, 1935



ECONOMIC AND SOCIAL IMPORTANCE OF A SUSTAINED SUPPLY  
OF RAW MATERIAL FOR THE WOOD-USING INDUSTRIES  
IN THE LAKE STATES<sup>1</sup>

By R. D. Garver, Senior Forester  
Forest Products Laboratory,<sup>2</sup> Forest Service  
U. S. Department of Agriculture<sup>3</sup>

----

JUL 2 3P 1935

A good yard stick of the practical importance of an industry is the number of people that it supports, the value of the products that it manufactures, and the capital invested in it. An examination of the lumber and timber products industries of the Lake States from this point of view reveals that in 1929 more than 32,000 wage earners, probably representing a family responsibility of more than one hundred thousand people, are dependent on these industries for a livelihood and would have to seek jobs elsewhere if the supply of raw material should play out. Furthermore, under such a situation products worth nearly one hundred million dollars would no longer be manufactured, and the opportunity of amortizing a capital investment of perhaps 40 to 45 million dollars in plants would be pretty well wiped out. (See Table 1)

---

<sup>1</sup> Minnesota, Wisconsin, and Michigan.

<sup>2</sup> Maintained at Madison, Wisconsin, in cooperation with the University of Wisconsin.

<sup>3</sup> Paper presented at the Lake States Forestry Conference, Madison, Wisconsin, April 24-25, 1935.





In addition there would be large additional losses due to the breaking up of communities and businesses dependent on the timber products industries. These enormous anticipated losses serve to emphasize the necessity of providing, in so far as is possible, by forest practice a permanent supply of raw material so that the sawmills, veneer plants, and the like, can continue to operate indefinitely thus sustaining themselves as well as the communities dependent upon them.

The same relative situation prevails in the pulp and paper industry and in addition the capital investment is much greater. Table 2 presents figures for this industry. Measured in terms of men employed the pulp and paper industry ranks about equally with lumber, pays nearly 10 million dollars more in wages, manufactures products worth 263 million dollars, or over 2-1/2 times that of the lumber industry, and has a capital investment roughly calculated at 140 million dollars as compared with approximately 42 million dollars in the lumber industry. Furthermore, it is much more difficult to move or salvage a pulp or paper mill than a sawmill. For all these reasons the pulp and paper industry is vitally concerned with the problem of providing a supply of raw material.

Together the lumber, timber products, and the pulp and paper industries have about one-quarter of a million people depending for a living upon the salaries and wages they pay out each year.





## Requirements

The wood-consuming industries and the people in general also have a very definite interest in a local timber supply. The magnitude of this interest is clearly indicated by the fact that these plants in the Lake States have been using annually about 1-1/4 billion feet of hardwoods and nearly 1 billion feet of softwoods. An additional 1-2/3 billion feet of lumber has been used for rural and urban residential construction and for non-residential uses. Table 1 shows that roughly 4/5 of the softwood and 2/5 of the hardwood requirements are now being supplied by outstate lumber. While the competing regions are ready to meet increased demands, this is not necessarily advantageous to local concerns because the hardwoods of the Lake States are especially good for such uses as flooring, furniture, planing mill products, and specialties, and the price for shipped-in lumber may not remain favorable. Should the supply of local timber play out the regional industries and the general public might have to pay more for their lumber than they do now, because of the absence of local competition. Furthermore, the industries manufacturing products that require a wood with special properties, such as hard maple, might have difficulty in finding a satisfactory substitute.

In connection with use requirements it is worth while to consider the Lake States species and see if some of them



have special properties which make their perpetuation especially desirable not only to the Lake States but to the United States. Generally, white pine has been thought of as typifying the ideal species of the region, with sugar maple as a close second. Of the other important regional hardwoods, yellow birch is, of course, an excellent wood for many purposes, among which are furniture and interior trim. Rock elm is eagerly sought for special uses, because of its bending and shock resisting qualities. Basswood, beech, and ash are also good woods, but none compare with hard maple as a universally acceptable wood for general industrial uses and for specialty uses. Approximately 1,600 uses or recognized parts are supplied by sugar maple as compared with 1,200 for ash, and 800 for yellow birch. Maple is a lively competitor with other woods in such major fields as furniture, flooring, motor vehicles, and boxes and crates, and it practically dominates the market for specialty uses like boot and shoe findings, bearings, machine parts, and professional instruments.

Sugar maple is unique among woods because in it are combined a pleasing appearance, high and uniform resistance to wear, strength and smoothness, and satisfactory working and finishing qualities. From a forestry standpoint the important thing to consider is that at present the Nation depends upon the Lake States to supply at least 2/3 of the total amount of sugar maple that is used.

1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$ .

2. In the second part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions.

3. In the third part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions and for arbitrary values of the boundary conditions.

4. In the fourth part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions and for arbitrary values of the boundary conditions and for arbitrary values of the initial and boundary conditions.

5. In the fifth part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions and for arbitrary values of the boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions.

6. In the sixth part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions and for arbitrary values of the boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions.

7. In the seventh part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions and for arbitrary values of the boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions.

8. In the eighth part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions and for arbitrary values of the boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions.

9. In the ninth part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions and for arbitrary values of the boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions.

10. In the tenth part we consider the case of the existence of solutions for the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$  and for arbitrary values of the initial conditions and for arbitrary values of the boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions and for arbitrary values of the initial and boundary conditions.

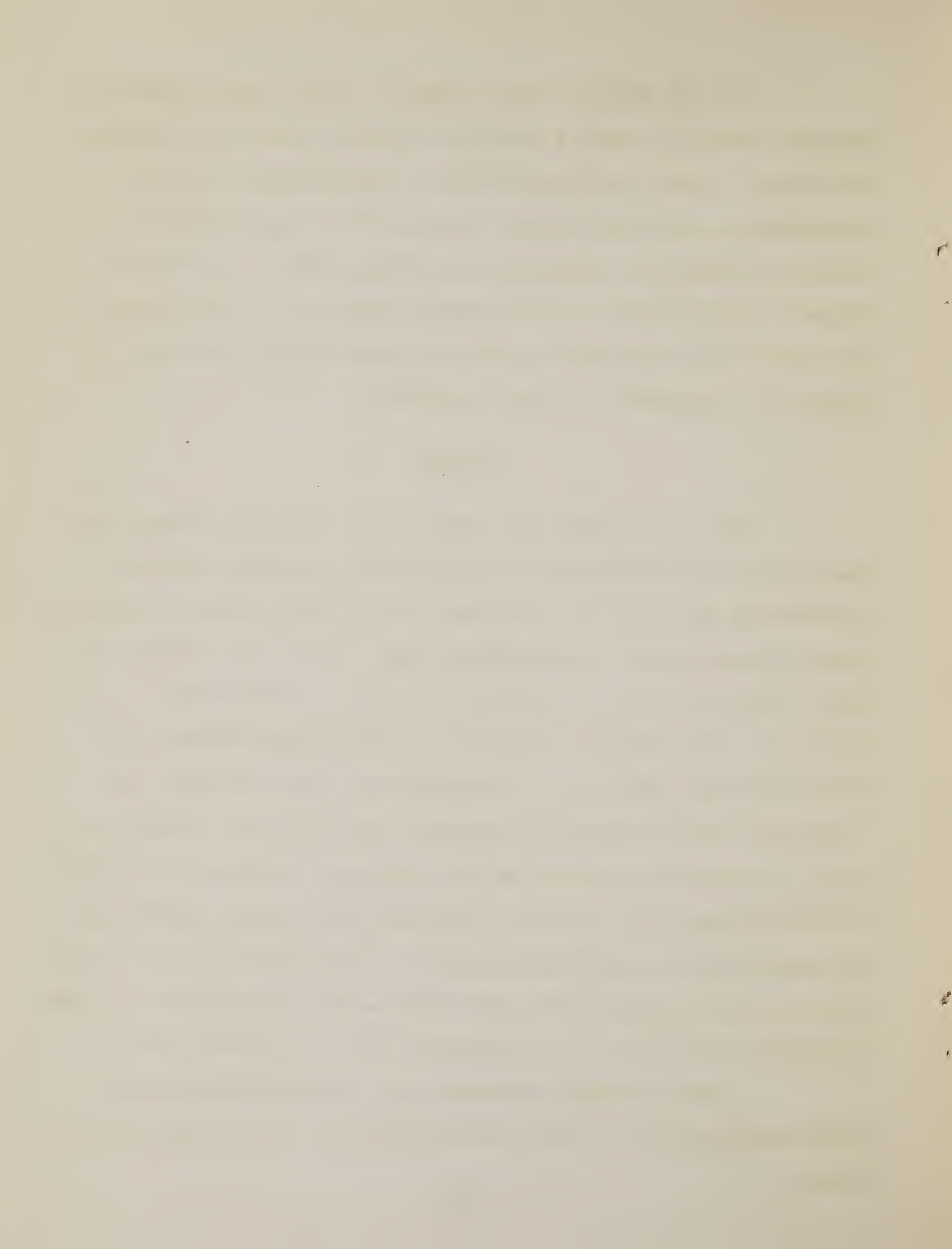


In the pulp and paper field, spruce, the premier of pulpwood species, grows readily in the Lake States as do also jack pine, hemlock, and balsam fir. Nevertheless, for the Lake States region as a whole, about 1/5 of the pulpwood is imported, Michigan and Minnesota importing about 1/3 of their pulpwood requirements, and Wisconsin about 1/9. This occurs not because the required species of wood will not grow in the region, but because it is not available.

### Markets

So far, it has been assumed that the only thing standing in the way of permanent industries in the Lake States is a sustained supply of raw material, but there is another requirement, perhaps even more important, and that is the ability to hold, recapture, and if possible expand the markets for timber products. One glance at the trend curve of wood consumption will convince anyone of the necessity for such efforts. To accomplish this, work along at least four lines is necessary: First, a lowering of costs to the consumer, second, an increase in satisfaction in the use of the products through improvement of properties and qualities, third, the development of new products or modified products, and fourth, the promotion of popular acceptance and use of the products by all legitimate means.

Such a program involves both industrial and public participation and a mutual responsibility. On the part of the





industry it is a problem of efficiency in production and distribution; on the part of the public it is one of protecting the long time public interest in forest land values through basic research and the development of products, especially those that industry cannot be expected to be interested in for the immediate future. For both, it is a job of developing interest and support from all sources so that forestry may be an economic success. Upon the successful marketing of the products of the forest depends not only the economic solvency of the industry but forest practice itself. To hold markets requires the most up-to-date merchandising methods and a product that gives satisfaction. Industry is mostly responsible for the first, while research mostly carried on by the public should point the way to meeting the second requirement.

### Forest Land and Community Planning

The job logically may be divided into two parts:

(1) How should our present stands of timber be managed and what adjustment in plant capacity and community relocation is possible and desirable, and (2) how much of the job of providing for our own as well as National timber requirements should be assumed by the Lake States in a long time plan of land management.

Silvicultural research has progressed far enough to handle the first point for the present, but the industrial side



of the question has not been developed far enough to formulate an equitable plan. As a first step, the plants in the region should be surveyed to obtain information upon which to base a plant adjustment policy and plan. This could well be made a job for the employment of emergency funds. It is well known that the supply of timber is so limited in the Lake States that a sharp reduction in lumber producing plants is imminent no matter what is done in forest practice, but which plants or which types of producing units, considering the best interests of the region as a whole, should be encouraged and which ones discouraged, that is the question. The survey might include also the pulp and paper plants even though, as pointed out previously, it is more difficult to shift and salvage these plants than sawmills.

Based on the Copeland report (U.S. Senate Doc. 12, 73d Congress) figures and measured in cubic feet the Lake States region is growing about 8.3 percent of our estimated long time wood requirements on 11.3 percent of the commercial forest land. Considering the relative rates of growth in the various regions and the condition of the forested areas this looks as though the Lake States were doing pretty well; but not well enough, for an analysis of the growth shows that too much of it is made up of secondary species, such as aspen. Furthermore, an aggressive regional policy would seem to dictate an attempt to grow more than is needed locally because being close to markets and having good transportation it should be possible to operate in nearby competitive markets, particularly in the sale of the more valuable species that grow in the Lake States.



Table No. 1--Lumber and Timber Products Industries<sup>1</sup>

Year	Production : : Soft-: Hard-: : woods: woods:	Lumber Used in : : Manufacture : : Soft- : Hard- : : woods : woods :	Percentage in : : shipped in : : Soft-: Hard- : : woods: woods:	Number of Establish- : : ments :	Number of Employees : : :	Wages and : : Salaries: Product:	Value of : : of : Invested <sup>2</sup>
		Million Board Feet				Million Dollars	
Michigan:							
1928:	---	---	471	93	46		
1929:	122	448	---	---	---	15.5	39.1
1933:	43	117	182	89	47		14.3
Minne- sota							
1928:	---	---	207	80	66		
1929:	306	51	---	---	---	5.2	14.7
1933:	38	11	80	61	32		8.9
Wiscon- sin							
1928:	---	---	295	70	26		
1929:	354	489	---	---	---	16.2	44.9
1933:	74	112	124	76	33		21.1
Total							
Lake States							
1928:	---	---	973	86	41		
1929:	782	988	---	---	---	36.9	98.7
1933:	155	240	386	76	33		44.3

1 From census data.

## 2 Rough calculations.



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	14
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	----

Table No. 2--Pulp and Paper<sup>1</sup>

	Pulpwood Consumption	Percentage of	Number of	Wages and	Value of	Invested
	in 1000 cords	Imported	Establishments	Salaries	Product	Capital
Total	Domestic	Imported				
						Million Dollars
Michigan:						
1929:	313					
1931:	251	33	53	21.7	106	49.2
		28	49	---	---	---
Minnesota:						
1929:	266					
1931:	198	41	13	4.1	28	23.4
		36	14	---	---	---
Wisconsin:						
1929:	1234					
1931:	957	11	79	20.8	129	66.7
		13	72	---	---	---
Total						
Lake						
States:						
1929:	1813	19	145	46.6	263	139.3
1931:	1406	19	135	---	---	---

<sup>1</sup> From census data.

<sup>2</sup> Rough calculations.



1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$ . It is shown that the system has solutions for all values of the parameters  $\alpha$  and  $\beta$  if and only if the condition  $\alpha + \beta > 0$  is satisfied. In the case when  $\alpha + \beta < 0$ , the system has no solutions.

2. In the second part of the paper, the problem of the stability of the solutions of the system (1) is considered. It is shown that the solutions of the system are stable for all values of the parameters  $\alpha$  and  $\beta$  if and only if the condition  $\alpha + \beta > 0$  is satisfied. In the case when  $\alpha + \beta < 0$ , the solutions of the system are unstable.

3. In the third part of the paper, the problem of the asymptotic behavior of the solutions of the system (1) is considered. It is shown that the solutions of the system approach zero as  $t \rightarrow \infty$  for all values of the parameters  $\alpha$  and  $\beta$  if and only if the condition  $\alpha + \beta > 0$  is satisfied. In the case when  $\alpha + \beta < 0$ , the solutions of the system do not approach zero as  $t \rightarrow \infty$ .

4. In the fourth part of the paper, the problem of the periodicity of the solutions of the system (1) is considered. It is shown that the solutions of the system are periodic for all values of the parameters  $\alpha$  and  $\beta$  if and only if the condition  $\alpha + \beta > 0$  is satisfied. In the case when  $\alpha + \beta < 0$ , the solutions of the system are not periodic.

5. In the fifth part of the paper, the problem of the boundedness of the solutions of the system (1) is considered. It is shown that the solutions of the system are bounded for all values of the parameters  $\alpha$  and  $\beta$  if and only if the condition  $\alpha + \beta > 0$  is satisfied. In the case when  $\alpha + \beta < 0$ , the solutions of the system are unbounded.