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OUR WATER RESOURCES

2. STREAM FLOW DATA

In the last issue of the News Letter there was described the need for basic information on the flow in our streams and its relation to municipal water supply, cheap power, and safe sewage disposal. The question may be asked, why cannot any engineer make his own stream flow measurements on any stream in which he is interested, and why burden the state with the cost of collecting this information? The answer is threefold:

(a) Because individual or isolated measurements of stream flow are of relatively little value. When an investigation is being made to utilize a stream for water supply, water power, or waste disposal the flow in that stream may be neither maximum, minimum, nor average. It is very necessary to know the extreme low flow in the driest period, the maximum flood which may ever occur, and the average flow which may be expected each week over a period of years. To learn these a gaging station must have been established on the stream, or on some nearby similar stream, years before the data are wanted, and operated continuously. The Water Resources Division of the State Department of Conservation and Development acts in cooperation with the United States Geological Survey, State Highway Commission, municipalities, power companies, and others, to determine where gaging stations may be strategically installed to collect data that will be needed in the future. Funds from the state and from all of these interested agencies are contributed to the State Conservation Department, which attempts to expend them on locating and operating gaging stations where the data will be of most value.

Best Done by Experts

(b) Because the measurement of stream flow is a highly specialized branch of engineering, requiring expert services if accurate data are to be obtained. The United States Geological Survey has maintained a very expert staff of engineers for many years which has done nothing but this work, and has brought the science of stream gaging to a state of great perfection. While the location of gaging stations in the state is largely directed by the State Department of Conservation, the actual work of stream gaging, and the collection of records of stream flow is carried on by the engineers of the United States Geological Survey operating from the district office in Asheville.

(c) Because records of stream flow to be of greatest value should be collected by a central agency, should have an official status to be accepted in court, and should be published so that they may be available to everyone. The State Conservation Department will shortly issue a new bulletin giving monthly and weekly stream flow for the entire period of record at every stream gaging station ever operated in North Carolina. This bulletin is being prepared by the Water Resources Division, which is located at Chapel Hill and cooperates with the Engineering School at the University, utilizing the highly trained hydraulic engineering staff in making these studies. The bulletin when issued will be the most comprehensive of its kind ever issued by any eastern state.

Stations of Two Kinds

Standard gaging stations are of two kinds, staff gage stations and automatic recording stations. Staff gage stations are merely metal strips graduated in feet and tenths located above a control point on a stream where measurements are made. The engineer visits the station at different degrees of flow and measures the discharge by an instrument known as a current meter. The local observer twice each day reads the height of the water surface on the staff gage, sending the results each week to the Asheville office of the United States Geological Survey. There, by appropriate methods the gage heights are converted into discharge. The automatic recording station is equipped with an instrument which draws a

line continuously on a piece of paper indicating the gage height. Such stations are required when there is no observer accessible, or where there are sudden variations in the flow, as when there is a water power development above the station, which may shut off the flow at night and let loose more than the average flow in the daytime. Manifestly two readings a day of a staff gage would not indicate the true average height of the water in the stream. The automatic recorder shows the gage height every instant and the averages for the day can be determined.

Durham Wants Facts

The actual use and need of stream flow data may be illustrated by some recent typical cases which have arisen. The city of Durham had to invest over one million dollars in a new water supply development, which was to utilize surplus flow for pumping. How much of the time would water be available for power purposes, and would the expenditure for hydro-electric equipment be warranted? No stream flow measurements had ever been made on the stream to be used, or on any similar streams in the vicinity. The best that could be done was to estimate the probable flow from rainfall data, a very unsatisfactory expedient. Realizing the value of stream flow data for future developments and in connection with the operation of the new plant, the city contributed two thousand dollars to the State Department of Conservation for the establishment of from two to four gaging stations on the streams tributary to the plant.

Another large city in the state discharges its sewage into a small stream. The far-sighted city engineer realized that in the future law suits might be brought against the city by property owners below. He arranged for a gaging station to be established on the stream so that actual facts regarding the amount of dilution afforded the city might be collected against a future day of need, and that data might be available to indicate the degree of treatment of the sewage that might be needed in the future.

Data Eagerly Sought

The great water power development at Badin would never have been constructed, officials of the company state, had not long term stream flow records been available. New gaging stations on the Deep, New, and Fisher rivers have been in operation from only a few months to three years, but the data from them are being eagerly sought by engineers engaged in designing water power developments on these streams.—Thorn-dike Saville.

FARMS TOO SMALL

The Progressive Farmer says that southern farmers must use more horsepower and machinery and thereby enable themselves to cultivate larger acreages if they are to prosper.

Quoting Dr. Branson the Progressive Farmer says: "In Nebraska 187,000 farm workers cultivate 23,000,000 acres, while in North Carolina 478,000 farm workers cultivate only 8,000,000 acres. Which means that in Nebraska about one-third as many farm workers cultivate nearly three times as much land as in North Carolina. They produce small values per acre, only \$9.09, against \$38.82 in North Carolina; but they produce large values per person, \$2,778, against \$1,053 in North Carolina."

The following table, based on the 1920 Census of Agriculture, shows how twelve southern states compare with eight mid-western states in acres of improved farm land per person living on farms. The table is derived by dividing the total acreage of improved farm land by the total farm population.

State	Acres per Person
North Dakota	62.1
South Dakota	50.2
Kansas	41.5
Nebraska	37.8
Iowa	29.0
Illinois	24.8
Minnesota	23.9
Wisconsin	13.5

IDEALISM IN COOPERATION

The interesting thing about cooperation in both Ireland and Denmark is the emphasis placed on the intangible, idealistic values. It is precisely this thing which is so sadly lacking in our cooperative efforts in the United States. Too many of our cooperative endeavors are different in no essential respect from old-line business. We have no one in the United States to-day who is continually holding up before us the beauties of an agricultural civilization that can hold its own against the attractions of city tinsel. In order to get the kind of a life we want on the farm, we should do our best to get a square deal in both the business and political worlds, but even more than that we must make sure that the farming of the future ministers to the spiritual life of the farmer and his family.—Wallace's Farmer.

Southern States

Texas	31.7
Virginia	8.9
Tennessee	8.7
Florida	8.1
Arkansas	8.0
Georgia	7.7
Alabama	7.4
Mississippi	7.3
Louisiana	7.1
Oklahoma	7.0
South Carolina	5.7
North Carolina	5.5

North Carolina cultivates fewer acres per person living on farms than any other state in the Union. In other words, we come nearer approaching the European conditions of hand and knee farming than any other state. It is necessary to farm intensively in Europe because of dense population. But in North Carolina 23 million acres, or three-fourths of the land area of the state, are uncultivated, and practically idle for the most part.

The Progressive Farmer says: "Unquestionably our failure to cultivate larger acreages is one of the chief reasons why southern farmers have not been as prosperous as western farmers."

HOME-COUNTY SURVEYS

For a decade the Department of Rural Social-Economics at the University has been amassing a considerable collection of facts about counties and county affairs in North Carolina. Students during this time have prepared and citizens of the home county have published twelve county surveys. A large edition of each survey was printed and distributed free of charge all over the home county. "A unique service", Mr. French Strother calls this in the November, 1924, issue of the World's Work.

The counties for which surveys have been printed are as follows: Buncombe, Rutherford, Pitt, Gaston, Rockingham, Forsyth, Randolph, Durham, Wake, Johnston, Sampson, and Halifax. Is your county included? If not, then get behind your home county students at the University and urge them to prepare a county survey. Data and materials are available for every county in the state.

What a Bulletin Contains

1. Historical Background.
2. The County's Towns.
3. Natural Resources.
 - Geography—Climate—Soils—Minerals—Forests
4. Industries and Opportunities.
 - General Statement—Details of Individual Plants.
5. Facts About the Folks.
 - Population Statistics—Density—Rural and Urban—Color and Nativity—Illiteracy—Birth and Death Rates—Marriages—Divorces—Church Membership—Statistical Table.
6. Wealth and Taxation.
 - Total Taxable Property—Agricultural Wealth—School Finances—Banks—Automobiles—Inheritance Taxes—Farm Mortgages—Taxation—Statistical Table.
7. Schools.
 - Organization—Teachers—School

- Terms—Attendance and Enrollment—Consolidation—Buildings—Finance—Statistical Table.
- 8. Farm Conditions and Practices.
 - Idle Lands—Size of Farms—Farm Tenancy—Rural Credits—Crops—Farmers' Organizations—Statistical Table.
- 9. Food and Feed Production.
 - Surplus or Deficit—Livestock Status—Poultry and Egg Production—The Local Market—Statistical Table.
- 10. Evidences of Progress.
- 11. Problems and Solutions.

An Ohio Opinion

Commenting on a North Carolina county survey, Professor G. Walter Fiske of Oberlin College, Oberlin, Ohio, author of *The Challenge of the Country*, writes, "It seems to me the most intelligent and thorough piece of survey work done by students that I have known. It gives a most illuminating and informing picture of the actual life of the county."

The students at the University are organized into county clubs, and there is a club for practically every county in the state. Many clubs have undertaken and published, with the aid of the home folks, a social and economic survey of their county. The members of every county club can do this and they will if local leaders and citizens let them know that they are interested and call on their students to turn out a social and economic study of their home county.

The library of the Department of Rural Social-Economics has a vast collection of information about every county in the state. For this information to be of value it must be properly assembled, interpreted, edited and published. This is the function of the home-county students, and they will do it if they are urged to do so by the home-folks, and receive their backing.

THE COUNTRY DOCTOR DIES

Death is a tragedy that sickens all of us, we can't get used to it. It visits all of us alike, those of high and of low degree. But there is that about the passing of our friend, the physician, which hits us a little harder than death usually does. Here is a man who has stood at the bedside of many, watching them die; he has stood by the bedside when babies of whom he keeps no count came into the world; he has listened sympathetically to countless stories of family sorrows; he has gone night and day to relieve distress, and never got a cent for his services. The typical country doctor is one of the world's choicest spirits. Usually little is said of him. He is no famous specialist who operates and charges thousands; he issues no bulletins about his humble patients; he says little or nothing; but he does a very real work in

the world, becomes a member of every family he visits, loves and is loved as few men understand endearments, and we can imagine no more hearty greeting than that which he receives when he reaches the gates of heaven and hears, "Well done thou good and faithful servant; enter thou into the joy of thy lord." If service to humanity is the measure of our worth, surely the country doctor outranks us all.—Raleigh Times.

THE COUNTRY DOCTOR

They are not all gone. "I am proud of you," said the great Edinburgh surgeon to the best type of the country doctor. But they are fewer and the coming of the specialist and the hospital evidences that change in life is seen in the practice of medicine. There are still William McClures in all countries, winning the gratitude of the rich and performing operations under adverse circumstances that would do credit to even a Mayo. Deploring the dwindling group of country doctors, the Vass Pilot pays high tribute to the late Dr. Gilbert McLeod, of Carthage, whose recent death is deplored. We quote:

Dr. McLeod has done his work, in a way that adds credit to the name of the country doctor, a man now almost as extinct as the other types that were of the rural past and that have fallen under the exactions of modern progress. The country doctor was the warden and the adviser and the healer and the friend of the neighborhood when a neighborhood was bounded solely by the distance a man could ride and get back in time to ride somewhere else before another call came from another direction. When Dr. McLeod commenced his work in the county it was nothing for him to set out at any hour of the day or night for any point in the county or the adjoining counties, the one thing being that he was wanted by some fellow creature in distress, and his field of work had no bounds, no hours, and no limits in any way.

He was unequivocally a man who lived to serve others, as the country doctor has always been. That he lived to serve is evidenced by the fact that he, like all other country doctors, forgot his collections, for it has been known that Dr. McLeod's benefactions in this respect have been enormous. If a man could pay and did pay it was acceptable. If an ailing human creature could not pay or did not pay it made no difference in the service. Dr. McLeod's religion was that the sick bed was never the place to consider the size of the fee or the likelihood of bad bills. His one purpose was to see that health should be regained. Then if anything else came up that something else could be discussed in its proper place.—News and Observer.

PATENTS GRANTED IN THE UNITED STATES

By States for the Year 1924

The following table, based on data released by the United States Patent Office, and compiled by Paul B. Eaton, Attorney-at-law, Winston-Salem, N. C., ranks the states according to the number of inhabitants per patent granted to residents of each state for the year 1924. The accompanying column shows the total number of patents granted for that year.

Patents granted to citizens of the United States totaled 40,520, or one patent for every 2,700 inhabitants. Patents granted to North Carolinians numbered 194, or one patent for every 13,191 inhabitants. Only four states rank below North Carolina. However, 30 more patents were granted in 1924 than in 1923.

Rank	States	Total Patents	Inhabs. per Patent	Rank	States	Total Patents	Inhabs. per Patent
1	Connecticut	1,276	1,082	25	Arizona	88	4,023
2	California	2,680	1,302	26	Utah	110	4,085
3	New Jersey	2,328	1,356	27	Nebraska	311	4,168
4	New York	6,907	1,508	28	Kansas	390	4,536
5	Illinois	4,222	1,536	29	South Dakota	139	4,580
6	Massachusetts	2,320	1,660	30	Idaho	89	4,852
7	Rhode Island	362	1,669	31	Florida	195	4,966
8	Ohio	3,230	1,783	32	Vermont	66	5,339
9	Michigan	1,671	2,195	33	West Virginia	272	5,381
10	Colorado	415	2,264	34	Oklahoma	370	5,482
11	Washington	572	2,372	35	North Dakota	116	5,566
12	Wisconsin	1,109	2,373	36	Texas	787	5,925
13	Pennsylvania	3,439	2,536	37	Maine	122	6,295
14	Wyoming	73	2,663	38	New Mexico	45	8,007
15	New Hampshire	157	2,822	39	Virginia	287	8,046
16	Minnesota	817	2,922	40	Kentucky	270	8,950
17	Oregon	264	2,967	41	Louisiana	197	9,129
18	Nevada	26	2,977	42	Tennessee	241	9,700
19	Missouri	1,054	3,229	43	Georgia	233	12,428
20	Maryland	442	3,279	44	North Carolina	194	13,191
21	Montana	164	3,347	45	Arkansas	130	13,478
22	Indiana	864	3,391	46	Alabama	172	13,573
23	Delaware	64	3,481	47	South Carolina	101	16,671
24	Iowa	656	3,664	48	Mississippi	92	19,463