Amount appropriated by Act approved June 15, 1880...... $15,000
July 1, 1880, amount available.......................... 15,000
Am't (estimated) required for completion of exixting project. 35,000
Am't that can be profitably expended in fiscal year ending
June 30, 1882.......................................... 35,000

The above work was in progress during the summer of 1881, under immediate charge of E. C. Shankland, U. S. assistant-engineer. A steam hydraulic grading machine or boat was employed on the north bank of the river, to prepare the bank for the floating dykes and recumbent wire mattresses. This machine was kept at work steadily by two crews, five working from noon to midnight, and five from midnight till noon; then a cook, making eleven men in all, and all Lexington men except one. The survey and sounding party, in charge of Mr. Howard Dunn, of Lexington, consisted of seven men, two flagmen on shore, three oarsmen, a leadman, and a recorder in boat; and five of this party were Lexington men.

### METEOROLOGY.

In the spring of 1877 Prof. Francis E. Knipher, of Washington University, St. Louis, established a system of voluntary weather observing stations throughout the state. It was purely a voluntary service, only engaged in by those who were willing to give time, labor, and care to it, from their love of science and their desire to secure to Missouri the practical benefits of such observations. There were in Missouri at one time eighty of these stations, but in June, 1881, only forty-nine made any reports. In the state of Iowa there are two hundred similar volunteer weather stations.

In December, 1877, Dr. J. B. Alexander, of Lexington, commenced his work as a member of the Missouri Volunteer Weather Bureau, making careful observations of wind, moisture, temperature, etc., three times each day, and at the end of each month reporting to Prof. Knipher in tabulated form, the results of the month's daily record. This is one of the most unremitting and taxing kinds of public service that any man can engage in; it is fraught with the supremest interests of agriculture, commerce, climatology, prevailing diseases, etc. Its devotees are self-sacrificing public benefactors, toiling gratuitously for the industrial and sanitary welfare of the state, for it is only by such observations, kept up through a long series of years, that the laws of climate and season can be learned, and their normal recurrences taken advantage of for the benefit of mankind.

The following tables of observations made at Lexington, show a marvelous amount of patient and painstaking labor, and were prepared by Dr. Alexander especially for this work, in order to their permanent preservation; and any one can see that when similar records have been kept

at forty or fifty different places throughout the state for ten, twenty, or thirty years successively, they must throw a vast deal of valuable light upon the problems of climate and season within our commonwealth.

MEAN TEMPERATURE AND AMOUNTS OF RAINFALL FOR THE SEVERAL MONTHS AND SEASONS OF THE FOLLOWING YEARS:

| | 1878. | | 1879. | | 1880. | | 1881. | | Average | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Temp. | Rain Fall. | Mean Temp. | Rain Fall | Mean Temp | Rain Fall. | Mean Temp | Rain Fall. | Mean Temp | Rain Fall |
| January | 33.2 | 1.34 | 22.0 | 1.05 | 39.3 | 2.29 | 16.8 | 17.3 | 27.8 | 1.25 |
| February | 38.9 | 3.57 | 31.5 | 0.48 | 35.3 | 1.62 | 32.6 | 4.20 | 37.2 | 2.40 |
| March | 50.0 | 2.55 | 35.8 | 1.07 | 40.5 | 1.85 | 33.9 | 2.65 | 42.6 | 2.04 |
| April | 58.3 | 3.43 | 54.0 | 1.94 | 51.5 | 2.15 | 47.6 | 2.15 | 53.7 | 2.41 |
| May | 61.3 | 3.29 | 59.5 | 2.05 | 57.8 | 3.65 | 63.6 | 3.39 | 65.1 | 4.50 |
| June | 70.8 | 2.77 | 71.8 | 10.58 | 71.4 | 0.65 | 73.1 | 5.14 | 71.7 | 4.97 |
| July | 77.2 | 2.60 | 70.5 | 6.80 | 75.0 | 3.70 | 75.5 | 2.22 | 76.2 | 4.50 |
| August | 79.0 | 1.20 | 74.2 | 0.44 | 74.9 | 5.14 | 79.6 | 2.22 | 76.1 | 2.29 |
| September | 69.1 | 1.78 | 63.2 | 3.02 | 62.5 | 4.87 | | | 64.9 | 3.05 |
| October | 55.8 | 1.59 | 59.0 | 3.12 | 49.7 | 2.24 | | | 54.8 | 2.31 |
| November | 45.0 | 0.59 | 41.7 | 3.04 | 27.9 | 2.51 | | | 37.8 | 2.29 |
| December | 21.7 | 4.00 | 24.5 | 2.61 | 21.7 | 0.97 | | | 27.8 | 2.29 |
| Winter | 33.5 | 6.47 | 21.7 | 5.53 | 33.0 | 1.85 | 20.4 | 5.69 | 32.6 | 6.04 |
| Spring | 56.8 | 9.28 | 50.3 | 5.08 | 51.3 | 7.63 | 49.1 | 8.79 | 54.1 | 7.83 |
| Summer | 76.2 | 6.57 | 74.2 | 17.59 | 72.9 | 9.49 | 76.4 | 10.25 | 74.9 | 11.05 |
| Autumn | 54.9 | 3.86 | 54.6 | 10.03 | 46.7 | 9.12 | | | 52.7 | 7.69 |
| *Year | 55.3 | 23.69 | 52.8 | 37.76 | 51.7 | 31.13 | | | 55.3 | 32.75 |

*This average is based upon four dry years. A more accurate average from a larger number of years would be much higher.

DAYS OF RAIN, SNOW, THUNDER-STORMS DURING THE FOLLOWING YEARS:

| | 1878. | | | 1879. | | | 1880. | | | 1881. | | | Average. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rainy Days. | Days of Snow. | Thunder Storms. | Rainy Days. | Days of Snow. | Thunder Storms. | Rainy Days. | Day of Snow. | Thunder Storms. | Rainy Days. | Days of Snow. | Thunder Storms. | Rainy Days. | Days of Snow. | Thunder Storms. |
| January | 10 | 5 | 1 | 5 | 3 | 0 | 9 | 1 | 1 | 8 | 7 | 0 | 7 | 4 | 1 |
| February | 11 | 4 | 1 | 5 | 4 | 0 | 3 | 1 | 1 | 11 | 4 | 1 | 8 | 4 | 1 |
| March | 8 | 0 | 6 | 9 | 2 | 2 | 5 | 2 | 3 | 11 | 1 | 1 | 8 | 1 | 4 |
| April | 7 | 0 | 7 | 9 | 0 | 8 | 6 | 0 | 3 | 10 | 0 | 6 | 8 | 0 | 7 |
| May | 14 | 0 | 6 | 7 | 0 | 6 | 9 | 0 | 8 | 10 | 0 | 10 | 11 | 0 | 8 |
| June | 10 | 0 | 6 | 12 | 0 | 12 | 7 | 0 | 8 | 11 | 0 | 7 | 10 | 0 | 8 |
| July | 5 | 0 | 1 | 11 | 0 | 10 | 10 | 0 | 6 | 11 | 0 | 7 | 9 | 0 | 6 |
| August | 6 | 0 | 4 | 5 | 0 | 5 | 11 | 0 | 10 | 3 | 0 | 2 | 6 | 0 | 5 |
| September | 6 | 0 | 2 | 6 | 0 | 5 | 6 | 0 | 4 | | | | 6 | 0 | 4 |
| October | 6 | 1 | 3 | 7 | 0 | 3 | 4 | 1 | 2 | | | | 5 | 1 | 2 |
| November | 5 | 1 | 0 | 8 | 1 | 6 | 8 | 5 | 1 | | | | 7 | 4 | 2 |
| December | 8 | 5 | 0 | 4 | 1 | 0 | 4 | 4 | 0 | | | | 5 | 4 | 0 |
| Winter | 31 | 13 | 2 | 19 | 15 | 0 | 18 | 3 | 5 | 23 | 13 | 1 | 23 | 11 | 2 |
| Spring | 29 | 0 | 19 | 25 | 1 | 16 | 19 | 2 | 17 | 31 | 7 | 15 | 27 | 0 | 17 |
| Summer | 21 | 0 | 11 | 28 | 0 | 27 | 28 | 0 | 25 | 19 | 0 | 12 | 24 | 0 | 19 |
| Autumn | 16 | 2 | 4 | 21 | 1 | 14 | 19 | 5 | 3 | | | | 19 | 3 | 8 |
| Year | 95 | 21 | 36 | 90 | 10 | 59 | 85 | 13 | 53 | | | | 90 | 14 | 49 |