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### The Grasses of Maryland.

BY BASIL SOLLERS.

The word grass has both a popular and a scientific use. Technically it is the name of a very well-marked natural order of plants. In the popular use it includes many plants that are not true grasses and excludes some that are. Wheat, oats, rye, barley, rice, Indian corn, bamboo are all true grasses, but are not popularly so considered, while many forage plants and others whose leaves resemble grass are grasses only in the more popular use of the word. It is with its exact meaning that the word is here used.

The leaves of grasses have a general resemblance to each other, which has given rise to the term grass-like, and most plants with grass-like leaves are popularly looked upon as grasses. Grass-like leaves, however, are as characteristic of sedges as of grasses, and many other orders widely differing botanically have plants with grass-like leaves.

The following peculiarities of structure belong to grasses:

1st. A hollow stem. Indian corn and sea-sand grass are exceptions.

2d. Horizontal section of stem circular. Exception, wire grass (*Poa compressa*, L.), in which the section is oval.

3d. Horizontal partitions separating the stem into joints.

4th. Alternate two-ranked leaves.

5th. The nerves of the leaves parallel and not branched.

6th. The sheath or part of leaf which encloses the stem, with the edges free or folded over each other, and not uniting to make a tube, as in the sedge family.

The plants which most resemble grasses are rushes and sedges. Rushes have seed-vessels (ovaries) which contain from three to many seed. The seeds of sedges and grasses are solitary. Sedges have the sheaths united into a tube which must be split to be removed from the stem. The stems are mostly solid, often triangular in horizontal section, and leaves, when present, three-ranked.

There are about fifty genera and upward of a hundred species of the grass family growing spontaneously in Maryland. A brief account of some of the more important grasses is all that can be here attempted.

Of the grasses cultivated for their grain but one was known in America before its discovery and settlement by the white man. Indian corn was the principal dependence of the Maryland and Virginia Indians, and the early settlers traded largely with them for supplies of corn. Corn (*Zea mays*) did not grow spontaneously, but was carefully planted and cultivated by the Indian squaws. It is probably the most precious gift obtained from the red man. The other grasses which antedate the arrival of the colonists are gifts of nature, growing spontaneously for red and white man alike. Some are appreciated and brought under cultivation, others but slightly valued, nevertheless add much to hay and pasture fields in spite of neglect.

The principal grasses of value as cattle food, either as pasture or hay, will first be mentioned, next some useful in other respects, and lastly some that are generally regarded as weeds.

Timothy (*Phleum pratense*, L.) is said to have been found by a Mr. Herd in a swamp in New Hampshire in 1711 and cultivated by him. In New England it is still known as Herd's grass.

Mr. Timothy Hanson brought it to Maryland in 1720 and it became known by his Christian name. No other grass is so extensively grown for hay in this State. Mr. Gould, in "Grasses and their Culture," says, "The heaviest crop of timothy in this country that we know anything of was raised by John Fisher, of Carroll county in Maryland, who cut from one acre five tons 1620 pounds of dry hay fit for the barn." It is usually sown with wheat in the fall, and cut for the first time the second summer after. It blooms early in July, and should be mowed when the flowers of the lower portion of the spike have turned brown, those of the upper portion being still purple. When cut too late it loses much of its food value. Care should be taken that it be not cut too close to the ground, as next year's crop depends largely upon bulbs which may be destroyed by too close cutting or cropping. Timothy indeed serves better for hay than for pasture, as the aftergrowth is not great, and it is easily dried up when a drought follows harvest. It is well adapted to wheat lands, but is not suited to sandy or light gravelly soils.

Orchard grass (*Dactylis glomerata*, L.) is widely cultivated and highly valued both for hay and pasture. It is adapted to a great variety of soils, stands droughts well, grows vigorously in shade (hence orchard grass), is the better for close cropping or cutting, does not quickly or readily run out, and is not considered exhaustive to the soil. It blossoms in May or June about the time of red clover, and as they are both in best condition for hay at the same time, they are sown together with advantage. For pasture it has no superior. "Here its merits stand unrivaled; the laceration produced by the teeth of cattle, instead of injuring, actually stimulates it to throw out additional leaves, yielding the tenderest and sweetest herbage." It should be closely pastured, as it recovers very rapidly, and the fresh growth contains twice the nutritive qualities contained by that which has been allowed to become old. Care should be taken to select seed which has been produced by vigorous plants, as it is remarkable for the variety in size and vigor of the plants and in breadth, color and succulence of foliage, and for breeding truly. Seed from stunted specimens is sure to produce puny offspring. Orchard grass is not so extensively cultivated in Maryland as timothy, but is more often found growing spontaneously in a great variety of situations.

Kentucky Blue grass (*Poa pratensis*, L.) is everywhere found growing spontaneously. In many pasture fields it is the principal grass. In good land it is sure to make its appearance without planting. Authorities differ greatly as to its value, but there can be little doubt that some of the best pasture lands owe their reputa-

tion largely to its presence. It has been claimed that the best butter, the sweetest and best keeping, cannot be made where it is wholly missing in the pasture. It bears extreme cold better than most other grasses. It sends up but one flowering stalk in a season, blooming in June, but in August there is a great growth of root leaves, which afford fine pasture, lasting late in the fall, or a heavy second crop of hay. It is well adapted for lawns, and when well set makes a dense, uniformly matted turf which has only to be kept closely mown and occasionally fertilized to be practically everlasting. "The chief reputation of this grass," says Major Alvord, "is as a pasture grass; the sod is easily obtained and very enduring, there being no such thing known as its running out on good land. Pastures (in Kentucky) sixty years unbroken afford their owners an annual profit of at least \$10 an acre. It starts very early in spring, and grows rapidly after being grazed off. It will furnish more late feed than most grasses, and no amount of pasturing is sufficient to utterly destroy it."

Whitetop and Redtop (*Agrostis alba*, L. and the variety *vulgaris*, Thurb.) make good hay if not cut too late. They bloom about the first of August, and are not relished by cattle if allowed to go to seed. They are important elements in pastures, where they should be fed close. They are sometimes sown with timothy and clover, but grow spontaneously under a great variety of soil and moisture. They vary so much in different situations that some botanists have made out several varieties and even different species. Their favorite situation is in moist bottom lands, where they are often the principal grasses. Here their matted roots are of service in preventing cattle from sinking too deep. Rough-stalked Meadow grass (*Poa trivialis*, L.) is also found in moist or marshy places. "It is especially adapted to wood pastures, as it delights in shade, banks of streams and moist ground generally. It bears tramping and is an excellent pasture grass." Some have preferred it to Kentucky Blue grass (*Poa pratensis*, L.), to which it is closely related. It may be distinguished by its rough sheaths, the sheaths of *Poa pratensis* being smooth.

Ray, or Rye grass (*Lolium perenne*, L.) is very highly esteemed in England, being the first grass which was cultivated in that country. There are several varieties. Italian Rye grass is generally preferred. It is plentiful here in waste places and in pastures, but is not generally cultivated.

Blue or Wire grass (*Poa compressa*, L.) grows in the most unpromising situations. It is found on dry, thin soils and rocky banks, in gravelly clays, along trodden paths, etc. Widely different estimates are formed of its value. Being

difficult to kill, by some it is considered a troublesome weed. Others cannot speak of it too highly. Flint says: "Most grazing animals eat it greedily. Cows feeding on it produce a very rich milk and fine-flavored butter, and it is especially relished by sheep. It shrinks less in drying than most other grasses, and consequently makes a hay very heavy in proportion to its bulk. It is an exceedingly valuable pasture grass on dry, rocky knolls, and should form a portion of a mixture for such soils." "It is certain," says Gould, "that cows that feed upon it both in pasture and in hay give more milk and keep in better condition than when fed on any other grass. Horses fed on this hay will do as well as when fed on timothy hay and oats combined. The crops are remarkably even, and rarely suffer from excessive wetness or dryness." An English authority mentioned in "British Grasses" by Margaret Plues "considers it a good grass for parks and sheep pastures, as it causes the mutton to cut short and be fine flavored, where it grows; the sheep take care that not a panicle ever lives to flower." It may be readily known by its bluish color and flattened stem.

Bermuda grass (*Cynodon Dactylon*, Pers.) is little thought of in this part of the world except perhaps as a weed which is hard to get rid of when it once makes its appearance. Its long creeping stems, which root and throw up new shoots at every joint, give it a remarkable power of resistance to the usual means employed to exterminate troublesome weeds. Plowing or hoeing but increases its hold upon the soil. Indeed, one way of propagating this grass is to cut up the creeping stems and sow the pieces broadcast. It is not able to stand severe cold, however, and if plowed in December and harrowed occasionally during the winter most of it will be killed by spring. In this latitude it is not superior to many other grasses either for pasture or hay, but in the Southern States, in India, in the West Indies, and indeed in most hot countries, it is highly esteemed. It is an excellent lawn grass and will stand long droughts remarkably well. It is very useful in binding loose sand by its creeping and rooting stems, and is employed extensively on Southern rivers to hold levees and embankments of roads. The washing of the deepest gully may be stopped by planting Bermuda grass. It might be used with advantage on the embankments of railroads passing through the southern portion of the State, where it would add security and be a means of saving expense in the repair of the roads. "It will reclaim the poorest lands," says an observer in Georgia. In the Veda it is called the "armor of India, the preserver of regions, a gem that gives increase to the fields."

Meadow Fescue (*Festuca elatior*, L.) is found

plentifully on the roadsides and in the moister portions of meadows. Dr. Darlington says, "This is a valuable grass—commonly mingled with *Poa pratensis*, L., in good soils. It is extensively naturalized in the Middle and Northern States; and although I have never known it to be cultivated, it soon finds its way into all rich pasture lands."

Nerved Manna grass (*Glyceria nervata*, Trin.) grows in moist lowlands by preference. It is remarkable from the fact that it weighs the same and contains the same amount of nutriment at the time of flowering and at the time of ripening its seed. It will grow in quite wet situations, and stands cold better than most other grasses. It is sometimes called fowl meadow-grass, but this name is more generally applied to *Poa serotina*, Ehrh.

Eleusine Indica, Gaertn., variously known as yard grass, crowfoot, crab grass, wire grass and dog's-tail grass, is a native of India, but has become naturalized in yards, lanes, and everywhere about dwellings. Looked upon generally as a troublesome weed, because of the difficulty of rooting it out where it is not wanted, it is considered by those who have tested it as a very nutritious grass, "good for grazing, soiling and hay."

Low Spear grass (*Poa annua*, L.) is one of the smallest of grasses, its culm in flowering being but six to ten inches long. It blooms in this climate in favorable seasons during every month of the year, provided there be in winter a few consecutive days of warm sunshine, and in summer there is not too protracted a drought. It is the quickest grower of all grasses, often springing up, blooming, and ripening its seed in the course of one month, so that many generations are produced in a year. This habit makes it difficult to eradicate and causes it to be considered a great pest in gravel walks, gardens, etc. It is about the only grass that will maintain its foothold in public parks and squares where it is continually trodden under foot. It is too small for hay, but is much relished by cattle in early spring. Birds are very fond of its seed. A patch of it accessible to the poultry yard is of great service in the successful rearing of chickens.

To the presence of Sweet Vernal-grass (*Anthoxanthum odoratum*, L.) is due the delicious fragrance of new-mown hay. Never cultivated alone, it is highly recommended for permanent pastures consisting of a mixture of grasses.

Velvet grass (*Holcus lanatus*, L.) is quite frequently found in meadows. It is an attractive grass to the eye, and soft and velvety to the touch. Though it cannot be considered one of our best grasses, it is not without value as hay, and is cultivated in places where there are not so many other grasses that are preferred by cattle.

Barn-yard grass (*Panicum Crus-galli*, L.), as the name indicates, is found about barn-yards and is considered a coarse weed here and at the North; in the Southern States, however, it is much esteemed, ranking as cattle food above the best corn-fodder. It yields four or five tons to the acre, and cows and horses are fond of it whether green or dry. A variety is found in many places on our shores which are accessible to brackish water.

Crab-grass (*Panicum sanguinale*, L.), Prolific Panic-grass (*Panicum proliferum*, Lam.), Foxtail (*Setaria glauca*, Beauv.), Green Foxtail (*Setaria viridis*, Beauv.), Gama grass (*Tripsacum dactyloides*, L.), Tall Redtop (*Triodea cuprea*, Jacq.), Salt-grass (*Distichlis maritima*, Raf.), Couch grass (*Agropyrum repens*, Beauv.), all have more or less value as cattle food, though some of them are best known to farmers as troublesome intruders in cultivated grounds.

Common Reed (*Phragmites communis*, Trin.) is the tallest of our grasses, reaching a height of twelve feet. Its large terminal panicle renders it one of the most beautiful. Of no value as food for animals, it has been utilized in other countries in many ways, the reeds for thatching and as shafts for arrows, etc., the panicle as a dye. "It is," says an English writer, "one of nature's most valuable colonists, and is largely concerned in the gradual conversion of swamps and fens, stagnant pools and other unwholesome spots where water accumulates, into dry land." This process may be seen in operation within a few miles of Baltimore.

Indian Rice (*Zizania aquatica*, L.) is another tall grass, growing on the swampy borders of streams and in shallow water. It often reaches the height of nine feet, and is terminated by a large panicle, on which the fertile flowers, contrary to the usual arrangement, are placed above the sterile ones. The pollen grains are lighter than the atmosphere and rise when discharged from the anthers. This is exactly opposite to the arrangement in Indian corn, where the sterile flowers are above the fertile, the pollen is heavier than the atmosphere, and falls to fertilize the grain.

Speaking of this plant, Capt. John Smith says, "Mattoume groweth as our bents do in meddews. The seed is not much unlike to rye, though much smaller. This they [the Indians] use for a dainty bread buttered with deare suet." According to Vasey, it is still gathered by the Indians in Minnesota and the Northwest for food. The seeds fall when ripe at the slightest touch, and for this reason are difficult to collect. This is probably the reason why it has not become an article of food among white people. Reed birds resort to it in great numbers, and many are killed by gunners who stand in boats which they push

slowly through the grass. The bobolink as he migrates northward in spring is little noticed by sportsmen, but when he returns in the fall in sober plumage, and is fattened on Indian rice, he becomes, under the name of reed bird, much prized game.

Sea-sand grass (*Ammophila arundinacea*, Host.) is one of the most remarkable of grasses. Its services to man on sandy sea-shores have been incalculably valuable. Many square miles of agricultural land have been preserved by it in England, Scotland and Holland, from destruction by the drifting sand. "It is common on sea-coasts," says the author of "British Grasses," "establishing itself among the loose drifting sand; its extensive creeping roots have an amazing power in binding together the loose material of its home, and thus forming out of useless drifting sand a firm bank against the encroachments of the sea. So well was its value appreciated in the olden time that acts of Parliament were issued, first in Scotland and then in England also, forbidding any to molest or injure the Sea Matweed on pain of heavy fines and penalties." "The town of Provincetown, once called Cape Cod, where the Pilgrims first landed, and its harbor, still called the harbor of Cape Cod,—one of the best and most important in the United States, sufficient in depth for ships of the largest size, and in extent to anchor three thousand vessels at once," says Flint, "owe their preservation to this grass." Many thousand dollars were appropriated by Congress for planting this binder of sand. Though its services, happily, are not needed on a large scale in Maryland, a knowledge of what it has done elsewhere cannot but give us an increased respect for this member of our flora. Bermuda grass (*Cynodon Dactylon*, Pers.) with its low or prostrate, diffusely branching stems which root freely at the joints, is our most common sand-binder. The shores of the bay and its tributaries are protected against waves by Salt Reed-grass (*Spartina polystachya*, Willd.), Rush Salt grass (*S. juncea*, Willd.), Salt Marsh-grass (*S. stricta*, Roth.), Spike-grass (*Distichlis maritima*, Ref.), *Panicum proliferum*, Lam., and by several sedges principally of the genus *Scirpus* (Bulrush).

The Small Cane (*Arundinaria macrosperma*, Michx. var. *suffruticosa*, Munro) is found in great abundance in certain limited areas of sandy marsh land in inland situations. The canebrakes are not numerous, but where one occurs the plants grow close together in such numbers as to exclude other vegetation. The leaves remain through the milder winters, the plant being destroyed only by very severe weather. A succession of mild winters enables it to attain a much greater size than usual. The stalks are used by florists as supports for pot-plants. They are

strong, light and inconspicuous when in contact with green foliage.

Some grasses are very troublesome in cultivated grounds, and for this reason are viewed with much disfavor by farmers. In many cases their evil reputations are not deserved, or at least there are counter-claims to favor. Among these may be mentioned Crab-grass (*Panicum sanguinale*, L.), Barn-yard grass (*Panicum Crus-galli*, L.), Fox-tail (*Setaria glauca*, Beauv.) in corn-fields, Green Fox-tail (*S. viridis*, Beauv.), Bur grass (*Cenchrus tribuloides*, L.), Drop-seed (*Muhlenbergia diffusa*, Schroeber), Wire-grass (*Eleusine Indica*, Gaertn.), and Cheat (*Bromus secalinus*, L.) among wheat.

Several species of *Andropogon*, the so-called sedge of old sedgefields, Poverty-grass (*Aristida dichotoma*, Michx.), Worthless Panic (*Panicum depauperatum*, Muhl.), Wild Oat-grass (*Dauthonia spicata*, Beauv.), and Small Fescue grass are indicative of very sterile soil.

In dry situations are found *Aira caryophylla*, L., *Deschampsia flexuosa*, Trin., *Danthonia sericea*, Nutt., *Triodia cuprea*, Jacq., *Festuca myurus*, L., and *Muhlenbergia capillaris*, Kunth. The principal grasses of sandy fields are *Paspalum setaceum*, Michx., *Panicum filiforme*, L., *Aristida gracilis*, Ell., *Sporobolus asper*, Kunth, *Eragrostis capillaris*, Nees, and *Uniola gracilis*, Michx. Growing in wet or marshy places *Paspalum laeve*, Michx., *P. Floridanum*, Michx., *Panicum Crus-galli*, L., var. *hispidum*, *Leersia Virginica*, Willd., *L. oryzoides*, Swartz, *Erianthus saccharoides*, Michx., *Phalaris arundinaria*, L., *Trisetum palustre*, Trin., *Glyceria Canadensis*, Trin., and *G. obtusa*, Trin., are found. The most common wood grasses are *Poa brevifolia*, Muhl., *Stipa avenacea*, L., *Muhlenbergia sylvatica*, T. and G., *M. Willdenovii*, Trin., *Brachyelytrum aristatum*, Gray, *Elymus striatus*, Willd. var. *villosus*, Gray, *Bromus ciliatus*, L., and *Asprella Hystrix*, Willd.

### Discussion of a 70 Years' Record of Temperature and Rainfall at Barron Creek Springs, Maryland.

BY ALBERT E. ACWORTH.

Of the 9 instances I have on record in which the thermometer has fallen to 60° or below, in July, 6 occur between the 12th and 24th, 2 between the 5th and 11th, and 1 on the 25th. Of the 9, only 3 occur after the 20th, and of the remainder all but 2 after the 12th.

That the moon has no apparent influence is evidenced by the fact that but 1 of the cold days fell on full moon, 1 the day following, 2 on the 6th day following new moon (24 days after full

moon), and 1 each on the 1st and 5th days after full moon. A most curious fact is that five-eighths of them fell in the 2nd decade of the month, two-eighths in the 3rd, and only one-eighth in the 1st.

Of the rains in July, in 20 years, over two-thirds of them fell in the 1st and 3rd decades of the month, and it is next to May in number of rainy days, the record for May being 96 and for July, 72.

It is said that sometimes there is a difference in temperature between the even and the odd years. Taking the months of January, April, July, and October as representative ones, we find that in 19 years the odd years were .4° higher than the even ones. Taking the same months for 1889, '90, '91, and '92, the odd years were 1.4° warmer than the even ones. As another example, 8 odd years commencing with 1833 and ending with 1849, compared with 8 even years, commencing with 1830 and ending with 1846, show the latter to average only .7° higher.

In 20 years between 1823 and 1850, January was .5° colder than February, and July 2° warmer than August; but between the years of 1849 and 1852, January was only .3° colder than February, while August was 3.5° warmer than July. Again, in these 20 years the thermometer never went lower than 7.5°, while in December, 1880, at Barron Creek Springs, it was 0°, or zero, and in January, 1893, it was -9.5° or 41.5° below freezing point. These facts do not prove that the years are growing colder, but that they have a longer cycle than is generally supposed. The peach crop of northern and southern Delaware is known to have one of twenty years.

The Chesapeake bay has been frozen across as low down as Kent Island at irregular periods.

The Weather Bureau forecasts are growing in certainty as the field of observation widens. When hard winters can be predicted, the farmer will break his land in the fall and let their freezings and frosts take the place of the clod-crusher, harrow, and cultivator; and when a cold, wet spring can be prophesied, the pleasant days of winter can be used.

Verily, we are in our infancy as regards the influence of the weather on soils, if we accept as rational the views of Hilgard, Whitney, and Wolny.

### Miscellaneous Notes.

The number of meteorological observing stations of the Maryland Weather Service, at present reporting, is nearly double what it was a year ago. This growth is very encouraging, but we do not want it to cease or become less healthy and rapid. There cannot be too many observers

to furnish their records of climate in the interest of Maryland, but there can be too few, and many an important section of the State should be able to supply better reports of its advantages, climatic and otherwise, than is now possible.

There should be a station in the western part of Southern Maryland, at or near Port Tobacco, and there should be others, also, at or in the vicinity of the following named places: Crisfield, Somerset county; Hancock, Washington county; Grantsville, Garrett county; Elkton, Cecil county, and Berlin, Worcester county.

The publication of the Weekly Weather-Crop Bulletin comes to an end in October. During the remaining weeks it is desired to continue it not only with unflagging, but with increased interest, and farmers from all sections of the State are cordially invited to contribute to its success. The Bulletin is sent free of charge upon application, and cards (bearing the frank of the Department of Agriculture) for making weekly reports will be furnished any one desiring them. Those correspondents who have heretofore furnished reports are earnestly requested to continue them regularly until the close of the growing season, so that the remaining numbers of the Bulletin will be the most complete of the series.

## Review of the Month—July.

### WEATHER.

**Precipitation** (in inches).—Average, 2.97; greatest amount, 7.12, at Cambridge; least amount, 1.38, at Cumberland (1).

The precipitation of the month was distributed very unevenly. As exhibited by the map, the total fall was heavy—considerably above the normal—over a section having a breadth of from 15 to 35 miles, and extending from the mouth of the Delaware River, southwest, into the central portion of Southern Maryland. Large portions of the southern-central and western parts of Maryland, however, received much less than the average amount.

**Temperature** (degrees).—Monthly mean (for State), 76.5; highest monthly mean, 81.3, at Cambridge; lowest monthly mean, 67.8, at Oakland. Highest temperature, 102, at Denton, on the 26th; lowest temperature, 43, at Sunny Side, on the 11th and 24th. Greatest local monthly range, 52, at Denton; least local monthly range, 30, at Cambridge; mean monthly range, 39.5. Mean maximum temperature, 86.2; mean minimum temperature, 66.4.

There was a marked difference in average temperatures, the isotherms of monthly means

varying all the way from 81° near Cambridge, Dorchester county, to 68° in the vicinity of Oakland, Garrett county. The extreme western portion of Maryland was, as a matter of course, the coldest section. The next coldest was the northern portion of northern-central Maryland, including portions of Baltimore and Harford counties. Cambridge, Dorchester county, Eastern Maryland, was the station with highest temperature, and the center of the warmest section.

**Wind**.—Prevailing direction, southwest. Total movement in miles, Baltimore, 4957; Norfolk, Va., 5370; Washington, D. C., 4133.

**Auroras**.—At Cumberland (2), on the 27th; at Dover, Del., on the 15th; at Millsboro, Del., on the 4th, 7th, 10th.

**Corona**.—Lunar, at Baltimore, on the 23rd.

**Hail**.—At Denton, on the 3rd; at Mt. St. Mary's, on the 8th; at Upper Marlboro, on the 3rd.

**Halos**.—Solar, at Barron Creek Springs, on the 29th.

**Meteors**.—At Barron Creek Springs, on the 15th; at Oakland, on the 18th.

**Parhelion**.—At Barron Creek Springs, on the 20th; at Cumberland (1), on the 15th.

**Polar Bands**.—At Barron Creek Springs, on the 15th; at Cumberland (1), on the 4th, 10th.

**Thunderstorms**.—(Stations and dates), Baltimore, 3, 6, 7, 8, 13, 25. Barron Creek Springs, 3, 5, 6, 7, 8, 13, 14, 15, 16, 17, 18, 22, 26, 30, 31. Bellevue, 8. Boettcherville, 1, 7, 8, 21, 31. Cambridge, 26, 31. Cavetown, 17, 26, 31. Cumberland, 1, 7, 8, 13, 15, 17, 21, 31. Darlington, 3, 5, 8, 13, 16, 17, 18, 26. Denton, 3, 7, 8, 26, 31. Dover, Del., 1, 3, 7, 8, 16, 18, 26, 31. Easton, 3, 8, 13, 14, 26, 31. Fenby, 3, 8. Federalsburg, 3, 8, 26, 31. Frederick, 8, 14, 18, 31. Glyndon, 13. Greensboro, 3, 7, 8, 18, 26, 31. Jewell, 8, 13, 18, 26, 31. Leonardtown, 8, 18, 26. Milford, Del., 7, 8, 16, 26, 31. Millsboro, Del., 3, 6, 8, 13, 16, 17, 26, 30, 31. Millington, 3, 8, 18, 26. Mt. St. Mary's, 8, 14. New Market, 8, 14. Oakland, 6, 8, 14, 26, 29. Port Deposit, 3, 8. Salisbury, 5, 14, 26. Seaford, Del., 3, 4, 6, 8, 13, 26, 31. Solomon's, 3, 8, 13, 14, 16, 18, 26, 29, 31. Upper Marlboro, 3, 8, 26.

### CROPS.

*Week ending July 4th.*

Wheat harvest about half over, and a good yield is expected. Oats look the best for years. Peaches are growing finely, and a heavy market should result. Apples promise to give a fair crop in most sections. Peas are being shipped. A fair crop of corn may be looked for. The



clover crop will be good, but the prospects for timothy are not so favorable.

*Week ending July 10th.*

Buckwheat progressing nicely. Haying commenced. Raspberries short, but the plum and peach crops are good. Cherries will give an average yield. Gardening prospects fine, potatoes and tomatoes doing especially well. Oats are heading nicely. Tobacco improving, but suffering from cut-worm in some sections. Fruit prospects good. Cucumbers a little backward.

*Week ending July 17th.*

Hay-making about over, and fair yield. Potato crop above average. Some oats being cut. Corn making splendid growth. Second crop of clover coming in. Vegetables plentiful. Tobacco growing nicely. Apple crop best in years. Wheat threshing nearly completed, and yield above expectations. Potato vines growing vigorously, and indications point to a big crop. Peaches are being shipped in large quantities, and the quality is good.

*Week ending July 24th.*

Corn coming into tassel, and the crop looks well. Wild berries a failure. Plowing for fall crops has commenced. Potatoes ripening. Fruit suffering some from insects. Gardens look dry. Early peach and apple crops good. Reports from Eastern Maryland state that the yield of wheat is the largest in years; the quality, too, is excellent.

*Week ending July 31st.*

Corn injured by drought, but still looks well in most localities. Some potatoes dug, and average yield reported. Vegetation, generally, suffering for want of rain. Some plowing for fall seeding being done. Gardens and pastures would be much benefited by rains. Heavy yields of peaches reported from some orchards. Prospect for apples is good. Satisfactory yield of wheat, generally, but light in some places.

### Notes by Observers.

**Barron Creek Springs, Md.**—Average humidity, 73 per cent.; high winds, 4, 6, 8, 10, 16, 18, 22, 23, 24, 25, 26, 27, 29; corn wilted on the 18th, and was little changed to the 31st.

A. E. ACWORTH.

**Boettcherville, Md.**—Corn and apples were slightly damaged by high northwest winds—70 miles per hour—on the 26th.

F. F. BROWN.

**Cambridge, Md.**—On July 31st, from 6 to 8 o'clock, we had four inches of rain. During the

remaining 7 hours it fell slowly. Altogether, it was the heaviest fall of water (5.12 inches) we have had for several years. There was very little thunder and lightning accompanying the rain.

CALVERT OREM.

**Cumberland, Md.**—2nd, first mosquitoes; birds of all kinds scarce. 8th, thick fog. 13th, fine electrical display at 9 P. M. Until a few days back, say 21st, the flow of the medicinal spring at Narrows was rather lighter than usual. This spring is the only one I know of that holds its own summer and winter; but on visiting it on the 27th, the stream was two or three times as large as usual. This was during the great drought of two months' duration. There had been a rain of 3 or 4 tenths of an inch, but that was insufficient to account for this increased flow. 27th, river and creek very low.

HOWARD SHRIVER.

**Denton, Md.**—Two heavy thunderstorms occurred on the 3rd, one at 7.15 P. M., and the other at 10.30 P. M. Some hail fell during the first storm, and very heavy thunder accompanied the second.

F. C. RAMSDALL.

**Fallston, Md.**—Mean temperature for July at this point for 20 years, 74 degrees, and mean rainfall, 4.92 inches.

G. G. CURTISS, A. M.

**Fenby, Md.**—The first half of the month was very favorable for all growing crops. Hay and grain were saved in good condition. Wheat and barley yield heavy. August 1st—Ground very dry, and unless we have rain soon, vegetation must suffer.

WILLIAM FENBY.

**Millsboro, Del.**—Very high wind on the 26th. Showers rising west of north, pass at the west; those rising a few points east of north, pass east. Thus far, more showers have passed west. Last year the majority passed east.

REV. L. W. WELLS.

**New Market, Md.**—During a thunderstorm on the 8th, a barn was struck, and four men in it were knocked down. The barn did not catch on fire, but some shingles were torn from the roof by the lightning.

MISS MARGARET D. HOPKINS.

**Oakland, Md.**—6th, 8.30 P. M., electrical storm began due west and went south. Lightning was continuous till 12.08 A. M. of the 7th. 9th, heavy dark clouds in west, going north; wind west; 8 P. M., indications of rain. 25th, water very low, and roads dry and dusty.

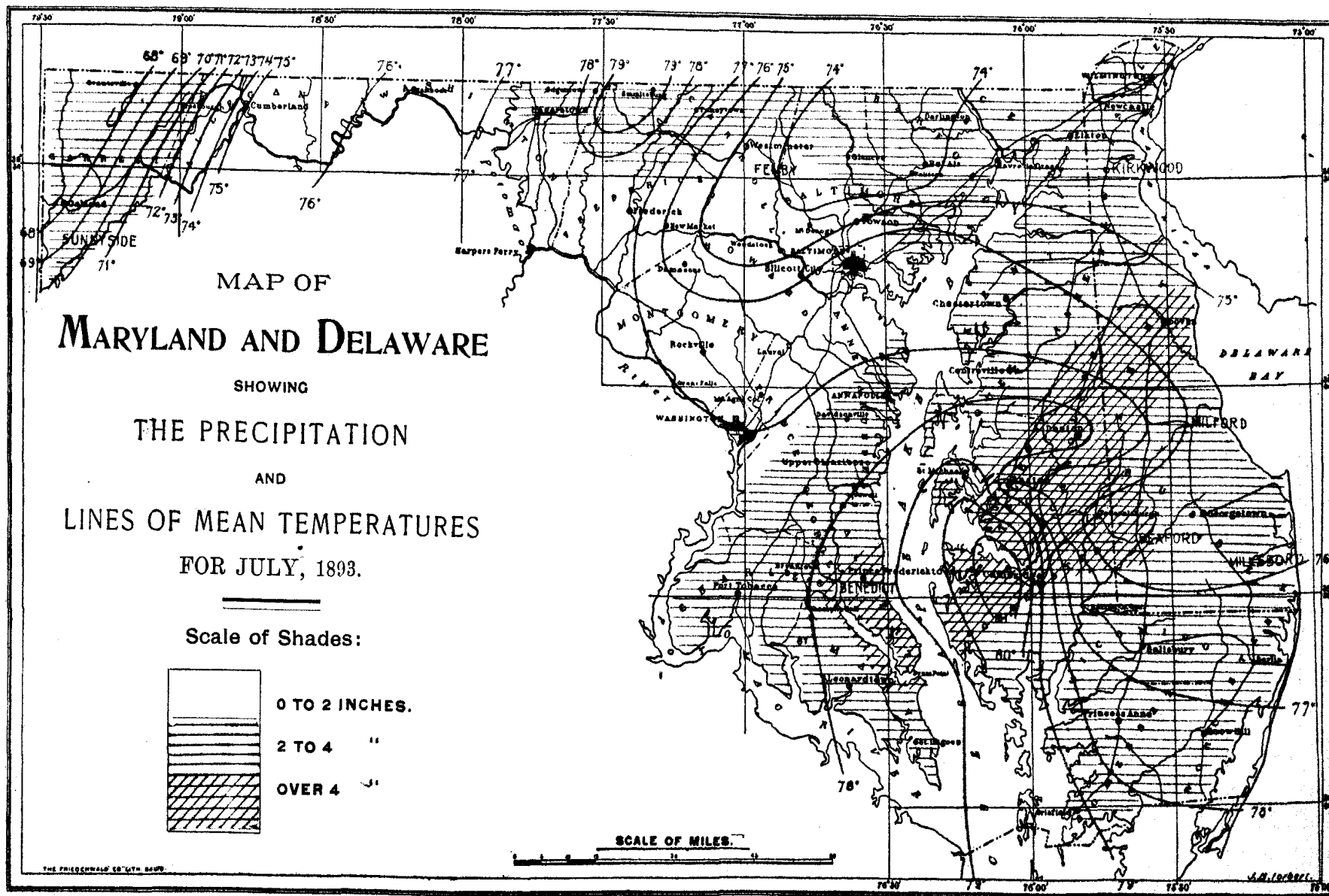
J. LEE MCCOMAS, M. D.

**Upper Marlboro, Md.**—Some hail with the thunderstorm on the evening of the 3rd. 8th, thunderstorm with high wind. During the last storm the roar of the thunder to the west, while the cloud was coming up, was continuous.

J. B. PARRIE.

**Warsaw, Va.**—Nearly all the rains were from thunderstorms.

C. H. CONSTABLE.





# Meteorological and Weather Signal Display Stations of the Maryland State Weather Service.

| Stations.                         | County.              | Meteorological Observer.  | Displayman.          |
|-----------------------------------|----------------------|---|----------------------|
| Annapolis.....                    | Anne Arundel.....    |   | W. M. Abbott.        |
| Appleton.....                     | Cecil.....           |   | W. C. Henderson.     |
| Baltimore.....                    |                      | G. N. Wilson.<br>E. C. Meredith.<br>A. T. Brewer.<br>H. D. Steuart.<br>R. C. New,<br>Ass't Editor of Monthly Report<br>and Weekly Bulletin. |                      |
| Barron Creek Springs...           | Wicomico.....        | A. E. Acworth.....  | L. A. Wilson.        |
| Benedict.....                     | Charles.....         | Thomas Berry.   |                      |
| Bel Air.....                      | Harford.....         |   | N. N. Nock.          |
| Boettcherville..                  | Alleghany.....       | F. F. Brown.  |                      |
| Bradshaw.....                     | Baltimore.....       |   | B. F. Taylor.        |
| Buckeystown.....                  | Frederick.....       |   | A. W. Nicodemus.     |
| Cambridge.....                    | Dorchester.....      | Calvert Orem.....   | Calvert Orem.        |
| Chestertown.....                  | Kent.....            | Hon. M. deK. Smith.....   | J. S. Vandegrift.    |
| Cumberland.....                   | Alleghany.....       | Howard Shriver.<br>E. T. Shriver.   |                      |
| Darlington.....                   | Harford.....         | A. F. Galbreath.....  | A. F. Galbreath.     |
| Delaware City, Del.....           | New Castle.....      |   | W. E. Reybold.       |
| Denton.....                       | Caroline.....        | F. C. Ramsdell.   |                      |
| Dickerson.....                    | Montgomery.....      |   | W. H. Dickerson.     |
| Distributing Reservoir, D. C..... |                      | Lieut.-Col. Elliot.   |                      |
| Dover, Del.....                   | Kent.....            | Jno. S. Jester.   |                      |
| Easton.....                       | Talbot.....          | G. W. Minnick.....  | G. W. Minnick.       |
| Edgemont.....                     | Washington.....      | Chas. Feldman.  |                      |
| Fallston.....                     | Harford.....         | G. G. Curtiss, A. M.  |                      |
| Fenby.....                        | Carroll.....         | Wm. Fenby.  |                      |
| †Felton, Del.....                 | Kent.....            |   | J. H. Hubbard.       |
| Frederick.....                    | Frederick.....       | G. Ernest Bantz.....  | W. T. Delaplaine.    |
| Frostburg.....                    | Alleghany.....       |   | C. J. Conner.        |
| Glyndon.....                      | Baltimore.....       | A. W. Nyce.....   | A. W. Nyce.          |
| Grantsville.....                  | Garrett.....         |   | T. H. Bittering.     |
| Great Falls.....                  | Montgomery.....      | Lieut.-Col. Elliot.   |                      |
| Havre de Grace.....               | Harford.....         |   | W. S. McCombs.       |
| Jewell.....                       | Anne Arundel.....    | Jos. Plummer.   |                      |
| Kirkwood, Del ..                  | New Castle.....      | W. C. L. Carnagy.   |                      |
| Leonardtown.....                  | St. Mary's.....      | G. W. Joy.  |                      |
| Lonaconing.....                   | Alleghany.....       |   | J. J. Robinson.      |
| McDonogh.....                     | Baltimore.....       | H. Pender.  |                      |
| Middletown.....                   | Frederick.....       |   | G. C. Rhoderick, Jr. |
| Milford, Del.....                 | Kent.....            | J. Y. Foulk.....  | J. Y. Foulk.         |
| Millsboro, Del.....               | Sussex.....          | Rev. L. W. Wells.   |                      |
| Mt. St. Mary's.....               | Frederick.....       | J. A. Mitchell, A. M.....   | Jos. H. Martin.      |
| New Market.....                   | Frederick.....       | Miss Margaret D. Hopkins.   |                      |
| Oakland.....                      | Garrett.....         | J. Lee McComas, M. D.   |                      |
| Odenton.....                      | Anne Arundel.....    |   | E. B. Watts.         |
| Receiving Reservoir, D. C.....    |                      | Lieut.-Col. Elliot.   |                      |
| Rising Sun.....                   | Cecil.....           |   | E. A. Reynolds.      |
| Salisbury.....                    | Wicomico.....        | Col. Lemuel Malone.....   | L. W. Gunby.         |
| Seaford, Del.....                 | Sussex.....          | H. L. Wallace.....  | H. L. Wallace.       |
| Snow Hill.....                    | Worcester.....       |   | Purnell & Vincent.   |
| Solomon's.....                    | Calvert.....         | W. H. Marsh, M. D.  |                      |
| †Sparrow's Point.....             | Baltimore.....       |   | Md. Steel Co.        |
| St. Michael's.....                | Talbot.....          |   | E. M. Jefferson.     |
| Sunny Side.....                   | Garrett.....         | John G. Knauer.   |                      |
| Upper Marlboro.....               | Prince George's..... | J. B. Perrie.   |                      |
| Washington, D. C.....             |                      | S. W. Beall.  |                      |
| Westover.....                     | Somerset.....        |   | E. D. Long.          |
| Wilmington, Del.....              | New Castle.....      |   | Wm. Lawton.          |
| Woodsboro.....                    | Frederick.....       |   | G. F. Smith.         |
| Woodstock.....                    | Howard.....          | T. J. A. Freeman, S. J.   |                      |
| *Birdsnest, Va.....               | Northampton.....     | C. R. Moore.  |                      |
| *Cape Charles, Va.....            | Northampton.....     | O. A. Browne.   |                      |
| *Norfolk, Va.....                 | Norfolk.....         | A. B. Crane.  |                      |
| *Warsaw, Va.....                  | Richmond.....        | C. H. Constable.  |                      |

\*Stations of the Virginia State Weather Service. †Whistle signals only.

# MONTHLY SUMMARY OF REPORTS FOR JULY, 1893.

| STATIONS.                  | COUNTIES.    | Altitude above<br>sea in ft. | Latitude. | Longitude. | TEMPERATURE.     |                 |                 |         |        |         |        |      |      |      | Monthly<br>Range. | Total Precipitation. | Clear Days. | Fair Days. | Cloudy Days. | Rainy Days.<br>(.01" or more.) | Prevailing<br>Wind. |
|----------------------------|--------------|------------------------------|-----------|------------|------------------|-----------------|-----------------|---------|--------|---------|--------|------|------|------|-------------------|----------------------|-------------|------------|--------------|--------------------------------|---------------------|
|                            |              |                              |           |            | Monthly<br>Mean. | Mean of<br>Max. | Mean of<br>Min. | Max.    |        | Min.    |        |      |      |      |                   |                      |             |            |              |                                |                     |
|                            |              |                              |           |            |                  |                 |                 | Degrees | Date.  | Degrees | Date.  |      |      |      |                   |                      |             |            |              |                                |                     |
| WESTERN MARYLAND.          |              |                              |           |            |                  |                 |                 |         |        |         |        |      |      |      |                   |                      |             |            |              |                                |                     |
| Boethcherville             | Alleghany    | 650                          | 39°33'    | 78°48'     | 75.6             | 86.7            | 64.6            | 99      | 21     | 54      | 24, 28 | 45   | 1.50 | ...  | ...               | ...                  | ...         | 6          | N.W.         |                                |                     |
| Cumberland (1)             | Alleghany    | 650                          | 39°39'    | 78°46'     | *77.7            | 89.1            | 67.1            | 97      | 25     | 57      | 11, 28 | 40   | 1.38 | ...  | ...               | ...                  | ...         | 7          | ...          |                                |                     |
| Cumberland (2)             | Alleghany    | 650                          | 39°39'    | 78°45'     | 75.2             | 85.1            | 64.5            | 94      | 8, 25  | 55      | 27     | 39   | 1.40 | 24   | 5                 | 2                    | 7           | ...        | ...          |                                |                     |
| Oakland                    | Garrett      | 2376                         | 39°24'    | 79°29'     | *67.8            | 78.6            | ...             | 87      | 25     | 47      | 28     | 40   | 3.08 | 21   | 9                 | 1                    | 11          | S.W.       | ...          |                                |                     |
| Sunny Side                 | Garrett      | ...                          | 39°20'    | 79°28'     | 68.9             | 81.7            | 56.1            | 90      | 7      | 43      | 11, 24 | 47   | 2.61 | 16   | 6                 | 9                    | 8           | S.W.       | ...          |                                |                     |
| Averages                   | ...          | ...                          | ...       | ...        | 73.0             | 84.2            | 63.1            | ...     | ...    | ...     | ...    | 42.2 | 1.99 | 20.3 | 6.6               | 4                    | 7.8         | S.W.       | ...          |                                |                     |
| NORTHERN-CENTRAL MARYLAND. |              |                              |           |            |                  |                 |                 |         |        |         |        |      |      |      |                   |                      |             |            |              |                                |                     |
| Baltimore                  | ...          | 179                          | 39°17'    | 76°36'     | 76.8             | 86.3            | 67.6            | 96      | 26     | 58      | 11     | 38   | 1.88 | 13   | 14                | 4                    | 11          | S.W.       | ...          |                                |                     |
| Darlington                 | Harford      | 300                          | 38°47'    | 76°14'     | 74.4             | 84.6            | 64.2            | 95      | 26     | 55      | 28     | 40   | 2.98 | 28   | 1                 | 2                    | 6           | W.         | ...          |                                |                     |
| Dist. Res., D. C.          | ...          | ...                          | 39°9'     | 77°0'      | *77.8            | ...             | ...             | *94     | 26     | *63     | 11     | 31   | 1.47 | ...  | ...               | ...                  | ...         | ...        | ...          |                                |                     |
| Fallston                   | Harford      | 450                          | 39°31'    | 76°24'     | *73.4            | ...             | ...             | *95     | 26     | *57     | 28     | 38   | 2.68 | 16   | 10                | 5                    | 7           | S.W.       | ...          |                                |                     |
| Fenby                      | Carroll      | 950                          | 39°33'    | 77°5'      | *74.4            | ...             | ...             | *94     | 26     | *60     | 24     | 34   | 1.40 | b19  | b10               | b0                   | 6           | N.W.       | ...          |                                |                     |
| Frederick                  | Frederick    | 280                          | 39°24'    | 77°18'     | 77.2             | 88.4            | 66.0            | 97      | 26     | 55      | 11, 28 | 42   | 1.80 | 17   | 14                | 0                    | 8           | ...        | ...          |                                |                     |
| Great Falls                | Montgomery   | ...                          | 39°0'     | 77°14'     | *77.4            | ...             | ...             | 96      | 26     | 61      | 28     | 35   | 2.10 | ...  | ...               | ...                  | ...         | ...        | ...          |                                |                     |
| McDonogh                   | Baltimore    | 535                          | 39°23'    | 76°44'     | *74.8            | b83.6           | b66.3           | 92      | 26     | 56      | 2      | 36   | 1.94 | ...  | ...               | ...                  | 3           | ...        | ...          |                                |                     |
| Mt. St. Mary's             | Frederick    | 720                          | 39°41'    | 77°21'     | 79.2             | 87.2            | 71.3            | 99      | 31     | 60      | 25     | 39   | 3.58 | 18   | 4                 | 9                    | 5           | N.W.       | ...          |                                |                     |
| New Market                 | Frederick    | 500                          | 39°23'    | 77°18'     | *75.4            | ...             | ...             | *95     | 29     | *56     | 24     | 39   | 1.70 | 23   | 8                 | 0                    | 4           | N.W.       | ...          |                                |                     |
| Rec. Res., D. C.           | ...          | ...                          | 38°52'    | 77°0'      | *77.4            | ...             | ...             | *94     | 26     | *63     | 28     | 31   | 2.41 | ...  | ...               | ...                  | ...         | ...        | ...          |                                |                     |
| Washington, D. C.          | ...          | 112                          | 38°52'    | 77°0'      | 77.0             | 87.1            | 66.9            | 97      | 26     | 57      | 11     | 40   | 1.44 | 17   | 11                | 3                    | 11          | S.         | ...          |                                |                     |
| Averages                   | ...          | ...                          | ...       | ...        | 76.3             | 86.2            | 67.0            | ...     | ...    | ...     | ...    | 36.9 | 2.12 | 19.1 | 9                 | 2.9                  | 6.8         | N.W.       | ...          |                                |                     |
| SOUTHERN MARYLAND.         |              |                              |           |            |                  |                 |                 |         |        |         |        |      |      |      |                   |                      |             |            |              |                                |                     |
| Benedict                   | Charles      | ...                          | 38°31'    | 76°39'     | 78.6             | 89.1            | 68.2            | 99      | 27     | 60      | 11     | 39   | 4.17 | 18   | 5                 | 8                    | 7           | S.W.       | ...          |                                |                     |
| Charlotte Hall             | St. Mary's   | ...                          | 38°30'    | 76°44'     | ...              | ...             | ...             | ...     | ...    | ...     | ...    | ...  | 3.66 | ...  | ...               | ...                  | ...         | ...        | ...          |                                |                     |
| Jewell                     | Anne Arundel | ...                          | 38°44'    | 76°36'     | *78.0            | ...             | ...             | ...     | ...    | ...     | ...    | ...  | 2.50 | 28   | 3                 | 0                    | 5           | S.W.       | ...          |                                |                     |
| Leonardtown                | St. Mary's   | ...                          | 38°18'    | 76°40'     | 78.2             | 87.5            | 69.2            | 95      | 26     | 57      | 2      | 38   | 3.64 | 17   | 14                | 0                    | 7           | S.W.       | ...          |                                |                     |
| Solomon's                  | Calvert      | 20                           | 38°19'    | 76°27'     | 78.2             | 86.8            | 69.5            | 94      | 13, 26 | 61      | 2      | 33   | 4.14 | 10   | 9                 | 12                   | 12          | S.W.       | ...          |                                |                     |
| Upper Marlboro             | Pr. George's | ...                          | 38°47'    | 76°45'     | 77.4             | 88.7            | 65.8            | 99      | 26     | 55      | 24, 28 | 44   | 2.54 | 20   | 8                 | 3                    | 6           | N.W.       | ...          |                                |                     |
| Averages                   | ...          | ...                          | ...       | ...        | 80.1             | 88.0            | 68.2            | ...     | ...    | ...     | ...    | 38.5 | 3.44 | 18.6 | 7.8               | 4.6                  | 7.4         | S.W.       | ...          |                                |                     |
| EASTERN MD. AND DELAWARE.  |              |                              |           |            |                  |                 |                 |         |        |         |        |      |      |      |                   |                      |             |            |              |                                |                     |
| Barron Ck. Springs         | Wicomico     | 25                           | 38°29'    | 75°39'     | 75.6             | 84.9            | 66.4            | 94      | 26     | 53      | 28     | 41   | 2.20 | 15   | 13                | 3                    | 8           | S.W.       | ...          |                                |                     |
| Cambridge                  | Dorchester   | ...                          | 39°39'    | 76°46'     | 81.3             | 87.9            | 74.7            | 97      | 26     | 67      | 24     | 30   | 7.12 | 0    | 26                | 5                    | 9           | N.W.       | ...          |                                |                     |
| Denton                     | Caroline     | 72                           | 38°52'    | 75°41'     | 78.2             | 88.9            | 67.4            | 102     | 26     | 50      | 25     | 52   | 4.97 | 26   | 3                 | 2                    | 5           | W.         | ...          |                                |                     |
| Dover, Del.                | Kent         | ...                          | 38°42'    | 75°31'     | 75.2             | 83.8            | 66.7            | 94      | 26     | 56      | 28     | 38   | 5.29 | 24   | 3                 | 4                    | 12          | S.W.       | ...          |                                |                     |
| Easton                     | Talbot       | 35                           | 38°42'    | 76°6'      | 77.2             | 86.0            | 68.3            | 95      | 18     | 58      | 28     | 37   | 4.29 | 29   | 0                 | 2                    | 8           | S.W.       | ...          |                                |                     |
| Kirkwood, Del.             | New Castle   | ...                          | 39°35'    | 75°40'     | *74.8            | ...             | ...             | ...     | ...    | ...     | ...    | ...  | ...  | ...  | ...               | ...                  | ...         | ...        | ...          |                                |                     |
| Millford, Del.             | Kent         | ...                          | 38°56'    | 75°25'     | 76.0             | 85.8            | 68.1            | 94      | 26     | 54      | 25     | 40   | 2.19 | 30   | 0                 | 1                    | 6           | S.W.       | ...          |                                |                     |
| Millsboro, Del.            | Sussex       | ...                          | 39°41'    | 75°15'     | 75.8             | 86.4            | 65.1            | 97      | 26     | 51      | 25     | 46   | 2.47 | 21   | 7                 | 3                    | 6           | N.         | ...          |                                |                     |
| Seaford, Del.              | Sussex       | ...                          | 38°40'    | 75°35'     | 75.8             | 85.9            | 65.1            | 96      | 18     | 56      | 25     | 40   | 6.08 | ...  | ...               | ...                  | ...         | ...        | ...          |                                |                     |
| Averages                   | ...          | ...                          | ...       | ...        | 76.6             | 86.2            | 67.5            | ...     | ...    | ...     | ...    | 40.5 | 4.33 | 20.7 | 7.4               | 2.9                  | 7.8         | S.W.       | ...          |                                |                     |
| Average for State          | ...          | ...                          | ...       | ...        | 76.5             | 86.2            | 66.4            | ...     | ...    | ...     | ...    | 39.5 | 2.97 | 19.7 | 7.7               | 3.6                  | 7.4         | S.W.       | ...          |                                |                     |
| VIRGINIA.                  |              |                              |           |            |                  |                 |                 |         |        |         |        |      |      |      |                   |                      |             |            |              |                                |                     |
| Cape Charles               | Northampton  | ...                          | ...       | ...        | *76.0            | 85.8            | 66.3            | *98     | 26     | *50     | 1      | 48   | 3.81 | 4    | 13                | 14                   | 7           | S.E.       | ...          |                                |                     |
| Norfolk                    | Norfolk      | ...                          | ...       | ...        | 79.0             | 88.0            | 70.0            | 95      | 16     | 62      | 1      | 33   | 6.11 | 16   | 13                | 2                    | 11          | S.W.       | ...          |                                |                     |
| Warsaw                     | Richmond     | ...                          | ...       | ...        | 77.3             | 88.3            | 66.3            | 96      | 26     | 58      | 25     | 38   | 6.67 | 14   | 13                | 4                    | 9           | S.         | ...          |                                |                     |

NOTE.—Letters of the alphabet are used to indicate the number of days that are missing from record: e. g. a—one day, b—two days, etc. (1)—H. SHRIVER. (2)—E. T. SHRIVER. \* From tri-daily readings. † From bi-daily readings.

## DAILY PRECIPITATION FOR JULY, 1893.

| STATIONS.      | 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   | Total. |      |      |
|----------------|------|------|------|-----|-----|-----|-----|------|-----|------|-----|----|-----|------|------|------|-----|-----|-----|----|-----|----|----|----|----|-----|-----|-----|----|----|------|--------|------|------|
| Baltimore.     | .... | .04  | .33  | .01 |     | T   | .03 | 1.09 | .01 |      |     |    | .01 | T    | .06  | .... | T   | .01 |     |    |     |    |    |    |    | .27 | T   |     | T  |    | .02  | 1.88   |      |      |
| Barron C.S.    | .... | .51  | .51  |     | T   |     | .02 | .61  |     |      |     |    | .15 | T    | .30  | .12  | .07 | .05 |     |    |     |    |    |    |    | .28 |     |     |    |    |      | 2.20   |      |      |
| Benedict.      | .... | .60  |      |     |     |     |     |      |     | .50  |     |    |     | .30  | .12  |      |     | .60 |     |    |     |    |    |    |    |     |     |     |    |    |      | 1.82   | 4.17 |      |
| Boettcherv.    | .... | .40  | T    |     |     |     |     | T    |     |      |     |    | .10 |      | .40  |      | .10 |     |     |    |     |    |    |    |    |     |     | .23 |    |    |      | 4.0    | 1.50 |      |
| Cambridge.     | .... | .10  | .40  |     | .18 |     |     | .46  |     |      |     |    | .36 | .48  |      |      | .10 | .10 |     |    |     |    |    |    |    |     |     |     |    |    | 5.12 | 7.12   |      |      |
| Charlotte Hall | .... | .45  | .20  |     |     |     |     | .60  |     |      |     |    | .16 | .25  |      |      |     |     |     |    |     |    |    |    |    |     | .18 |     |    |    |      | 3.66   |      |      |
| Cumb. (1)      | .... |      | .37  |     |     |     |     |      |     |      |     |    | .16 |      | .24  |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      | .36    | 1.38 |      |
| Cumb. (2)      | .... |      | .42  |     |     |     |     |      |     |      |     |    | .10 | .24  |      | .05  |     |     |     |    | .10 |    |    |    |    | .07 |     |     |    |    |      | .34    | 1.40 |      |
| Darlington.    | .... |      |      |     |     |     | .34 |      |     |      |     |    | .54 |      |      | .55  |     |     |     |    | .17 |    |    |    |    | .08 |     |     |    |    |      | 2.98   |      |      |
| Denton.        | .... |      | 1.19 |     |     |     | .81 | .75  |     |      |     |    | T   |      |      |      |     | .20 |     |    |     |    |    |    |    | .05 |     |     |    |    |      | 4.97   |      |      |
| Dist. R., D.C. | .... |      |      | .15 |     |     |     |      |     | .50  |     |    |     |      | .02  | .46  |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 1.47 |      |
| Dover, Del.    | .... | .61  | .26  |     |     |     | .19 | .21  |     |      |     |    | .45 |      |      | .22  |     | .22 |     |    |     |    |    |    |    |     |     | .06 |    |    |      |        | 2.42 | 5.29 |
| Easton         | .... | .22  | 1.23 |     |     | .53 |     | .60  |     |      |     |    | .10 |      | .12  |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 1.11 | 4.29 |
| Fallston.      | .... |      | .39  |     |     |     | .22 | .12  |     |      |     |    | .60 | T    | T    | .22  |     | .83 |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.68 |      |
| Fenby.         | .... | .20  | T    |     |     |     | .10 | .60  |     |      |     |    | T   | T    |      |      |     | .20 |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 1.40 |      |
| Frederick.     | .... | .07  |      |     | .20 |     | .01 | .64  |     |      |     |    | .03 | .88  |      |      |     |     | .03 |    |     |    |    |    |    |     |     |     |    |    |      |        | 1.80 |      |
| Great Falls    | .... | .26  |      | .16 |     |     |     |      |     | .28  |     |    |     |      | 1.40 |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.10 |      |
| Jewell.        | .... | T    |      | .80 |     |     |     | .25  |     |      |     |    | T   | 1.00 |      | T    |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.50 |      |
| Leonardt'n     | .... | .41  |      |     |     |     |     | 1.42 |     |      |     |    |     | .44  |      |      |     | .78 |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.60 |      |
| McDonogh.      | .... |      |      |     |     |     |     |      |     |      |     |    | .24 |      | 1.13 |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 1.94 |      |
| Millford, Del. | .... | .67  | .30  |     |     |     | .40 |      |     | .91  |     |    |     |      | .01  |      |     |     | .03 |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.19 |      |
| Millsb'o, Del. | .... | 1.25 | .04  |     |     |     | .67 | .35  |     |      |     |    |     |      |      |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.47 |      |
| M. S. Mary's   | .... |      |      |     |     | .02 | .01 | 1.94 |     |      |     |    | .34 |      | 1.27 |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 3.58 |      |
| New Markt      | .... | .10  | T    | T   |     |     | .00 |      |     | .31  |     |    | .70 |      | T    |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 1.70 |      |
| Oakland.       | .... | .36  | .09  |     |     | .03 |     | .35  |     |      |     |    |     | .62  |      |      | .26 |     | .07 |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.08 |      |
| R. R., D. C.   | .... |      | .17  |     | .30 |     |     |      |     | 1.23 |     |    |     |      | .77  |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.41 |      |
| Seaford Del.   | .... |      | .05  |     | .75 |     | .49 | .76  |     |      |     |    | .29 |      |      |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 3.06 |      |
| Sunny Side     | .... | .29  | .25  |     |     | .14 |     | .54  |     |      |     |    |     | .37  |      | T    | .16 |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 6.08 |      |
| Solomon's.     | .... | .06  | .43  |     | .12 |     |     |      |     |      |     |    | .50 |      | .09  |      |     | .40 |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.61 |      |
| Upper Marl.    | .... |      |      | T   |     |     |     | .82  |     |      | T   |    | .03 |      | .55  |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 4.14 |      |
| Wash., D. C.   | .... | .03  | .03  | T   |     |     |     | .42  | .01 |      |     |    |     | .14  | .31  |      |     |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 2.54 |      |
| C. Chas., Va.  | .... |      | 1.70 |     |     |     |     | .14  |     |      | .12 |    |     |      |      | 1.00 |     | .02 |     |    | T   |    |    |    |    |     |     |     |    |    |      |        | 1.44 |      |
| Norfolk, Va.   | .... | 2.82 | 1.38 |     | .09 |     | T   |      |     | .06  | .07 | T  |     | .05  | .23  | .95  | .04 |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 6.11 |      |
| Warsaw, Va.    | .... |      | 1.70 | .79 |     |     |     | .95  |     |      |     |    |     |      | .75  | .48  | .80 |     |     |    |     |    |    |    |    |     |     |     |    |    |      |        | 3.87 |      |