

## NOTES, ABSTRACTS, AND REVIEWS.

## MEETING OF THE AMERICAN METEOROLOGICAL SOCIETY TO BE HELD IN LOS ANGELES, CALIFORNIA, SEPTEMBER 17-19, 1923.

The Pacific Branch of the Association for the Advancement of Science has kindly invited the western members of the American Meteorological Society to meet with them at their annual meeting in Los Angeles, Calif., on September 17, 18, 19, 1923. In response to a questionnaire about 22 members of the A. M. S. have signified their desire to attend and present papers on that occasion. This will insure a successful meeting, as very likely there will be more to come later. Quite a number stated they could not this early say positively that they would be on hand for the meetings; but would advise the secretary pro tem at a later date if they found it possible to be there.

It is proposed to hold a symposium on the relation of the weather to forest fires, which will be of interest to the meteorologists and to Forest officials connected with our National Forests, as well as to those interested in privately owned timber. Also at least half a day will be taken up with matters pertaining to evaporation and to precipitation in the mountains as affecting the run-off of streams from which water is employed for irrigation and hydroelectric purposes.

Other papers will be presented pertaining to nearly every branch of meteorology and these, together with their discussion, will provide food for thought for some time to come. Our members will be invited to the entertainments given by the citizens of Los Angeles to the Pacific Branch of the American Association for the Advancement of Science, and all will share in the reduced transportation rates that will be available at the time of the meeting.—*E. A. Beals, Secretary Pro-tem.*

## POLAR-FRONT THEORY OF THE STRUCTURE OF CYCLONES DISCUSSED BY THE ROYAL METEOROLOGICAL SOCIETY.

[Reprinted from *The Meteorological Magazine*, May, 1923, p. 84.]

The monthly meeting of the society was held on Wednesday, April 18, 1923, at 49 Cromwell Road, South Kensington, Dr. C. Chree, F. R. S., president, in the chair.

*W. H. Dines, F. R. S., and L. H. G. Dines, M. A.—An examination of British upper-air data in the light of the Norwegian theory of the structure of the cyclone.*

The theories of the Norwegian school of meteorologists, which have occupied so much attention during the last few years, were formulated without much reference to upper-air observations, and the desirability of a scrutiny of such observations as are available is manifest. Such a scrutiny has been made by the authors of this paper, and the results are disappointing.

The first method adopted was to select from the occasions on which *ballon sonde* records were available, those on which the synoptic charts indicated that it was likely that the balloon had passed through the polar front. Graphs showing the relation of temperature to height were drawn for these occasions, and compared with graphs for other occasions, selected more or less at random. It was found that there were no striking differences between the two groups, inversions of temperature occurring with about the same frequency.

A second problem, the relation between humidity and temperature, was attacked by utilizing the kite ascents made at Pyrtton Hill. It was found that an inversion of temperature was nearly always associated with a decrease

in the humidity, whereas the Norwegian theory requires an increase.

The conclusion reached is that the observational evidence fails to support the hypothesis that the superposition of equatorial over polar air is a characteristic feature of the structure of a cyclone. The speakers who took part in the discussion showed great reluctance to accept this conclusion. Further examination of the material is evidently desirable.

## FROST RECESSION FROM GROUND IN ALASKA.

[Reprinted from *The Official Record*, Department of Agriculture, Washington, June 6, 1923.]

Travelers and others in Alaska have frequently commented on the frozen earth that lies just under the blanket of moss so common throughout much of the Territory, and this has led many to believe that crop production could not be made successful in much of that country. The experience at the experiment stations in the interior of Alaska is quite to the contrary. In many parts the ice is not permanent except under the layer of moss. When this is removed the stratum of permanent ice recedes and agriculture becomes possible.

At the Rampart station, which is situated within about 50 miles of the Arctic Circle, grain growing has been carried on successfully for more than 20 years. The first clearing was made in 1900 and a layer of moss removed from the land. At that time the soil was frozen to within 8 inches of the surface. After one summer's exposure the ice had melted to a sufficient depth to permit the first crop to be planted. The ice layer has now receded to a depth of 6 or 7 feet and it is still gradually being lowered.

The presence of this frozen subsoil is not without advantage in the interior of Alaska, where the rainfall is light and dry seasons sometimes prevail. At such times the moisture from below is brought to the roots of plants by capillarity and crop production is assured.

The receding of the permanent ice is shown in other ways. At the Holy Cross Mission, on the lower Yukon River, a well was dug in the summer of 1899 to a depth of 25 feet and no permanent ice encountered. The place where the well was dug had been under cultivation for about 10 years.

At the Fairbanks station in the spring of 1909 a well 40 feet deep was dug and no frost met with except in the first 2 feet on land cleared in 1907.

These instances show that if the moss is removed the ice will thaw to a greater depth in summer than it freezes in winter.

## WATER BALANCE IN THE PANAMA CANAL, DRY SEASON OF 1923.

By R. Z. KIRKPATRICK, Chief Hydrographer.

Figure 1 shows concisely the amount of water available for all uses at the Panama Canal during the dry season of 1923 and the amount available as storage at the beginning of the rainy season May 1, 1923.

## MORTALITY FROM HEAT AND SUNSTROKE.

[Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Co., May, 1923, p. 6-8.]

The greatest variations occur from year to year in the number of cases of and deaths from heat prostration and

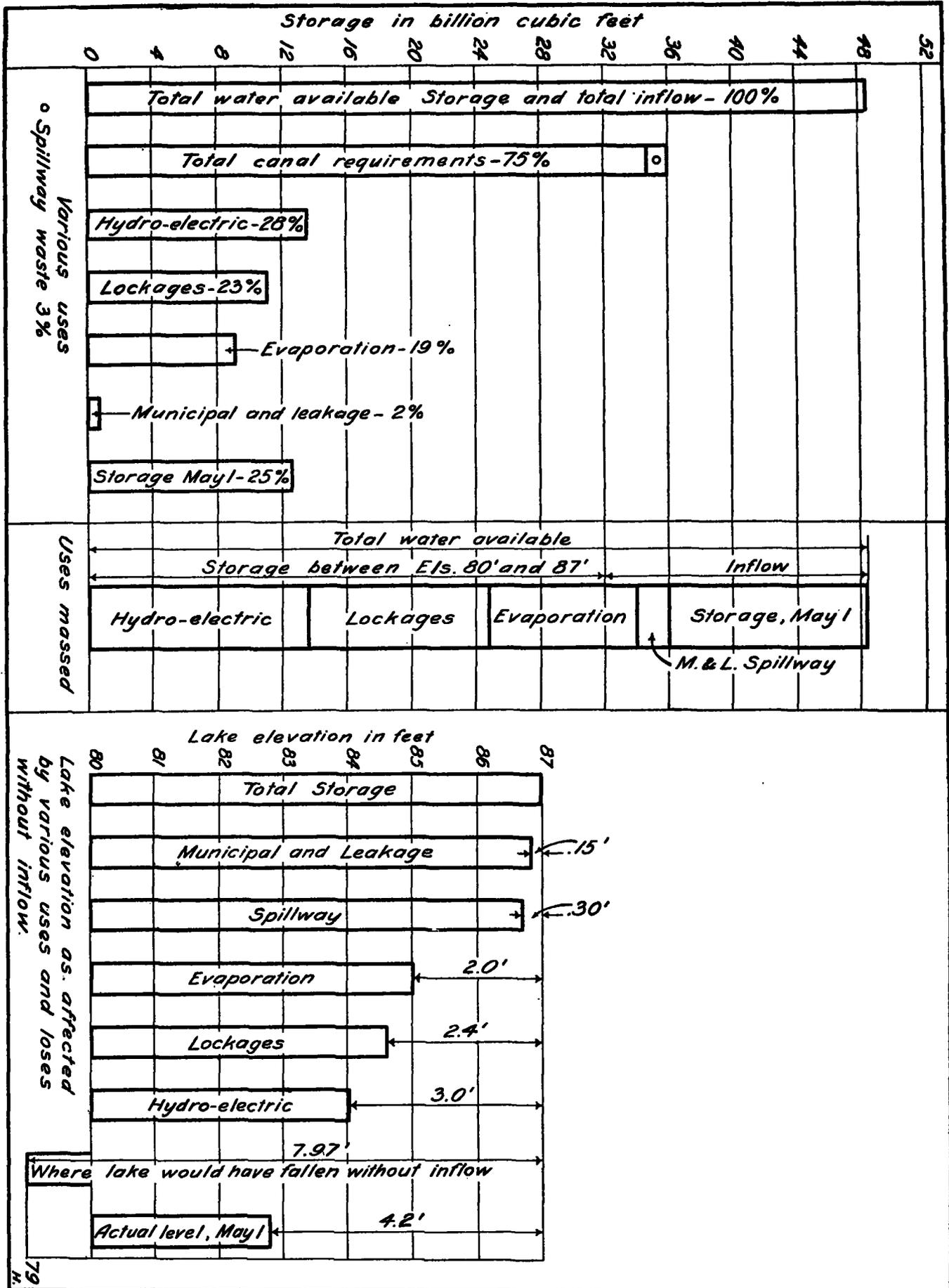


FIG. 1.—The uses and losses of Gatun Lake, dry season, 1923.

sunstroke. Their occurrence is dependent, obviously, upon conditions of atmospheric heat and humidity. When the summer months of any year are featured by frequent and protracted periods of high temperature, there result relatively large numbers of both fatal and nonfatal heat strokes.

How great are the variations in the death rate from this cause in various years will be news to the average person. Few realize that fatal heat prostrations could be 33½ times as numerous in one year as in another. Yet this is precisely what has happened among the industrial policyholders of the Metropolitan Life Insurance Co. during the period 1911 to 1922. In 1911, 6.7 policyholders per 100,000 died from the effects of heat; while in the year 1920, only 0.2 per 100,000 died from this cause. For the United States registration area, rates are available for a period of 21 years (1900 to 1920, inclusive). Here there is even a larger margin between the maximum heat fatality rate, which was 12.8 per 100,000 in 1901, and the minimum, which was 0.3 in 1920. There were about 43 times as many deaths from heat and sunstroke per 100,000 population in the maximum as in the minimum year. For no other single cause has there been as marked variation in the death rate during the past two decades as for heat and sunstroke.

Heat fatalities register a much higher death rate among males than among females. This is inevitable because men are engaged in occupations which subject them more often to the hazards of heat. Colored persons have a higher death rate than whites and this can not be ascribed to the fact that colored people are relatively more numerous in the South. Experience has shown that even in the Southern States, the heat prostration death rate of colored persons exceeds that for whites.

The fact is that the highest death rates from the effects of heat are not found, as might be supposed, in the Southern States. North and South Carolina, for example, show, year after year, very low death rates from this cause, and the figures for Kentucky, Tennessee, and Virginia are well below the average for the registration area. The lowest rates usually prevail in the Mountain States, particularly in Colorado and Montana; in Washington on the Pacific coast, and in Maine and Vermont of the New England States. The States which in most years show above-average rates are Michigan, Wisconsin, Indiana, and Ohio in the East North Central region, particularly the first two; all of the Middle Atlantic States, New York, New Jersey, and Pennsylvania; Connecticut and Rhode Island in New England; Maryland in the South Atlantic region and Missouri in the West North Central section.

Comparison of the figures year after year shows clearly that the death rate from this cause is very much higher in the cities than in the rural districts. This is unquestionably due to the environmental conditions that obtain for city workers and city dwellers as well as their lower resistance. Those engaged in agricultural pursuits are notably less subject to the effects of heat.

Mortality from this cause has a very decided age incidence. Infants are particularly susceptible and elderly people are even more so. About one-half of the deaths from heat and sunstroke are those of persons over 50 years of age. It is obvious that during the heated season nothing should be left undone to protect infants from exposure and to give all possible attention to their diet. Older persons should guard as much as possible, not only against exposure to high temperatures, but against over-activity during the summer months.

## THE NATURE OF INSENSIBLE PERSPIRATION IN HEAT REGULATION.

[Editorial from *The Journal of the American Medical Association*, July 1, 1922, p. 45, vol. 79, No. 1.]

Every person continually experiences a loss of water from the skin in quantities that may become not inconsiderable under certain circumstances. The cutaneous excretion of water is determined mainly by the need for regulating the temperature of the body, so that the amount leaving by way of the skin depends on the heat production of the body or on the external temperature, and is very little affected by the quantity of fluid consumed. Under ordinary conditions, in which no visible collection of fluid on the skin surfaces occurs, the water lost is included in the so-called insensible perspiration. According to observations on anomalous persons without sweat glands, the evaporation of water from the non-sweating skin may amount to 800 gm. (28 ounces) a day. In normal persons it will be noticed that the quantity of water thus given off increases with a rise of environmental temperature slowly up to a certain degree, and then rises rapidly. This sudden increase occurs simultaneously with the activity of the sweat glands, resulting in the formation of visible sweat. The insensible perspiration is therefore conventionally regarded as represented by evaporation of water from the surface of the cuticle itself apart altogether from the sweat glands. If the removal of heat through the loss of water by insensible perspiration is purely a physical process, as it is commonly assumed to be, the transfer should be affected not only by temperature factors but also, to some extent at least, by the humidity of the surrounding air. If the skin is to be regarded, so far as the insensible perspiration is concerned, merely as a membrane through which water is diffused into air, obviously the process should be retarded when the external medium tends to be more saturated with moisture. Several investigators have found, however, that in fact this is not necessarily the case. Most recently, for example, in Schwenkenbecher's clinic at Marburg, Moog<sup>1</sup> has observed that at a fairly constant temperature of 25° C. (77 F.) increases of from 30 to 40 per cent in the relative humidity may actually be attended by increased invisible perspiration through the skin. If such data are accurate, one can not escape the conviction that this loss, instead of being merely a purely physical process dependent on the composition and temperature of the air, is a physiologic one varied by the necessities of heat regulation in the body. Perhaps we may think of it, with Schwenkenbecher, as an insensible secretion of sweat rather than a mere diffusion of water through the skin membrane.

## THE RYKATCHEF FAMILY.

[Reprinted from *Nature*, London, May 26, 1923, p. 716.]

News has reached this country [England] of the family of the late General Rykatchef, who was director of the Russian Meteorological and Magnetic Service until shortly before the war.

General Rykatchef died on April 1, 1919, his wife on November 22 of the same year. The last survivor of three sons died on February 24, 1920. A son-in-law perished on July 6, 1919, leaving five young children. They, with their mother and her sister, who is well known to meteorologists and magneticians as her father's constant companion on his international journeys, are the only survivors of a once large family.

<sup>1</sup> Moog, O.: Der Einfluss der relativen Luftfeuchtigkeit auf die unmerkliche Hautwasserabgabe, Deutsch. Archiv. f. klin. Med. 138: 181 (Jan. 24) 1922.