may not be inherently predictable in sufficient detail and over sufficiently extended ranges of time to satisfy many of the needs of society for such information." Partly because of this state of affairs, the Federal Government is in the midst of a vast, strong effort to greatly expand the National endeavor involving climatology and its uses. To put this effort in perspective, the planned budget is many times the $1 million it cost to run the last year of the old Federal Climatological Program in 1973. However, a major part of the new program is research. The program is to include:

A. Considerable basic research in computer-simulation studies to further our knowledge of the complex relationships of land, sea, atmosphere, and sun to climatic changes.

B. Expand the activities of the center which translated the latest global climatological data into real-time crop and energy projections, and

C. Establish another center for developing analysis and prediction techniques with the hope of extending routine outlooks with skill beyond 3 months.

Thus, we shall have to rely on current climatological statistics for sometime until this new program bears fruitful results.

In closing, I thought that it would be good to give you an outlook for the coming spring and summer. The winter has been abnormally warm and is well on its way to being the 2nd or 3rd warmest winter in the last 44 years. Our concern this February is not water supply, but the fruit crop. The warm winter has advanced budding of the trees to where the buds are going to be severely damaged by just usual temperatures to be expected in March. You hear some people say that a warm winter signals a cold, wet spring. That is probably because they remember it happened that way in 1970. However, in 1934, northern Utah experienced a warmer winter than this year and the spring was abnormally warm also. Our state climatologist tells me that climatological statistics indicate that this spring is just as likely to be abnormally warm as it is to be abnormally cold. Even the National Weather Service average temperature outlook for the 3 months of this February, March, and April indicates an indeterminate temperature forecast for northern Utah. So, it is one of those cases where I must say, like a doctor does, on occasion, "we need to wait and see what later data shows. Although the odds are slim, let's hope that temperatures stay high enough so that we don't lose our fruit crop this year."

Thank you.

TRADING POST

Technical Procedure Bulletins -- The newest TPB #223 entitled Sea Surface Temperature Analysis, North Atlantic and Northeast Pacific Oceans is now available. Please note that the correct address for requests is: Dr. Duane Cooley, Chief, Technical Procedures Branch, W111 National Weather Serice, NOAA, 8060 13th St., Silver Spring, MD 20910.

A METHOD FOR MAKING QUICK FAHRENHEIT/CELSIUS CONVERSONS

Introduction: A few formulas have been tossed around the meteorological world to quickly approximate an equivalent temperature from the Fahrenheit scale to the Celsius scale (or vice versa). But here is a method to make an almost instantaneous mental conversion to the nearest whole degree.

Is your office wallpapered with Fahrenheit/Celsius conversion charts? Are you frustrated by constantly having to refer to these charts? Do you refuse to plot Canadian Surface data because the temperature and dew point are in Celsius?

The Metric Age is coming to America, but as yet, not here. To the weatherman who presently has to work in both temperature systems, a method for quickly converting fron one scale to the other without making his mind look like a mental scratchpad would be welcome.

A few simple formulas to approximate (within a few degrees) a temperature conversion have been developed. But now, here is a scheme in which exact conversions (to the nearest whole degree) can be made without doubling, halving, taking 10 percent, subtracting 32, etc.

To employ this method, two basic concepts must be understood:

(1) What we will call "Exact Conversion Equivalents" (ECE's), and

(2) The pattern other Fahrenheit/Celsius equivalents form around each ECE.

Exact Conversion Equivalents

Of course $0.0^{\circ}C = 32.0^{\circ}F$

But these exact equivalents are also true,

$-15.0^{\circ}C = 5.0^{\circ}F$	$5.0^{\circ}C = 41.0^{\circ}F$
$-10.0^{\circ}C = 14.0^{\circ}F$	$10.0^{\circ}C = 50.0^{\circ}F$
$-5.0^{\circ}C = 23.0^{\circ}F$	$15.0^{\circ}C = 59.0^{\circ}F$

In fact, from a starting point of $0^{\circ}C = 32^{\circ}F$, for every 5.0° change in Celsius the Fahrenheit temperature changes exactly 9.0 degrees. We will call these relationships Exact Conversion Equivalents (ECE's). Other ECE's include: $-20^{\circ}C = -4^{\circ}F$, $35^{\circ}C = 95^{\circ}F$, $20^{\circ}C = 68^{\circ}F$.

The Pattern

There is a basic relationship surrounding each ECE. Empirically --

(Eq. 1) C-2 = F-4*, F-3
(Eq. 2) C-1 = F-2*, F-1
(Eq. 3) C = F
(Eq. 4) C+1 = F+1, F+2*
(Eq. 5) C+2 = F+3, F+4*

Where C = F can be any ECE ($-5^{\circ}C = 23^{\circ}F$, $0^{\circ}C = 32^{\circ}F$, $5^{\circ}C = 41^{\circ}F$, etc.)

Examples

ECE: $0^{\circ}C = 32^{\circ}F$

$-2^{\circ}C = 28^{\circ}F, 29^{\circ}F$
$-1^{\circ}C = 30^{\circ}F, 31^{\circ}F$
$0^{\circ}C = 32^{\circ}F$
$1^{\circ}C = 33^{\circ}F, 34^{\circ}F$
$2^{\circ}C = 35^{\circ}F, 36^{\circ}F$

ECE: $20^{\circ}C = 68^{\circ}F$

$18^{\circ}C = 64^{\circ}F, 65^{\circ}F$
$19^{\circ}C = 66^{\circ}F, 67^{\circ}F$
$20^{\circ}C = 68^{\circ}F$
$21^{\circ}C = 69^{\circ}F, 70^{\circ}F$
$22^{\circ}C = 71^{\circ}F, 72^{\circ}F$

Now examine the conversion table, and note how this pattern is evident around each Exact Conversion Equivalent.

From the table notice that ...

(1) From a starting point of $0^{\circ}C = 32^{\circ}F$, each change of 5 Celsius degrees has a corresponding change of 9 Fahrenheit degrees.

(2) With every 1 Celsius degree departure from an ECE, there is a corresponding change of 1 or 2 Fahrenheit degrees. (Remember we are speaking in terms of whole numbers.)

(3) With every 2 Celsius degree departure from an ECE, there is a corresponding change of 3 or 4 Fahrenheit degrees.

Conversion Table ("--" denotes an Exact Conversion Equivalent)

C	F	C	F
-12	10	13	55
-12	11	13	56
-11	12	14	57
-11	13	14	58
-10	-- 14	15	-- 59
- 9	15	16	60
- 9	16	16	61
- 8	17	17	62
- 8	18	17	63
- 7	19	18	64
- 7	20	18	65
- 6	21	19	66
- 6	22	19	67
- 5	-- 23	20	-- 68
- 4	24	21	69
- 4	25	21	70
- 3	26	22	71
- 3	27	22	72
- 2	28	23	73
- 2	29	23	74
- 1	30	24	75
- 1	31	24	76
0	-- 32	25	-- 77
1	33	26	78
1	34	26	79
2	35	27	80
2	36	27	81
3	37	28	82
3	38	28	83
4	39	29	84
4	40	29	85
5	-- 41	30	-- 86
6	42	31	87
6	43	31	88
7	44	32	89
7	45	32	90
8	46	33	91
8	47	33	92
9	48	34	93
9	49	34	94
10	-- 50	35	-- 95
11	51	36	96
11	52	36	97
12	53	37	98
12	54	37	99

Note: The two and four degree changes of Fahrenheit temperatures are the more exact approximations.

Now Practice

As soon as you understand these two basic relationships, you are ready to do a little practicing.

What is the equivalent Fahrenheit temperature of $12^{\circ}C$?

First, determine the ECE closest to $12^{\circ}C$, $10^{\circ}C = 50^{\circ}F$ (the Celsius side of any ECE is always divisible by 5). Since $12^{\circ}C$ is 2 degrees more than $10^{\circ}C$, its equivalent Fahrenheit temperature is 3 or 4 degrees more than $50^{\circ}F$, or $53^{\circ}F$ or $54^{\circ}F$ (see equation 5). $54^{\circ}F$ is the more exact equivalent.

What is the equivalent Fahrenheit temperature of $-16^{\circ}C$?

The closest ECE to $-16^{\circ}C$ is $-15^{\circ}C = 5^{\circ}F$. Since $-16^{\circ}C$ is one degree less than $-15^{\circ}C$, its equivalent Fahrenheit temperature is 1 or 2 degrees less than $5^{\circ}F$, or $4^{\circ}F$ or $3^{\circ}F$ (see equation 2). $3^{\circ}F$ is the more exact equivalent.

the more exact equivalent.

What is the equivalent Celsius temperature of $91^{\circ}F$?

The closest ECE to $91^{\circ}F$ is $95^{\circ}F = 35^{\circ}C$. Since $91^{\circ}F$ is 4 less than $95^{\circ}F$, its equivalent Celsius temperature is 2 degrees less than $35^{\circ}C$, or $33^{\circ}C$ (see equation 1).

Hints

Memorization of the "Exact Conversion Equivalents" is essential, but this is not as hard as it may seem. Just remember that every change of 5 Celsius degrees has a corresponding change of 9 Fahrenheit degrees. ...

Increase of 5 ...

C: -20; -15; -10; - 5; 0; 5; 10; 15; 20; 25
F: - 4; 5; 14; 23; 32; 41; 50; 59; 68; 77.

Increase of 9 ...

There are also a few ECE's which are easily remembered:

$-1\underline{5}^{\circ}C = \underline{5}^{\circ}F$ (The 5's are common)

$0^{\circ}C = 32^{\circ}F$

$1\underline{0}^{\circ}C = 5\underline{0}^{\circ}F$ (Zeros are common)

$3\underline{5}^{\circ}C = 9\underline{5}^{\circ}F$ (5's are common)

It takes a little memorization and practice, but by using this conversion method almost INSTANTANEOUS conversions can be made in the temperature ranges commonly used by professional and amateur weathermen.

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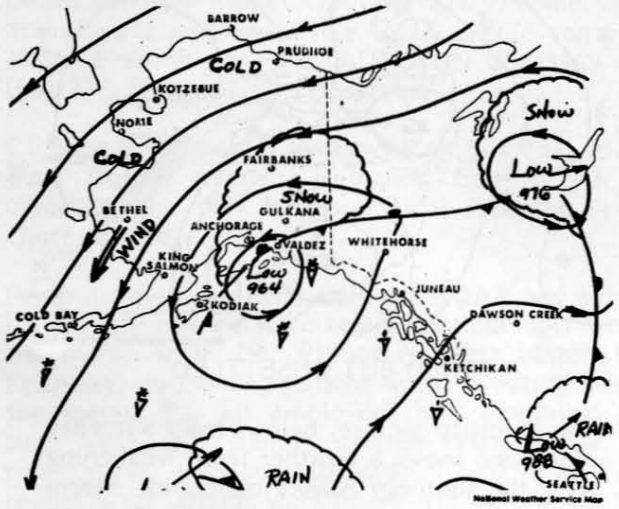
Alaskan Weather Reports. Describing the weather and the forecast for tomorrow oftentimes is a difficult task that meteorologists are faced with. Recently, I had the opportunity to be reading the *Anchorage Times*, and ran across this interesting discussion of the weather that was expected in the reading area. The weather column is divided into three sections as shown by these two examples from the February 4th and 19th, 1978 Sunday editions. The forecast, produced by the National Weather Service is shown as a schematic and then discussed in the copy below. The discussion relies on the satellite photograph, provided by the Satellite Field Services Station in Anchorage, to portray the initial conditions, storm centers, fronts, etc. The expected movement of these weather systems is then outlined relative to the expected weather for "tommorrow." This format is both attractive and informative, and might be an idea for other stations to try for their local area. F. P.



"WEATHERMEN SAY IT WILL SNOW"

"The satellite picture, below, taken yesterday afternoon, shows a large area of dense clouds extending from Southcentral Alaska through the Gulf and east Pacific. The forecast is for the deep low south of Kodiak Island to move to Prince William Sound by tomorrow morning while the low off the Washington coast moves into the Northwest Territory. Snow is forecast over most of Southcentral and the eastern part of the Interior with snow and rain showers over the north Gulf Coast and the Panhandle. Cold air over the Interior, with temperatures below zero, will move around the low pressure system and over the eastern Bering Sea and eastern Aleutians. As the cold air moderates over the north Pacific, the air mass will become unstable with snow showers extending far south over the ocean."