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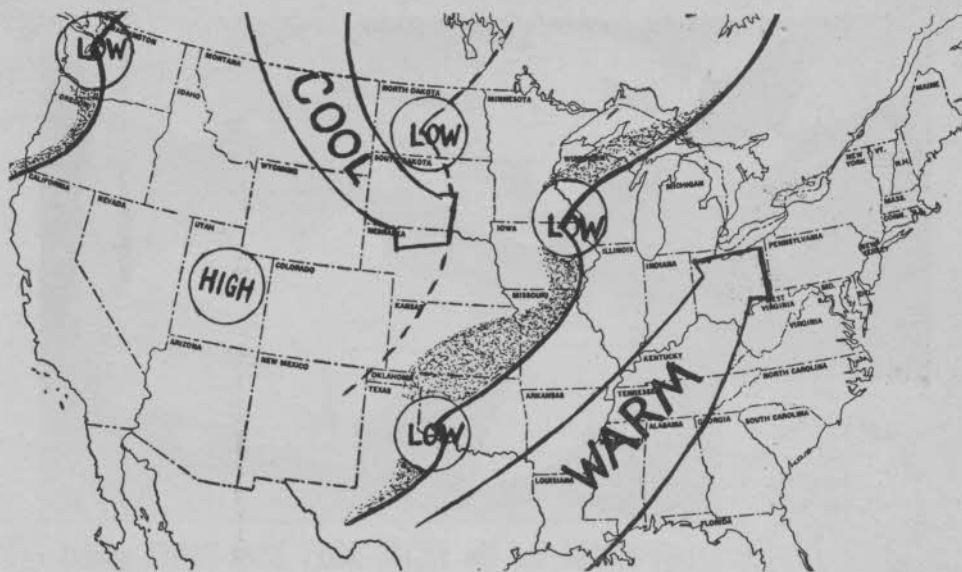
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Cold front (broken line) with low centered over North Dakota picks up a secondary low as it moves eastward through Wisconsin, Iowa, Missouri, Oklahoma and Texas. Until secondary low formed, front had been moving rapidly with little or no rain. Now it slows down, and due to strong mixing of warm and cold air masses around secondary low in southwest Oklahoma, rain becomes quite heavy. This low will travel slowly east or northeast and continue to cause rather intense precipitation. Systems such as this are prevalent in spring and fall but occasionally move across eastern half of U.S. during the summer. Note front (upper left) moving into northern Pacific Coast area.

probably only light or little rain will occur when the front passes. But if it is around 75 or 80 per cent, you can predict heavy showers or thunderstorms and usually strong winds and your forecast will hold up 80 per cent of the time. It should be noted in passing that most professional meteorologists will settle for being right four out of five times.

How Fronts Slow Down

Fronts always extend out of low pressure systems. Lows tend to run pretty steadily to the east and in most cases move ahead of the frontal system. The path of the low that we picked up in Bismarck would be roughly along the Chicago, Buffalo, central Maine line. Frontal systems with only one low pressure center usually move rapidly and are not marked by much weather. When secondary lows form along the front, though, that can be a different story.

In our Bismarck-Amarillo front, it is not uncommon for the system to pick up a secondary low, which forms in the vicinity of the Texas Panhandle, while it is moving eastward. This slows down the movement of the entire system and at the same time, since lows revolve counterclockwise, brings up a large mass of warm, moist air from

the Gulf of Mexico. The net result is that the front slows down to about 10 mph or less. In some cases, the northern half of the system may run on to the East Coast while the southern portion lags. The secondary low then starts traveling up the front, often taking a path that carries it through the Ohio Valley. Since it deepens (pressure continues to drop) as it progresses, its speed is retarded and the weather accompanying it continues to pile up. Eventually, this may give rise to a third low pressure system with the result that weather throughout the Midwest and East can become pretty miserable. It usually takes a good strong high pressure system, moving down from Canada, to push this kind of weather off into the Atlantic.

The fouled-up situation described above is not a common mid-summer phenomenon, but you'll see it frequently in April and May and again in late September and October.

About the only other retarding influence on frontal systems as they sweep across the country is the Atlantic and Bermuda high pressure system. This system ordinarily is centered between Bermuda and the Azores and its western edge often extends inland

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across the Eastern Coast. The Bermuda high is referred to as stationary, but that doesn't mean it won't occasionally shift so that its western portion moves in as far as a line extending roughly from Columbus, Ohio to Atlanta, Ga. If, when this happens, a cold front is moving eastward across the Midwest, the frontal system will stall somewhere along a line extending south from western Ohio or eastern Indiana.

A supt. in Indianapolis may be plagued for two or three days by rain, and eventually foggy weather, by the stalled or stationary front that is sitting practically on his first tee, while another supt., say in Pittsburgh, may be wondering when the weather that he had tracked across the Midwest, is going to move into Pennsylvania.

A front in this circumstance may do one of several things. The Atlantic high pressure system may move farther west, pushing the front back to western Indiana or perhaps eastern Illinois; the high may shift eastward and allow the front to slowly move toward the East coast; or, as often happens, the front may remain stationary and break up in three or four days.

Second Type of Front

The only other front that affects weather in the midwestern and eastern part of U. S. comes out of central Canada. It tends to drift southeast at about 10 to 15 mph and on many occasions only penetrates as far south as a line that runs roughly between Chicago and perhaps Boston. When this front does get plenty of push and covers most of the eastern half of the country it brings sharp drops in temperatures, causes little rain and is marked for several days following its invasion by extremely clear weather.

This polar front occurs mainly in the winter, rarely in the summer, but quite often in April and May and again in October.

Weather that sweeps into the Pacific coast is usually generated in the Aleutian Islands area. It travels with low pressure systems that originate in the Islands. Unless there is an extremely strong high moving in behind an Aleutian low, typical frontal weather doesn't occur much below Portland, Ore. Lows taking the path from the Aleutians usually break up when they move inland against the mountains, are blocked by high pressure systems centered in Canada or move eastward and regenerate as systems connected with the previously mentioned Bismarck-Amarillo fronts.

It is due to the northerly paths of the Aleutian lows that Californians can brag about their weather. On rare occasions in the spring and fall, fronts from the Aleutians dip into Northern California and move into the San Francisco area; the same thing holds true for cold outbreaks from western and central Canada, but it takes an extremely high pressure system to push the cold air over the Sierra Nevada range and into the California heartland.

Making the Rain Forecast

After looking over a weather map and getting an idea of how quickly a front is going to move into the forecast area, it is important to check the type of rain that accompanies the front. Newspaper weather maps show whether light rain, showers or thunderstorms are occurring along the frontal line and also indicate whether these are steady, intermittent or scattered. To determine how long the rain can be expected to last it is only necessary to estimate the number of miles behind the front the rain belt extends and then divide this figure by the estimated speed of the front. For example, if the front is moving 20 miles an hour and the rain belt behind it extends 200 miles, it is logical to predict 10 hours of rain after the front has moved into the area for which the forecast is made. This is not coldly scientific, but it is a fairly reliable rule of thumb.

Temperature forecasts can be made in approximately the same manner. By selecting a city roughly 200 or 300 miles back of the front and checking its maximum and minimum temperature range for the day after the front has passed, it is possible to get a reliable idea of what these temperatures will be for your area after frontal passage. If you are located in Cleveland, for example, Chicago's temperature range will give you a tipoff as to what to expect. Speaking further of temperatures, it should be kept in mind that they usually drop to their lowest point the second day, or about 36 hours, following cold front passage. Many newspapers show maximum and minimum temperature range for the large cities.

Instability Shower

About the only other summer weather situation that has to be taken into account is the instability shower or thunderstorm. It is not an easy one to predict. Meteorologists have upper air charts compiled from radio soundings to help them in determining when instability showers are going to occur. The do-it-yourself forecaster, though, has to depend on observation and a "sense

of feel," developed after observing the buildup that touches off these showers, to predict them accurately.

Ordinarily they occur after noon and during periods when relative humidity is excessively high (75 per cent or higher) and the air has that sticky feeling. Another indication of them is the rapid buildup of fluffy cumulus-type clouds around nine or ten in the morning. Ordinarily, these clouds don't begin to form until noontime or later, but if they start to develop in the mid-morning hours, the indication is that there is an excess of moisture in the atmosphere which is being carried aloft where it will cool and condense and then fall as rain. The intensity or violence of these showers or thunderstorms usually can be gauged by the degree of relative humidity and by taking note of how early and how quickly the cloud buildup begins.

Mid-afternoon showers often are welcome since they bring relief to parched courses, but the winds that accompany them sometimes can cause great damage. If conditions point to a violent afternoon shower or thunderstorm, then all necessary precautions should be taken against wind damage since winds generated by these storms very often get up to or exceed 40 or 50 mph.

Instability showers probably occur more frequently in the south during the summer than in the north, but they are quite common in all high temperatures latitudes where humidity tends to build up.

Southern Weather Situations

Relatively few weather changes due to frontal passages occur in the summertime south of a line extending from Charleston, S. C. to Little Rock, Ark. and through the Texas Panhandle. The aforementioned front extending from Bismarck to Amarillo ordinarily is weakly defined in its southern portion and therefore gives rise to little weather. However, when secondary lows form along this front they sometimes follow a path from Oklahoma City to Atlanta and cause widespread shower and thunderstorm activity. Usually their movement is slow, about 10-15 mph. Cold fronts that come out of central Canada during the summertime rarely penetrate the South since their movement is more easterly than southerly.

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(Continued from page 38)

complaints were about 5 per cent technical and 95 per cent human nature, just as are GE's.

Don Caulkins, Fox Hills CC, Culver City, Calif. presided over the highly interesting Wednesday morning session.

Five-Star Film

The first hour passed in what seemed to superintendents to last about five minutes. It was devoted to O. J. Noer's colored motion picture of latest developments in maintenance practices and of fine golf holes on famous courses. The film is 16mm. and silent. Noer did a running comment on the picture that was a veritable short course in maintenance and included a roundup of some of the high spots in supts.' achievements during the past year.

There hasn't been anything else in golf comparable to this picture with the exception of the PGA-Life magazine instruction film, "Keep 'Em on the Fairway." This picture probably will be shown at sectional association meetings with Noer doing the narrating or supplying the script for reading.

The film, made by the widely-travelled veteran maintenance consultant of the Milwaukee Sewerage Commission, is rich in possibilities as player entertainment and information material after some editing for length. The only complaint supts. had about the film was that it attracted more of a crowd than the conference room could accommodate and about 100 were shut out.

The picture is an excellent job of covering maintenance, geographically, and has a good seasoning of personalities. Among points covered were views of noted courses; construction of the new Houston (Tex.) CC course which has Gene Titt greens, fairways, tees and rough; machinery and material uses; construction and planting methods; experiment station operations and results; handling of golf cart and car problems; insecticide and fungicide use; soil sterilizing and new strains of grass.

Of great timely value was the symposium on "Training New Men," which had as moderator, Fred V. Grau, who has had considerable successful experience in training young men who have become experts in maintenance. (See Grau's Answer, page 72).

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First to speak on training was Rex McMorris, Executive v.p., National Golf Foundation.

McMorris set the stage for the panel members to follow by reporting the increasing number of new job opportunities opening up as a result of new construction and the growing number of new courses being opened for play each year. Training of new men falls far short of meeting the demand for capable, experienced personnel in turf management. Shortages have already reached the critical stage in some areas.

If the rate of increase in new course construction continues as Foundation records indicate the superintendent stands to benefit because of the short supply of trained men resulting in the need for new course officials to bid for the services of personnel available.

As encouraging as the situation might seem for the superintendent new course and club officials are faced with a situation which will become more critical before it gets better, according to McMorris. The club member and official must learn, and to some this may come the hard way, that the key man on their course is not only a valuable but a scarce commodity

but that they are dealing in a highly competitive market. The realization must come that if they are to continue to enjoy the finest maintained courses in the world they have a responsibility of putting the job of superintendent in a position where young men will want to become educated and take special training for openings in turf management.

Ted Woehrl, ass't. supt., Beverly CC, Chicago, gave an excellent report of his preparation and training to become a course superintendent. Starting at the early age of five in his father's nursery, Ted seemed destined for the role he has picked for himself. He received his formal training at Purdue University. He outlined courses he took and his reasons for taking them including practical study in turf management and research. His years in the Armed Forces gave him experience in administration and also an opportunity to observe course maintenance methods in Europe. His apprenticeship with Bob Williams at Beverly where he has been privileged to sit in on committee meetings has given him further training in administration. After a season with Norm Johnson, Supt., Country Club of Florida where he is learning southern turf management



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Frank Ward, Supt., Bradenton Country Club

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A. G. Attaway, Supt., Hollywood Country Club

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Ted expects to return to Chicago for another year with Bob Williams at Beverly before going on his own — an excellent example of the education, training and preparation it is hoped others will emulate.

Following Woehrl the experienced superintendent, Andrew Bertoni, Meadowbrook CC, Detroit dist., told of the "Why" of training new men. His remarks will be found on page 66.

Prof. H. B. Musser, Dept. of Agronomy, Penn State Univ., gave a comprehensive report on training opportunities available in colleges and universities to conclude this highly informative session on the Training of New Men. For a complete record of the contribution by educational institutions in the training of young men for the turfgrass business turn to page 46.

A sharp focus on the keynote of the conference was made in the "Supts' Responsibilities — 12 points for Good Management" part of the program which had Kayem Oviaan, Woodmere (N.Y.) CC, as chmn.

Leo Feser, Orono GC, Inc., Wayzata, Minn. was moderator. Handling two of the list of responsibilities were Raymond

H. Gerber, Glen Oak CC, Glen Ellyn, Ill.; Sherwood Moore, Hollywood GC, Deal, N.J.; Warren Bidwell, Seaview CC, Abscon, N.J.; Marion C. Mendenhall, Kenwood CC, Cincinnati, O.; Malcolm E. McLaren, Oakwood Club, Cleveland and Robert Williams, Beverly CC, Chicago.

Flow of Responsibility

The plan here was to show flow of responsibility from the pres. or owner, through the board of directors, the grounds committee, which is concerned with policy and liason to the supt., who is responsible for results.

Supts. in planning this examination of their work designated the 12 main departments of their responsibilities and the subdivisions as:

AREA MAINTENANCE — golf course, clubhouse grounds, parking lot, range, new grounds construction.

LANDSCAPE MAINTENANCE — planning, planting, removal, pruning, inventory, etc.

WORKING STAFF — procurement, training, supervision, morale, benefits, etc.

SUPPLIES AND MATERIALS — purchase, storage, inventory, use, selection, etc.