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DESERT ENVIRONMENTAL CONSIDERATIONS

Army Test and Evaluation Command
Aberdeen Proving Ground, Maryland

10 August 1972

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DESERT ENVIRONMENTAL CONSIDERATIONS

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SECTION I
GENERAL

1. Purpose and Scope. This TOP has been prepared for two purposes. The desert environment has been defined in order that cause and effect relationships encountered during desert test operations are understood by developers and testers. Also, a practical statement of test requirements to be used as a guideline in desert field testing of material is outlined. A rationale for storage criteria is stated for hot-dry and intermediate hot-dry climates. This document is also applicable to other desert climates. However, primary stress is on the hot-dry climate because it is this environment which is the most difficult to fully achieve in field testing.

This document is not to be used for testing and evaluating of food or clothing. The specific values presented in this document do not supersede the requirements outlined in Army Regulations, Military Standard and Materiel Needs Statements.

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13. ABSTRACT

Provides background information on the test of materials in a desert environment. Discusses desert environmental characteristics, climate, temperature, solar radiation, humidity, terrain, desert types, desert terrain, classification, distribution, sand, dust, vegetation, and camouflage. Appendixes provide world extreme hot-dry temperature distribution and computation of Yuma degree-hour levels. Applicable to desert testing. Not applicable to testing of food and clothing.

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2. Basic Information. Hot-dry regions have many environmental extremes unique to the world. The world's highest ambient air temperature (136°F) has been recorded in the dry air of the desert and large average diurnal temperature changes are common in the desert areas where the vegetation-free ground quickly dissipates the sun's heat. The effect of temperature, solar radiation, humidity, and sand/dust on storage, transportation, and operation of materiel is one of the principal considerations in the planning of the desert environmental testing.

This document outlines a practical technique to be used as a guideline in evaluating materiel. A degree-hour testing philosophy is discussed, and Yuma's summer "degree-hour" levels and the world's extreme "degree-hour" levels are developed. Although the degree-hour criteria applies to all phases of a materiel's lifetime, it is particularly important in storage (exposure) testing.

This document is presented as a guideline and aid in determining whether or not a test is a valid desert environmental field test. In the final analysis, the project engineer must render a scientific judgment as to whether or not the materiel meets the established criteria of AR 70-38, Research Development Test and Evaluation of Materiel for Extreme Climatic Conditions.

Paragraph 1.6.b of AR 70-38 states: "Field climatic test. Climatic conditions during a field test often are not as extreme as the climatic conditions specified in the relevant climatic categories in Chapter 2. In these cases, the adequacy of the field test will be reviewed, particularly when test results are marginal, and consideration will be given to results obtained under simulated extreme conditions. Observations of the climatic conditions prevailing during field tests at the test site will be made to provide a record for future evaluation."

3. Definition of a Desert. A desert is generally defined as a region with an arid climate in which the potential evaporation rate exceeds the precipitation rate. The arid climate results in the scanty vegetation which is characteristic of such a climate (Xerophytic or drought resistant). The lack of vegetation cover, in turn, results in soils with a low organic content, and contributes directly to the distinctive shaping of the topography.

The U. S. Army has taken the position that a desert is defined as ". . . an area in which the seasonal or annual rainfall is less than the seasonal or annual evaporation rate. Meteorological conditions common to all desert regions are: glaring sunlight, sudden and violent windstorms, and drastic changes in temperature." (Ref 1)

Deserts can be classified in many different ways. Most of the classification systems are based on either climatic, terrain, or vegetation factors. The boundaries of the desert are defined as "core" or "transition" areas. The core area represents that part of the desert

which exhibits all the characteristics of a desert environment, and the transition area that part of a desert that represents some characteristics of a desert environment but cannot be clearly defined as a desert.

Desert areas based on vegetation and soil types have been reviewed by Ramaley (Ref 8) by comparing the works of various specialists in the field. Ramaley has provided a composite map based on soils, climate and vegetation, to show the world's deserts (Figure 1). Added to this map have been those areas which are considered in the hot-dry climate category.

Within the 10.5 million square miles of arid and very arid land lie the world's primary deserts*. If we consider a desert in the generally accepted terms as a dry and barren sea area, there are 12 regions named as major deserts of the world. These are:

Desert Name	Location	Approx. Extent (Thousands of Square Miles)	Climate* AR 70-38 Category (Major, Minor)
Sahara	North Africa	3500	4, 5
Australian	Australia	1300	5, 4
Arabian	Middle East	1000	5, 4
Turkestan	Soviet Middle Asia	750	5
Sonoran	U.S. and Mexico	500	5, 4
Gobi	Chinese Inner Asia (East)	400	5
Patagonia	Argentina	260	5
Thar	South Central Asia (East)	230	4, 5
Kalahari	South Africa	220	5
Takla Makan	Chinese Inner Asia (West)	200	5
Iranian	South Central Asia (West)	150	4, 5
Atacama	Peru-Chile	140	5
		8650	

*4 Hot-Dry, 5 Intermediate Hot-Dry
Humid-Hot-Coastal Deserts limited to narrow strips along Red Sea and Persian Gulf.

The Army FM31-25 states, "The most important deserts politically and militarily are Sahara---the Arabian and Siestan----and the Gobi." The Siestan region is usually considered part of the Iranian desert.

4. Climate. One of the world's harshest climatic environments for the operation, transportation, and storage of materiel is found in the world's hot-dry regions. This environment includes very high temperatures, intense solar radiation, extremely low humidities and prevalent sand and dust.

A summary of the desert's principal effects on, and typical failures to, materiel is given in Table 1. This table is not intended to be inclusive.

*Of the total land area of the world (56 million square miles 4% is very arid, 15% is arid and 14.6% is semiarid. (Ref 11)

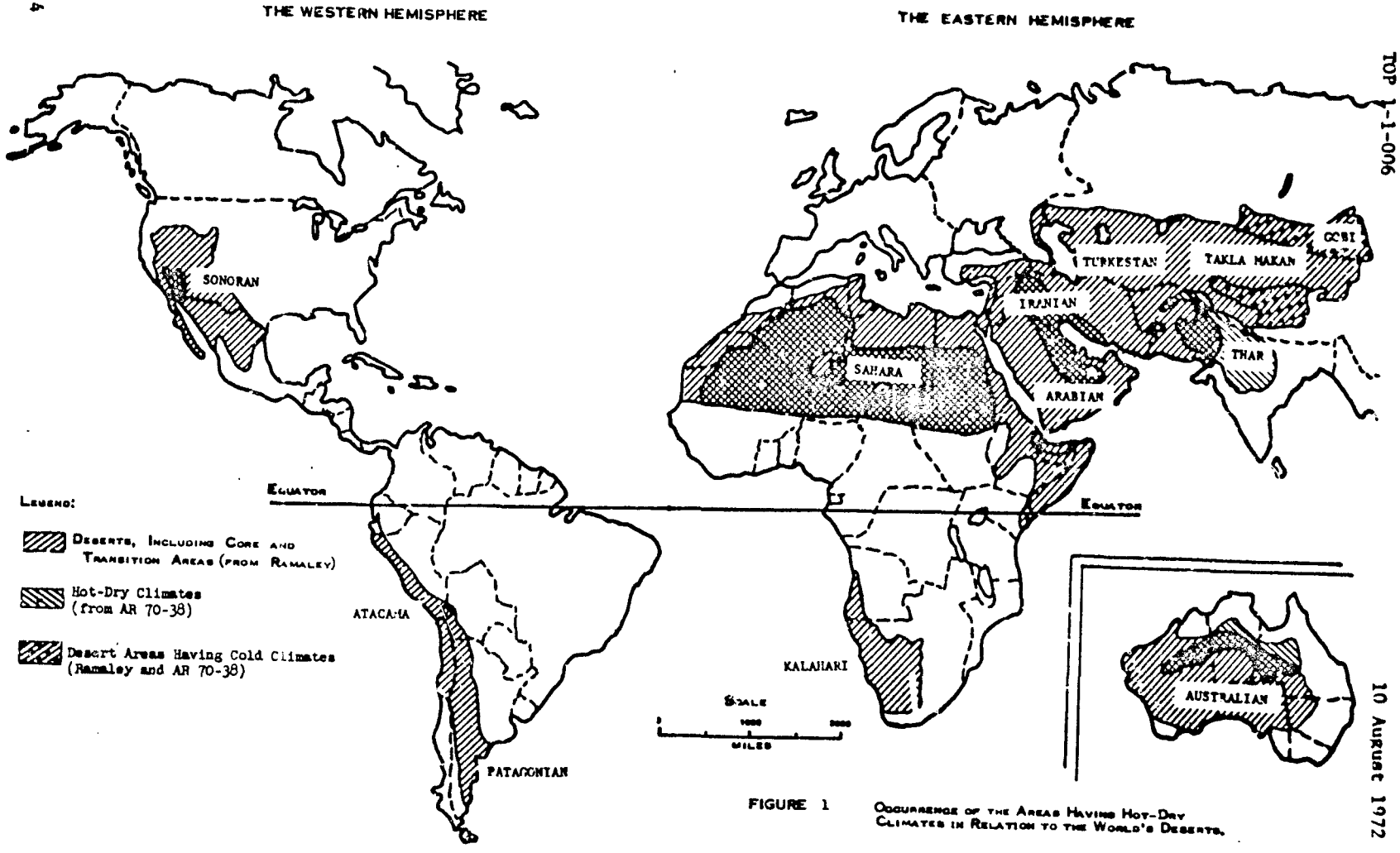


FIGURE 1 OCCURRENCE OF THE AREAS HAVING HOT-DRY CLIMATES IN RELATION TO THE WORLD'S DESERTS.

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TABLE 1. ENVIRONMENTAL EFFECTS ON MATERIALS

Factor	Principal Effects	Typical Failures Induced
High temperature	Thermal aging: Oxidation	Insulation failure Alternation of electrical properties
	Structural change Chemical reaction	
	Softening, melting and sublimation	Structural failure
	Viscosity reduction and evaporation	Loss of lubrication properties
	Physical expansion	Structural failure Increased mechanical stress Increased wear on moving parts
Thermal shock	Mechanical stress	Structural collapse or weakening Seal damage
Low relative humidity	Dessication:	Loss of mechanical strength
	Embrittlement Granulation	Structural collapse Alteration of electrical properties "Dusting"
High relative humidity	Water absorption	Structural weakening Electrical failure Interference of function
	Fungal growth	Surface deterioration
Solar radiation	Actinic and physiochemical reactions	Surface deterioration
	Embrittlement	Alternation of electrical properties Discoloration of materials
	Ozone formation	Deterioration of rubber
Sand and dust	Abrasion	Increased wear
	Clogging	Interference with function Alteration of electrical properties

Factor	Principal Effects	Typical Failures Induced
Salt spray	Chemical Reactions:	Increased wear
		Loss of mechanical strength
	Corrosion	Alteration of electrical properties
		Interference with function
	Electrolysis	Surface deterioration
		Structural weakening
		Increased conductivity
Wind	Force application	Structural collapse
		Interference with function
		Loss of mechanical strength
	Deposition of materials	Mechanical interference and clogging
		Abrasion accelerated
	Heat loss	Accelerates low temperature effects
	Heat gain	Accelerates high temperature effects
	Erosion	Removes protective coatings
		Structural weakening
		Surface deterioration
Rain	Physical stress	Structural collapse
	Water absorption and immersion	Increase in weight
		Aids heat removal
		Electrical failure
		Structural weakening
	Corrosion	Enhances chemical reactions

5. Temperature. The world's highest ambient air temperature (136°F) has been measured in the dry air of the desert. Large diurnal temperature changes are common in desert areas where the bare ground quickly gives up its heat. Both Mil-Std-210A and AR 70-38 use 125°F as temperature criteria. This is the probable temperature reached on three consecutive days in the hottest region during the hottest month. This has been exceeded with 10 consecutive days of 125°F occurring in

Death Valley. The North American maximum of 134°F occurred during this period. These occurrences are very rare. (Ref 17)

A more recent criteria is the percent of the time a given temperature is exceeded during the hottest month of the year. Only small areas of the world have temperatures exceeding 120°F for 1% of the time. One such place is Death Valley at 121°F. Yuma Proving Ground is the hottest Army installation in the United States, with 1% of July temperature exceeding 112°F.

a. Temperature Effects. High temperatures can cause degradation and even destruction of many materials. A typical direct effect is the overheating of a cooling system. Some other direct effects are physical expansion, softening, and melting. Degrading effects which work over a period of time are thermal aging (a material property change), softening, evaporation, and degradation of lubricant properties. Also, in systems including men, temperature can make it impossible for man to operate effectively.

Typical effects include failed electrical insulation, short life for electronics, poor lubrication with wear, overheated cooling system, seized actuators, and systems too hot for man to operate.

If at all possible, the test officer should anticipate the type of effects which will be acting on this system. This will better enable him to measure and watch for the extent of these effects.

b. Degree-Hour Testing Philosphy. Because North American desert summertime temperatures do not consistently reach the maximum temperatures described in AR 70-38 for hot-dry climates, an equivalent criteria having maximum temperatures with the normal summertime range of the Sonora Desert was developed several years ago and is the present foundation of YPG desert storage exposure testing.

This "degree-hour" testing philosophy assumes that the "degree-hour" is a meaningful unit of measure, i.e., an item subjected to a number of degree-hours at a certain maximum temperatures (within a specified range) is being stressed the same, or nearly so, as an item subjected to the same number of degree-hours specified by the temperature curve of AR 70-38 (Figure 2). The validity of this assumption depends upon the limits of the temperature range within which the items are exposed. For example, it would not be valid to assume that an item exposed to 40°F for eight hours would experience the same stress as an item exposed to 160°F for two hours although the degree-hours of exposure would be the same for both cases. The difference between the two temperatures is too great to make a valid comparison.

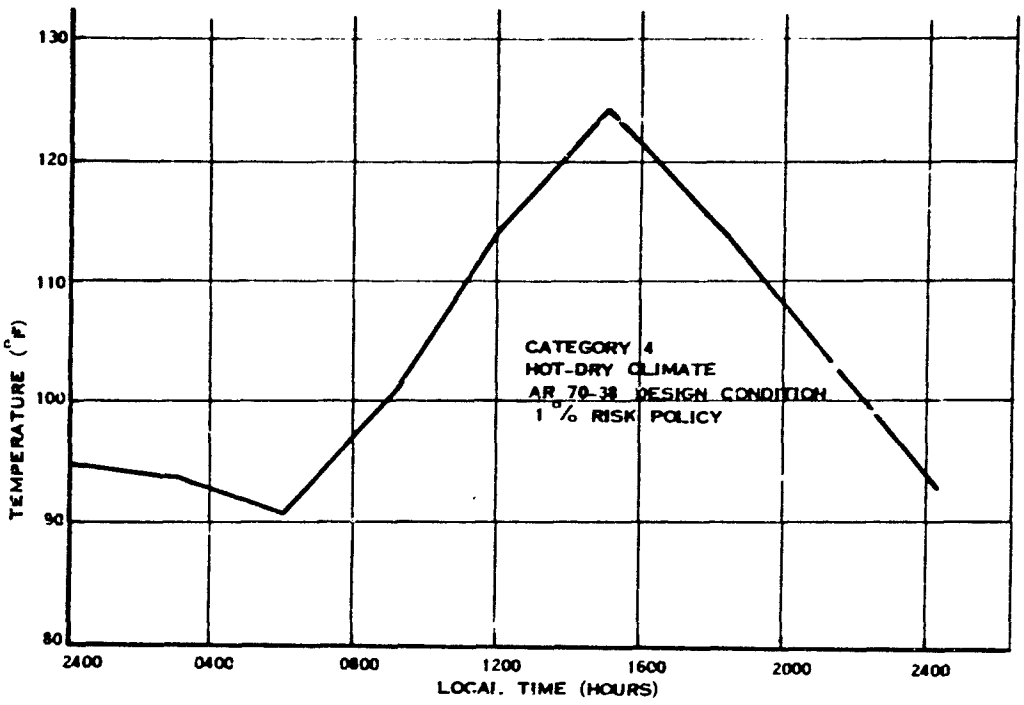


FIGURE 2. APPROXIMATION OF DIURNAL TEMPERATURE CONDITION FOR CATEGORY 4.

YPG has chosen 90°F as the base temperature for comparing exposures. Temperatures below 90°F are considered to have little effect and raising the base temperature by very much would make World Hot-Dry Climate equivalance testing nearly impossible outside of test chambers. The difference between AR 70-38 degree-hour levels and the World Extreme Climate degree-hour levels would also be greater with higher base temperatures.

Although this method is somewhat arbitrary, it will take a tremendous amount of data to verify a better method. These data exist for foodstuffs and possibly for certain types of electronic equipment.

(1) Calculation of Degree-Hour Levels. Degree-hours are equal to the "temperature minus 90°F" times the number of hours of occurrence. Temperatures less than 90°F are not considered. Examples, 92°F for 3 hours = 2x3 or 6 degree-hours, 89°F for 2 hours = 0 degree-hours.

In the absence of hourly data, the degree-hour levels for hot-dry climates can be estimated using the maximum temperatures. These levels are derived in Appendix C and are given in Table 2.

TABLE 2.

DEGREE-HOUR LEVELS VS. MAXIMUM TEMPERATURE
HOT-DRY CLIMATE ONLY

Max. temp (°F)	$90 \leq T < 95$	$95 \leq T < 100$	$100 \leq T < 105$	$105 \leq T < 110$	$110 \leq T$
Degree-hours/day	9	50	100	180	290

It is important to re-emphasize that hand calculation of the cumulative degree-hours by the method just described is merely an alternative to be used only when a temperature logging system and/or computer are not available.

(2) Comparison of World Extreme Hot-Dry Area Degree-Hour Level with Mil-Std-210, AR 70-38, and Yuma Proving Ground's Levels. The probable extreme hot-dry degree-hour level has been estimated at 8900 degree-hours in 30 days or an average of 297 degree-hours per day (Appendix B). AR 70-38 requires 366 degree-hours/day, and Mil-Std-210A requires 315 degree-hours/day. These are based on three consecutive days and therefore should require more than the 297 degree-hours, which is a 30-day average condition.

The probable degree-hours for an intermediate hot-dry climate is 3070 degree-hours in 30 days or 103 degree-hours/day. This is based on Sissenwine's extrapolation technique for an area with a 1% design temperature of 110°F.

YPG degree-hour levels have been calculated from records (Appendix C) and are: 1713 degree-hours in May, 3908 degree-hours in June, 6020 degree-hours in July, 5130 degree-hours in August, and 3517 degree-hours in September.

It must be noted that the number of actual degree-hours in a given month can be far less than anticipated. This is particularly true of months other than July. For example, June 1965 had only 1735 degree-hours as opposed to 3908 normal. For this reason, extra exposure time should be allowed in planning so cool weather will not ruin the test. Also, high exposure tests should be started early in the summer to avoid the possibility of not meeting criteria in a single season.

(3) Applications of the Degree-Hour Techniques. The criteria developed above can be utilized in all three phases of desert field testing.

As an example where the degree-hour technique is useful, assume a tank is to be tested under desert field conditions on a rough terrain course for a single day. Is it a true desert field test if the maximum ambient temperature reaches only 93°F? No; test operating conditions are such that TECOM could not certify that in a combat situation this tank could travel for one day over rough terrain when the maximum ambient temperature was 117°F, for instance. But this certification is exactly YPG's mission, so further testing is required. Other examples can be given for materiel that is transported or stored. Careful application of the degree-hour technique will provide the engineer with a means of evaluating the performance of materiel.

(4) Degree-Hour Criteria. The equivalent world hot-dry climate operating time can be estimated using degree-hour criteria. For example, an item which survived 1500 degree-hours during testing could be expected to survive five days in an extreme hot-dry area, where the expected temperature stress is 297 degree-hours per day. It must be remembered that this applies only to degradative effects. It does not apply to failures caused by extreme temperature itself. Example, cooling system temperatures must be extrapolated from test condition to extremes to determine capability. The degree-hour concept would apply to the fan belt driving the pump. This difference in effect must be emphasised; there are many effects (softening, melting, part interference, etc.) which cannot be ascertained by extended testing at less than extreme levels. Ideally, the project engineer should review all pertinent data and render a scientific judgment of the performance of the test item.

6. Solar Radiation. Intense solar radiation is a characteristic of hot-dry regions because of their dry and low cloudiness nature. This is especially true in summer when the sun is high and, therefore, the intervening air mass is low.

a. Solar Radiation Effects. The most important single effect of solar radiation is the raising of surface temperatures. Temperatures exceeding 160°F have been measured on ordinary surfaces. Temperatures can greatly exceed this under special circumstances. These extreme temperatures greatly exaggerate the normal temperature effects, especially since they are very non-uniform. Typical effects are ageing, differential thermal expansion, softening or melting of materiel and even evaporation or sublimation of volatile materiel with possible deposition on cooler surfaces.

Other effects of solar radiation are due to the direct effect of radiation on materiel. Typical examples are: discoloration of optics, bleaching of dyes, crazing of paints, cracking of rubber, and deterioration of plastics, etc.

b. Solar Radiation Levels and Measurement. Solar radiation is usually measured on a horizontal surface by a pyranometer sensitive to solar radiation only. For accuracy, the device should be calibrated initially by the manufacturer and then calibrated periodically as required. AR 70-38 (Table 2-5) specifies the direct radiation intensity for a complete day and is shown in Figure 3. In the case of solar simulation chamber use, care must be taken in the orientation of the test item. This is because the conditions reached vary with the attitude of exposed surfaces and very few chambers can simulate the movement of the sun during the day.

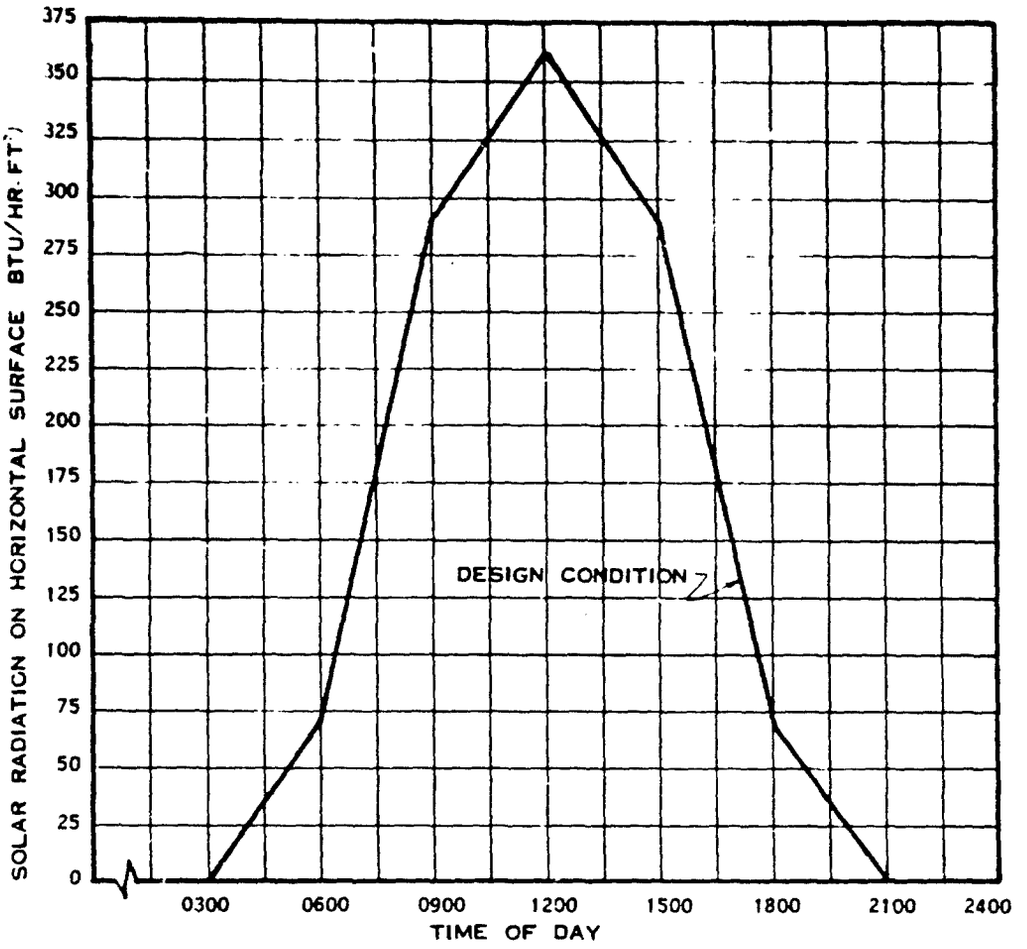


FIGURE 3. Solar Radiation, AR 70-38

Because of the importance of solar radiation on temperatures, records of the radiation should be included with the test report. Also useful would be an overall hourly average for the test. In this regard surface temperatures may be very helpful.

The radiation levels in AR 70-38 are exceeded at high altitudes. However, the highest surface temperatures occur at the lower altitudes where ambient temperatures are highest. Since temperature is generally the most important parameter, testing is not required at higher radiation levels.

Summer radiation levels at YPG average about 90% of the AR 70-38 design levels. Although ambient temperatures at Death Valley are higher, the incoming direct solar radiation intensity is lower than YPG. The total levels measured, possibly due to additive reflections, may actually exceed the standard.

7. Humidity. Low humidity is a characteristic of the hot deserts. Even in the narrow strips of hot-humid coastal desert, the humidity is low when the temperatures are high.

a. Terminology. The definitions used in this section are those defined in the Glossary and are the ones generally used in the literature. In most cases the difference between definitions will be slight, but where accuracy is important the usage should be checked.

b. Humidity Effects. Many materials, especially organic materials, contain non-chemically bound water. The water content sometimes significantly affects the material properties. It has been demonstrated that this water content is primarily affected by the relative humidity and only slightly by the temperature (Ref 12). The low relative humidity of the desert desiccates these materials and causes such effects as brittleness, crazing, and cracking.

Another hazard common in low relative humidity is the production of static electricity. This hazard can be serious. Because of the dry soil as well as the dry air in deserts, the common methods of grounding may not work. Hazardous operations such as refueling must be done with direct electrical grounds connected. Passive grounds such as drag chains will not work. Examination should be made of the test material to determine areas where static charges may be generated. This would include those areas which have rubbing contact.

It must be noted that humidity as well as many other factors act in concert and therefore their effects cannot be separated out in testing. In other words, the effect of high temperature and low humidity combined may be greater than the effects of high temperature plus effects of low humidity.

c. Occurrence and Measurement. The standard means of reporting humidity is by dew-point or by relative humidity. Dew-point is an absolute measurement and it is, therefore, preferred. Relative humidity must have an associated temperature to have much meaning. In all cases temperature and pressure should be included for completeness.

There are three common means of measuring humidity; a meter directly sensitive to the relative humidity, a wet and dry-bulb psychrometer, and a dew point apparatus. At very low humidities, the meter device can have poor accuracy. The hair hygrometer, for example, is calibrated to ±6% and can be trusted to perhaps ±10%. The needed and obtainable accuracies must be ascertained before using this device. The classical type dew-point apparatus is complicated in use and is used primarily for those cases where the psychrometer method has insufficient accuracy. Newer versions of this are simpler in use but are not generally available. The psychrometer operates by exposing a wet-bulb and a dry-bulb thermometer to a stream of air. The evaporation of water from the wet-bulb thermometer will lower its temperature The difference between the temperatures of the two thermometers is known as the wet-bulb depression. This depression in conjunction with the dry-bulb temperature can be used with standard tables and charts to obtain relative humidity and dew point. In a well designed psychrometer, the actual wet-bulb depression will differ from the theoretical wet-bulb depression by less than 1%. The accuracies obtainable from this device are directly related to the accuracy of the thermometer readings. Example, if the thermometers were read to ±1° and the air was 100°F, 5% relative humidity, standard pressure, the psychrometer reading would be somewhere between 2.4% and 8.1%. The accuracy will be less at lower temperatures. With carefully calibrated and read thermometers, better accuracies can be obtained.

Another device sometimes encountered is the dew-cell. This operates by passing a current between wires in a lithium chloride saturated wick. The current raises the temperature until the vapor pressure of saturated LiCl is the same as the air. By reading the temperature of the wick, the dew-point of the air can be determined. The device does not work at relative humidities below about 15% because the wick dries out.

AR 70-38 (Category 4, hot-dry) specifies dew points varying daily between 34°F and 47°F, with relative humidities between 5% and 20%. YPG in July normally has relative humidities varying between 17% and 47%. The normal daily minimum dew point is 53°F. Maximum daily dew point is about 60°F. This does not meet AR 70-38 hot-dry levels but is representative of many desert areas. Sissenwine gives, for selected African stations, a median relative humidity varying daily from 16% to 26% and a dew point of 52°F-59°F. The lowest value cited had relative humidities from 7-16% and a dew point of 38°F.

The comparable AR 70-38 design conditions for intermediate hot-dry are dew point (60°F to 75°F), relative humidity (20% to 85%). Conditions for the humid-hot-coastal desert are dew point (80°F to 86°F), relative humidity (63% to 90%).

8. Terrain. One of the critical factors in testing is the geophysical environment, comprising both surface configuration and materials, regardless of climate or location. These factors exist worldwide, but nowhere does their severity and range of extremes surpass that found in the deserts of the world.

9. Desert Types. Deserts of the world possess certain basic terrain types. The predominance of any one type will change as the area progresses to a more mature stage* (Figure 4).

There are three main types of deserts: rocky or stony deserts, gravelly deserts, and sandy deserts. There are also border areas, such as desert plateau (mesa and butte) and mountains or peaks and minor areas such as clay deserts (Figure 5). (See Figure 1-B for world-wide distribution of types). The three main types of deserts are as follows:

a. Stony Deserts - At the foot of mountains, the eroded rock surface may be steep enough that only large boulders or rock fragments are left on the surface. This hard rock surface, or "hammada," is the heart of the stony desert. Its surface consists of exposed bedrock, with scattered boulders and rubble, and scattered thin sheets of wind-deposited sand. It is bordered by mountain, bajadas and plains dissected by washes. In the transition zone between hammada and alluvium, an increasingly thick veneer of gravel is deposited.

b. Gravelly deserts - Towards the lower levels of the desert floor, only the finer material is found. These gravels, pebbles and sand grains may be deposited in alluvium hundreds of feet thick. If there is no exterior drainage from the area, the surrounding highlands forming a basin, the infrequent flooding may result in ephemeral lakes. Suspended fines are left behind as the waters evaporate, and form playas. Changing water tables may bring dissolved minerals to the surface, forming pans. This rock alluvium is the dominant feature of gravelly deserts, the most common desert type. It is made up of gravel stratum,

*There has been considerable debate among geomorphologists in recent years. The question of the development processes of deserts has traditionally been based on a "youth-to-maturity" cycle. A new school of thought adheres to the "general systems theory" approach. For our purpose, the question is academic.

mixed with sands and silts. Usually, the surfaces are poorly consolidated, bounded by bajadas or individual fans, and cut by washes. If strong prevailing winds are present, surface sand and dust may be blown away, leaving a tightly fitted mosaic of gravel behind. This mosaic is known by many names, but commonly called "desert pavement" in the United States.

c. Sandy Deserts - The wind-blown fines from the rocky and gravelly deserts are the material which form the sandy deserts. The material may be deposited in long, thick sheets, or centralized in dunes, which travel with the winds. Sandy deserts are usually bounded by gravelly deserts. On the downwind side they may abut on mountains or bajadas. Transition areas are typically covered by thin sheets of sand, overlaying resistant gravels.

10. Desert Terrain Classification. As previously discussed, similar components are found in all deserts in varying degrees, depending on the stage of development of the particular desert. An exhaustive listing of these components would cover many pages. Fortunately, these components can be summarized under certain broad headings, for the purpose of discussion. These summaries include mountains, badlands and hills, fans and washes, desert flats and plains, and sand dunes and fields. Each heading is discussed in more detail in the following paragraphs. The physiographic association classification used by the Corps of Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi, (Ref 16) may be used to provide quantitative descriptions of desert components (Figures 4 and 5).

The WES landscape classification is based on a four digit code. These four digits can be used to describe either component or gross landscape (Figure 6). The first digit describes the characteristic plan-profile as shown in Figure 7. The second, third, and fourth digits describe the slope occurrence, characteristic slope and characteristic relief respectively (Table 3).

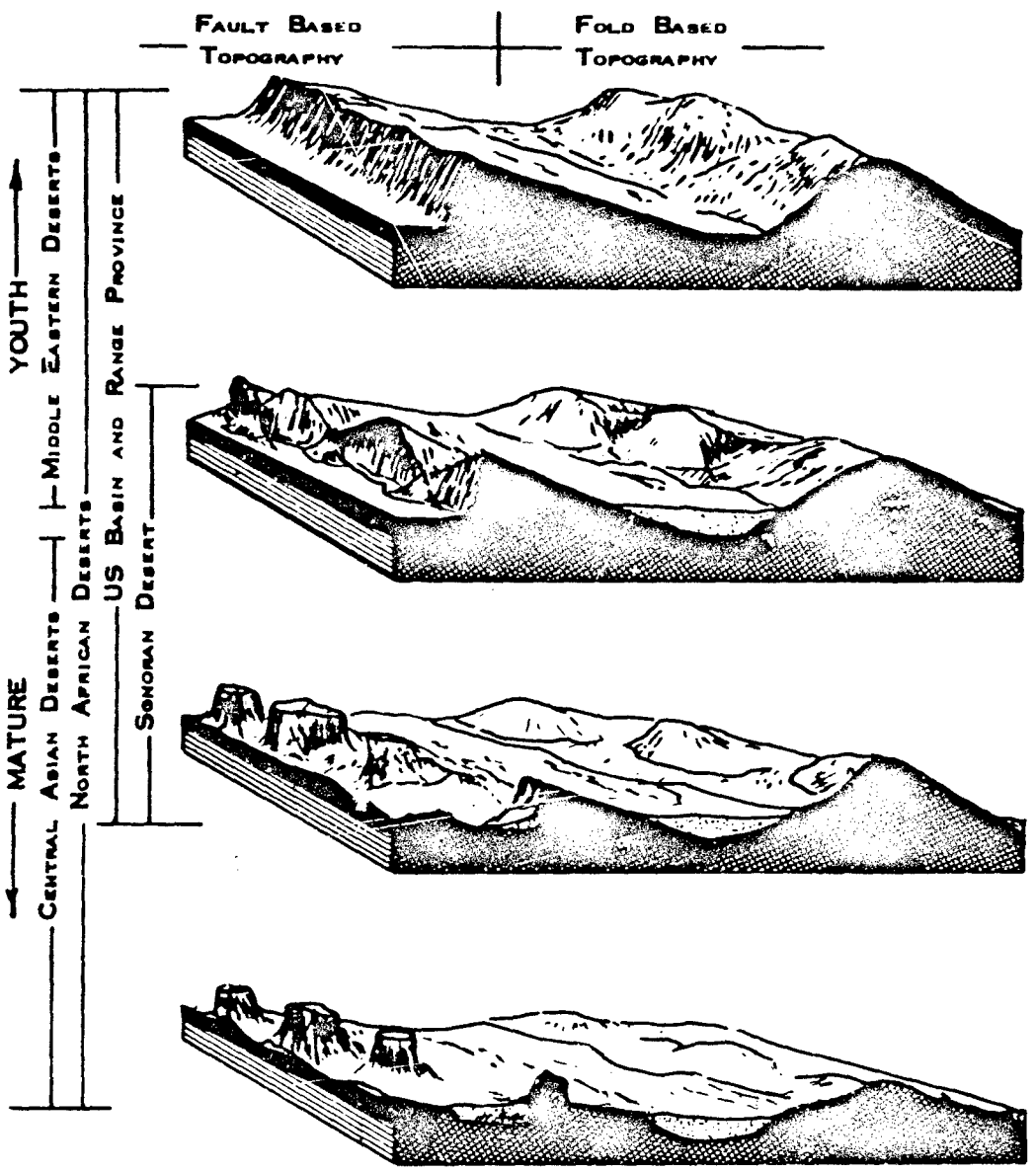


FIGURE 4. Stages in the Development of Desert Landscapes
Reference 13

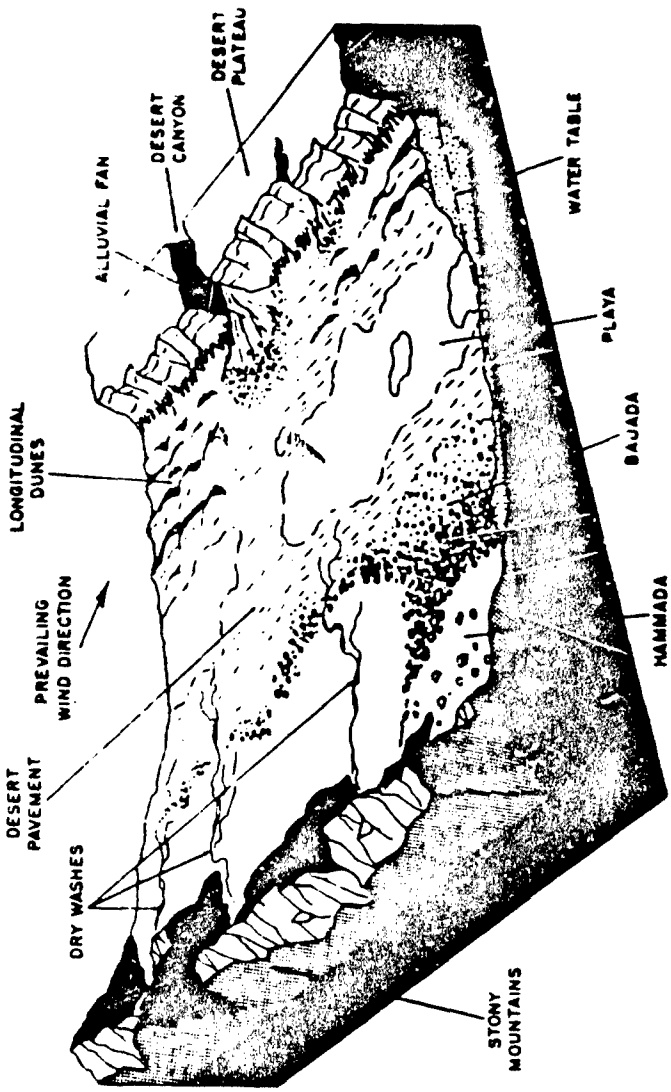


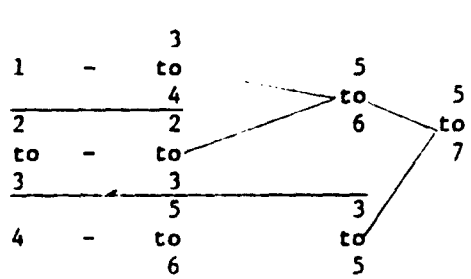
FIGURE 3. Desert Terrain Features

TABLE 3. Terrain Factor Coding

Factor Code	Slope Occurrence (per 10 miles) <1	1 to 5	5 to 20	20 to 100	100 to 200	>200	Characteristic Slope (deg) 0 to 1/2	1/2 to 2	2 to 6	6 to 14	14 to 26 1/2	26-1/2 to 45	>45	Characteristic Relief (ft) Type 1 0 to 10	10 to 50	>50	Type 2 0 to 100	100 to 400	400 to 1000	>1000
1	X	-	-	-	-	-	———							X	-	-	-	-	-	-
1a	———						X	-	-	-	-	-	-	———						
1b	———						-	X	-	-	-	-	-	———			———			
2	-	X	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-	-
3	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-
4	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-
5	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-
6	-	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	X	-
7	———						———							-	-	-	-	-	-	X

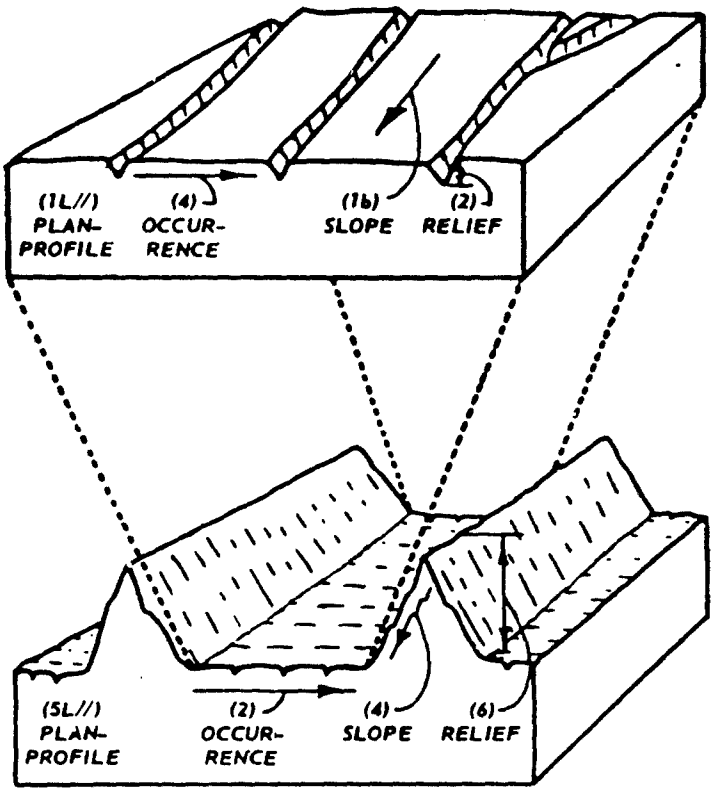
a. Mountains. Included under mountains are the areas of the desert plateau, crossed by canyon-like valleys of rivers and isolated sections of plateau in the form of mesas and buttes in actual rock peaks, as in the TIBESTI and AHUGGER Ranges of the central Sahara, the chaotic peaks of Sinai, and the mountains of Western Arabia and those of Baluchistan (Ref 15).

The WES classifications include:



COMPONENT LANDSCAPE

A PLAIN WITH A 1 TO 2.5% SLOPE DISSECTED BY ROUGHLY PARALLEL WASHES FROM 10 TO 50 FT DEEP, SPACED FROM 1000 TO 5000 FT APART



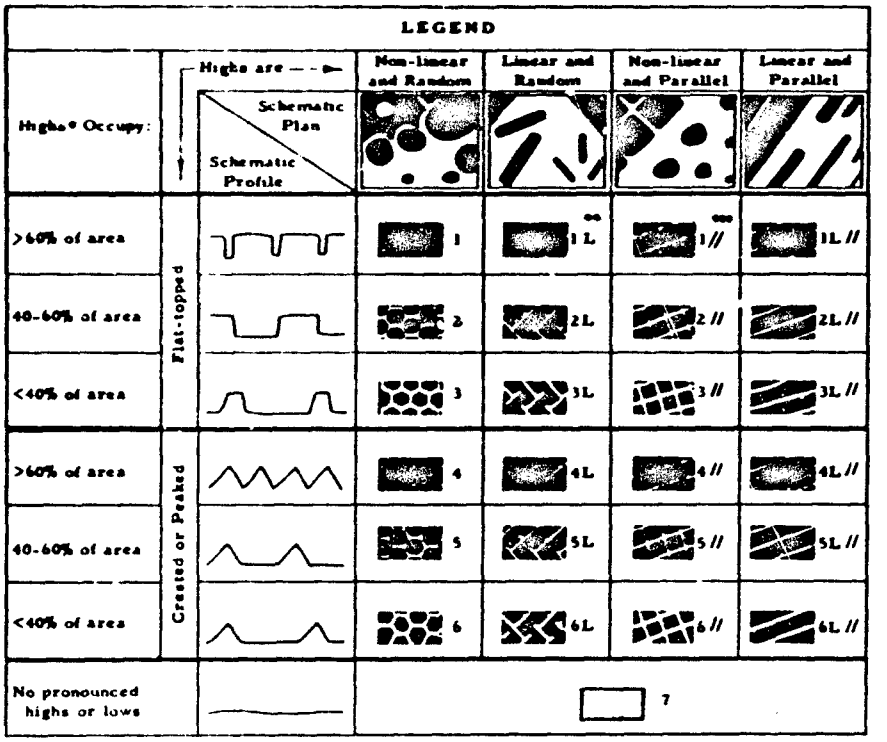
GROSS LANDSCAPE

A PARALLEL RIDGE AREA WITH THE RIDGES FROM 2 TO 10 MILES APART, THEIR HEIGHT RANGING BETWEEN 400 AND 1000 FT, AND THEIR CHARACTERISTIC SLOPE BETWEEN 25 AND 80%

FIGURE 6. Waterways Experiment Station, Vicksburg, Mississippi, Landscape Classification System Coding. (10.2)

CHARACTERISTIC PLAN-PROFILE

The characteristic plan-profile is the most commonly found plan-profile within a region. It may be either gross or restrictive. A gross plan-profile is one that can be subdivided into two restrictive component plan-profiles each exhibiting relief of a lower order than the gross plan-profile. Random sampling with circles 35 miles in diameter is used in determining the gross profile. Random sampling with circles 1 mile in diameter is used to determine the restrictive plan-profile. Local relief of less than 10 feet is not considered.



REPRESENTATIVE PLAN-PROFILES

Each of the following block diagrams illustrates a landscape representative of a specific plan-profile type. It should be emphasized that, within the defined limits of each type, a wide variety of landscape configurations are possible.

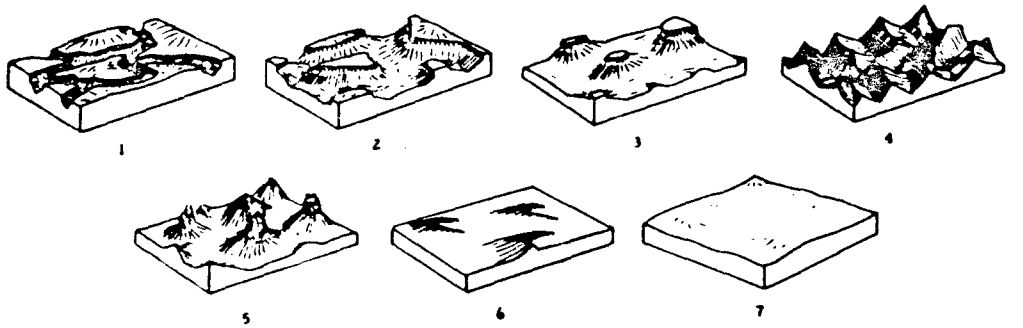


FIGURE 7. Characteristic Plan-Profile Coding (10.1)
WES Landscape Classification System

b. Badlands and Hills. Badlands and hills include the areas of extremely rough terrain, limited only by relative relief from the mountain classification. Slopes are steep, even vertical. Ridges are flat, rounded, or knife-edged, depending on the type of material and the stage of development. Surface materials vary from silt-sand mixtures through gravels.

The WES classification include:

1	-	2	-	5 to 6	-	5
4	-	3	-	4	-	4 to 5
		4	-	3 to 5		3 to 5
		5	-	3 to 4		4 to 5
6	-	2	-	4		5 to 6

c. Fans and Washes. The terms "fans and washes" includes coalesced alluvial fans, known as "bajadas." Fans are made up of water transported sediments, deposited at the mouths of canyons and valleys in a radiating surface similar to a segment of a cone. Stream channels, or washes, are cut deep into the heads of fans, while they divide into several braided channels across the foot of the fans.

The fan and wash complexes include the following WES classifications:

1	4	-	1b to 2	-	2	
	3	-	2	-	2	
	1	-	1b	-	1	
7	3	-	1b to 2	-	2	

d. Desert Flats. Desert flats, also known as "valley flats" and "alluvial plains" cover the bulk of desert surfaces not covered under other headings. They include the "desert pavement", the valley alluvium, gravel covered terraces, and the various playas.

The following WES classifications fall within the "desert flats" category:

1	-	2 to 3	-	1a to 2	-	2 to 3
7	-	1 to 2	-	1a to 2	-	1 to 2

e. Sand Dunes and Sand Fields. The areas covered by "sand dunes and sand fields" are self-explanatory. The significant factor is the sand surface; land form geometry is similar in many instances to other terrain categories. WES classifications which cover sand dunes and fields include:

4	3 to 4	-	3	-	4 to 5
	5	-	3	-	4
5	3 to 4	-	3	-	4 to 5
	4	-	2	-	3
6	1 to 3	-	3	-	5
	3 to 4	-	2	-	2

11. Distribution. The distribution of these types over the world's deserts is indicated in Table 4. This table is based on WES studies of the world's deserts for analogy with the desert at Yuma Proving Ground. Entries for each heading are based on the classification groupings shown above. Data are based on WES reports.

TABLE 4. Distribution of Desert Components in World's Primary Deserts

	NE Africa	NW Africa	Mid-East	S Central Asia	World*
Total Area (1000 sq mi)	1916	2013	1390	784	6247
% of Total Area:					
Mountains	13.4	17.8	18.2	28.2	18.0
Hills	7.4	8.2	2.2	2.3	5.7
Fans	16.6	6.2	20.8	25.2	16.9
Flats	41.6	37.4	31.1	20.2	33.9
Playas	3.9	8.8	6.4	14.1	7.3
Dunes	17.0	19.1	19.0	10.2	16.8
Misc**	0.2	2.4	2.6	—	1.4

*Total considered area of world deserts includes Mexican deserts.
**Includes hammadas, river terraces, volcanic cones and dikes, etc.
NOTE: Only area included in WES Yuma-Analogy Reports considered.

12. Sand and Dust. The arid soil with sparse vegetation found in hot-dry regions is commonly susceptible to sand and dust storms. This is especially true when the natural surface of the desert has been disturbed by military operations. In general, however, the major dust hazards come from the sand and dust clouds generated by vehicles.

a. Effects. The primary effects of sand and dust are abrasion, poor visibility, jamming of precision machines and clogging of air intakes. The direct abrasion is much effected by speed, and vulnerable surfaces such as optics and paint are quickly destroyed by movement against storms. The same applies to rotating machinery such as fans and propellers where not only the fan or propeller is abraded but also adjacent surfaces. The sand and dust can also work into machinery and cause abrasive wear. Typical failures would be scored shafts, seized bearings, failed oil seals, jammed slides, etc. It may be noted that although clay particles are non-abrasive they can be sintered into abrasive particles when ingested into an internal combustion engine.

b. Occurrence and Measurement. The Army Standard for sand and dust testing is MIL-STD-210A. This specifies wind velocities, particle sizes, and sand and dust concentrations. Unfortunately the common control and measurement techniques are applicable only to simulation chambers. Measurements can be made and are useful. The techniques and the apparatus should be fully described when reporting the results. Since this is the case, testing in the field is done by operating on specific test courses. If the item is normally operated in convoys, it is preferable to test in a small convoy. This is to cause operation in the dust environment of another vehicle which can be much more severe than in storms. The normal spacing of vehicles is given in the pertinent FM's, but it must be noted that these will vary extensively in practice. In the case of stored items, the general procedure would be to prepare dust strips and operate vehicles upwind of the test item.

For systems which are susceptible to clogging by fine dust (air intake devices), the dust course allows evaluation in a very short time. This course will degrade performance and increase maintenance of poor systems within a few miles. It will not, however, replace the durability operations on cross-country and gravel road courses because the total effect is different.

13. Vegetation. A delineation of the limits of what area should be classified as desert versus non-desert can not readily be made due to differing opinions among desert authorities. The characteristics of plant distribution does not allow us to use the presence or absence of certain species to mark desert boundaries. This lack of distinction obviously affects any detailed description of desert vegetation types.

Certain general characteristics of desert vegetation are held in common to a given limit by all deserts of the world. The most obvious

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characteristic is the scarcity of vegetation. The vegetation cover (higher plants) may vary from nothing to an open stand and even under the most favorable conditions a closed canopy is rarely seen. The second major characteristic is the seasonality of the vegetation and is dependent in varying degrees on water and temperature (see factors affecting distribution of desert vegetation).

These general classes of vegetation are normally considered: (1) perennial plants and (2) annuals or ephemerals. Most perennial plants are found in the deeper soils and have spines, harsh texture and few leaves during the driest months of the year. Other perennials are leafless or nearly so all the time and have green stems for photosynthesis. The ephemerals appear after rains in dense stands on shallow soils with their entire life cycle being completed in a span of several weeks and possibly becoming a fire hazard when dried.

Several factors affect the distribution of vegetation in a desert environment. These factors are listed below in order of decreasing importance* and their environmental impact.

a. Water - Its distribution and abundance throughout the year, its form: rain, fog, salt spray, humidity, dew, snow, etc.

b. Temperature - Deserts may be very hot, cold, or temperate and with definite seasons.

c. Soil types and chemical constituents - Soil type may vary from stony to clayey to sandy and mixtures of these affecting drainage and soil moisture. The chemical constituents usually encountered in desert soils are alkaline and saline, but the soil itself is rich in the minerals necessary to sustain plant growth.

d. Wind - As it affects seed distribution, soil erosion, and instability (shifting sand) and plant water loss.

e. Man and Animals - A controversial topic, for some scientists believe that changes are due to natural fluctuations in climate while others believe the activities of man particularly farm animal grazing, have been the important influence. Indigenous animals, selective grazing and subsequent seed distribution also effect genus distribution.

f. Plant disease and insects - Particularly those diseases and insects which are plant family or genus specific.

g. Plant competition and plant dependence - Plant competition for moisture, nutrients, etc. and the dependence of some species on others for shade and other forms of protection during all or part of their

*The order of importance may differ with species and location.

life cycle. Vegetation is often found only on slopes with some protection from direct rays of the sun.

Even with these greatly varying parameters affecting distribution of desert vegetation, desert local boundaries are often based on vegetation due to the absence of meteorological data in most desert areas.

The toxicity of some desert plants, the structurally dangerous appendages of some desert vegetation, and several other factors may adversely affect man, animals, and equipment. An inordinate number of desert plants possess spines, thorns, cutting edges and similar perilous protrusions. These plants can greatly affect the performance of personnel that are air-dropped in and traveling through these areas. Wheeled vehicles may also be affected by these plants. If any indigenous plants are being used as food or food supplements, consideration must be given to poisonous plants and those plants rendered poisonous by the soil in which they are growing, i.e., selenium uptake from soils and its concentration in some plants.

Dependence upon desert vegetation as a sole source of food for people is unrealistic; however, it can provide a useful supplement to an individual's diet.

The desert vegetation may result in blocked cooling ducts; vegetation, specifically vines, may wind around drive shafts and similar revolving shafts. Even though the desert vegetation may appear sparse and relatively frail, especially in encounters with vehicles, it adds resistance to movement with possible resultant overheating and possible body damage to the vehicle and accessory parts. The desert vegetation can also camouflage terrain features that may be obstacles to equipment movement. As mentioned earlier, at certain times of the year ephemerals may become a fire hazard from muzzle blasts and engine exhausts as well as man and nature. The vegetation may also conceal insects, snakes, scorpions and other noxious animals and finally may limit visibility, especially from low vehicles.

14. Camouflage. The following documents describe in detail the principles involved in concealing or disguising troops, vehicles, weapons and field installations. They are also sources of reference data on camouflage materials and field manufacturing techniques:

FM 5-20:	Camouflage	May 1968
FM 5-22:	Camouflage Materials	January 1956
TM 5-200:	Camouflage Materials	April 1968

Camouflage and concealment by passive deception measures, in a desert environment, present particular problems because of the generally barren nature of the terrain. Concealment is most often achieved by blending into the landscape, colors blending with soil and foliage, shapes

blending into the terrain formations. Nets, drapes, and paint patterns may be used to assist in this concealment action. Rough terrain results in shadowed areas in which concealment is simplified.

Recommended changes to this publication should be forwarded to Commander, U. S. Army Test and Evaluation Command, ATTN: AMSTE-ME, Aberdeen Proving Ground, Maryland 21005. Technical information related to this publication may be obtained from the preparing activity: Commander, Yuma Proving Ground, ATTN: STEYP-MMI, Yuma, Arizona 85364. Additional copies of this document are available from the Defense Documentation Center, Cameron Station, Alexandria, Virginia 22314. This document is identified by the accession number (AD No.) printed on the first page.

APPENDIX A

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32. MTP 5-4-001, "Desert Environmental Testing of Missile and Rocket Systems."

33. MTP 6-4-001, "Desert (Field) Environmental Testing of Communication, Surveillance, and Avionic Electronic Equipment."

34. MTP 9-4-001, "Desert Environmental Testing of Construction, Service, and Support Equipment."

35. MTP 10-1-003, "Desert Terrain".

APPENDIX B

WORLD HOT-DRY TEMPERATURE DISTRIBUTION

Computation of the world's extreme degree-hours is a problem because data are extremely limited. Ideally, a mean temperature and standard deviation are required for each hour of the day so a distribution curve can be constructed. These data are not available within the system. An alternate method is to use estimated points on the distribution curve. This method is used here.

In World Frequency of High Temperatures (Ref 6), Sissenwine developed empirical frequency temperature distribution during the hottest month based on a temperature index. For an area which has temperatures exceeding 120°F for 1% of the time, this index is 133.8. For this index, the temperatures exceeded for 5% and 10% of the time are calculated to be 117°F and 114.3°F. For the temperatures exceeded 50% of the time, the Death Valley average temperature (102°F) is used. This is based on the fact that Death Valley has approximately the correct index and is the hottest known average. It was further assumed that the temperature distribution is symmetric about the average. (It can be shown that the only critical assumption is the 50% temperature level; all other assumptions have little effect). The values are plotted on probability paper to give Figure B1.

Assume materiel is under operation, storage, or transit conditions for a period of 30 days in a hot-dry environment. Table B1 gives the probability of a given temperature being exceeded, the net number of hours of occurrence in 30 days of extreme weather, and the expected number of degree-hours in 30 days using the temperature distribution shown in Figure B1.

TABLE B1.

World's Extreme Hot Dry Degree Hours in 30 Days (over 90°F)

Based on Temperature Distribution Indicated

Temp (°F)	Probability of a Greater Temp	Expected No. of Hrs. in 30 Days Temp> to	Net Hours	Avg Temp (°F)	Avg Temp minus 90°	Deg-Hrs
120.0	1%	7.2	7.2	122.00	32.00	230
117.0	5%	36.0	28.8	118.50	28.50	821
114.3	10%	72.0	36.0	115.65	25.65	923
102.0	50%	360.0	288.0	108.15	18.15	5227
90.0	89.5%	644.0	284.4	96.00	6.00	1706
						8907

TABLE B1 (continued)

Total degree-hours for 30 days - 8907
Average degree-hours for 1 day - 297

Mil Std 210A has 315 degree-hours per day
AR 70-38 has 366 degree-hours per day

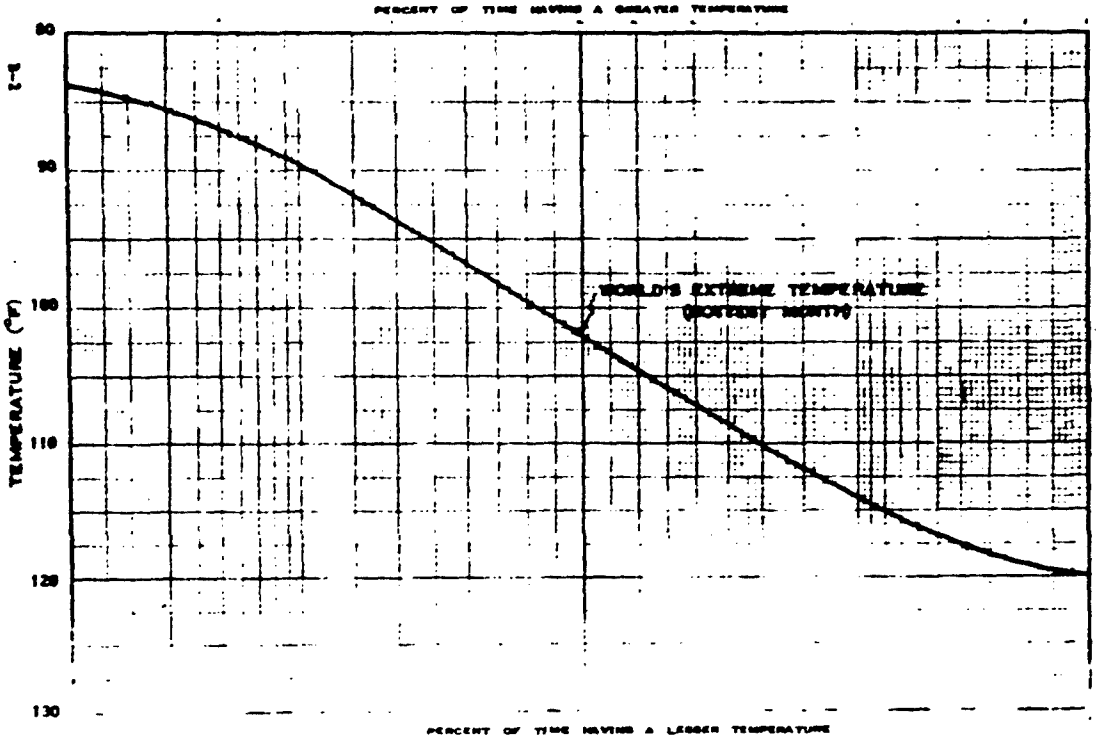


FIGURE B1. WORLD'S EXTREME TEMPERATURE DISTRIBUTION CURVE - HOTTEST MONTH

This gives the probable exposure of an item exposed to a region with a 1% level of temperatures exceeding 120°F. No place has temperatures at the 1% level very much exceeding 120°F. This exposure is not, however, the exposure exceeded 1% of the time but only the probable exposure which could be exceeded in 50% of exposures. However, the variation from exposure to exposure would be small. The highest number of degree-hours recorded in one month was in Death Valley (July 1922) with greater than 12,100 degree-hours. The average temperature was 106.8°F.

Table B2 interpolates the 30-day degree-hour data to 1, 15, and 30 days. Extrapolation for greater periods is not linear because there is no place which meets the 120°F-1% condition for more than one month.

For example. Death Valley has only 6,850 degree-hours in the second hottest month. However, hot regions in the Sahara are nearer to the equator and remain hot longer. Therefore, 7,850 degree-hours is used for the second month in Table B2.

TABLE B2. World's Extreme Degree-Hours

Theoretical No. of Testing Days	Degree-Hours over 90°F Required
1	297
15	4453
30	8907
60	16,750

APPENDIX C

COMPUTATION OF YUMA DEGREE-HOUR LEVELS

The mean temperature and standard deviation at the U. S. Weather Bureau station, Yuma, Arizona, during July for the hours of 0000, 0600, 1200, and 1800 were computed in Unusual Extremes and Diurnal Cycles of Desert Heat Loads (Ref 7). Figure C1 gives the probability distribution of temperatures during July (hottest month) at YPG at 0000, 0600, 1200, and 1800 hours based on the mean and standard deviation. Approximate daily temperature curves can then be constructed for days in which the maximum temperature is (a) greater than or equal to 90°F and less than 95°F, (b) equal to or greater than 95°F and less than 100°F, (c) equal to or greater than 100°F and less than 105°F, (d) equal to or greater than 105°F and less than 110°F, (e) equal to or greater than 110°F. See Figure C2.

The area above 90°F but under each of the five curves in Figure C2 is equal to the degree-hours above 90°F for each of the five representative days. Table C1 gives the results.

TABLE C1.

Degree-Hours when the Maximum Temperature is Within a Specified Range (Hot-Dry Climate Only)		
Category	Maximum Temperature (°F)	Degree-Hours/Day
a	$90 \leq T < 95$	9
b	$95 \leq T < 100$	50
c	$100 \leq T < 105$	110
d	$105 \leq T < 110$	180
e	$110 \leq T$	290

Since each of the curves in Figure C2 represents an average temperature curve for all days having maximum temperatures within the specified ranges, the cumulative degree-hours over 90°F for the time period can be calculated by multiplying 9, 50, 110, 180, and 290 degree-hours, respectively, by the number of days having maximum temperatures within the respective ranges listed above, and then adding the product.

For example, if during the test there were five days with maximum temperatures falling in category (a) above, eight days within category (b), thirteen days within category (c), nine days within category (d), and four days within category (e), the degree-hours over 90°F would be:

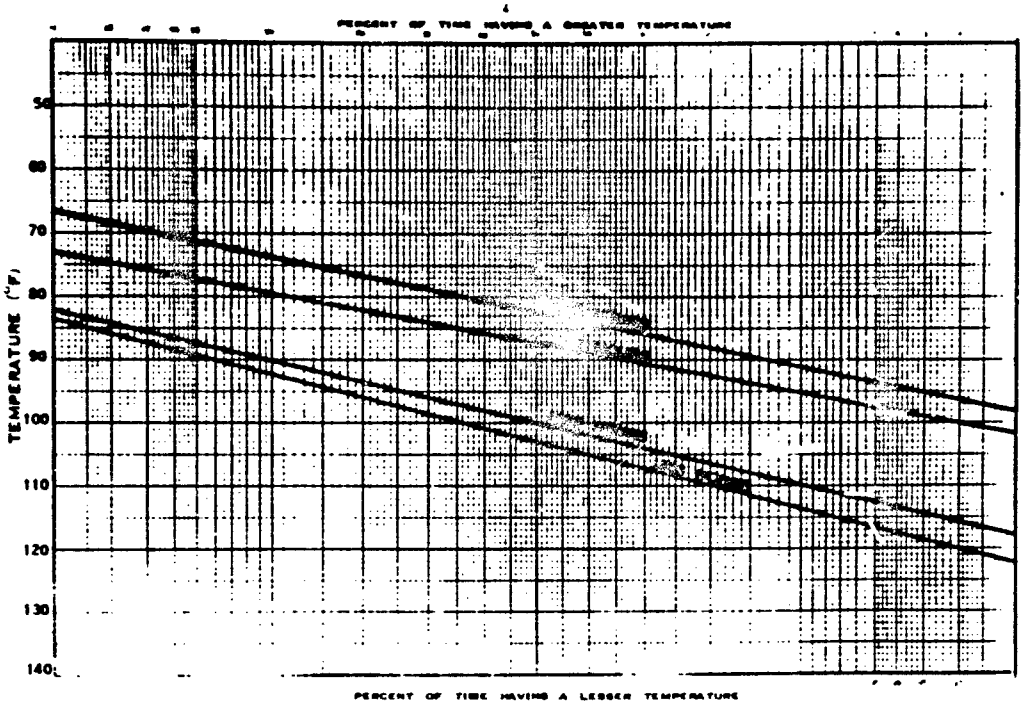


FIGURE C1 PROBABILITY DISTRIBUTION OF TEMPERATURE DURING JULY AT YPG.

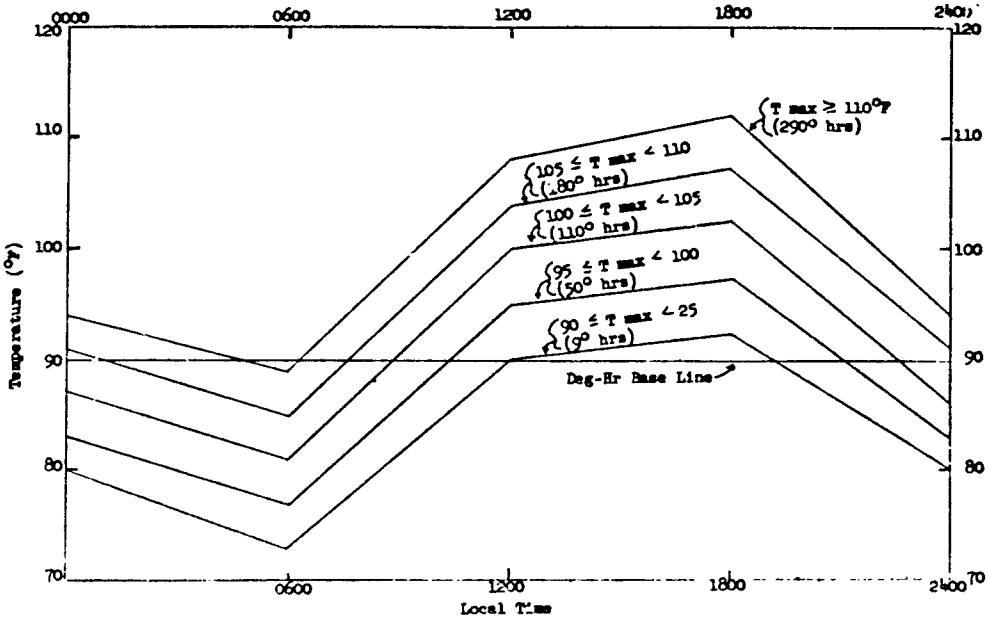


Figure C2 Diurnal Temperature Curves at YPG with the Maximum Temperature Within Specified Ranges

5 X 9 = 45
8 X 50 = 400
13 X 110 = 1430
9 X 180 = 1620
4 X 290 = 1160

4655 degree-hours over 90°F

From 25-year records in the Handbook of Yuma Environment, the expected number of days per month falling in each of the maximum daily temperature ranges is shown in Table C2. Also, the degree-hours over 90°F have been calculated by the method just described and are listed in the column indicated.

TABLE C2. Maximum Daily Temperature Frequencies - Yuma, Arizona

Month	Maximum Diurnal Temperature Range*	Expected No. of Days	Degree-Fahrenheit-Hours Over 90°F
	(a)	7	63
	(b)	9	450
MAY	(c)	5	550
	(d)	2	360
	(e)	1	290
		Total	1713
	(a)	2	18
	(b)	6	300
JUNE	(c)	9	990
	(d)	8	1440
	(e)	4	1160
		Total	3908
	(a)	0	0
	(b)	1	50
JULY	(c)	6	660
	(d)	15	2700
	(e)	9	2610
		Total	6020
	(a)	0	0
	(b)	2	100
AUGUST	(c)	8	880
	(d)	15	2700
	(e)	5	1450
		Total	5130

*(a) 90°F ≤ Max. Temp. < 95°F (c) 100°F ≤ Max. Temp. < 105°F (e) 110°F ≤ Max. Temp.
(b) 95°F ≤ Max. Temp. < 100°F (d) 105°F ≤ Max. Temp. < 110°F

TABLE C2. Maximum Daily Temperature Frequencies - Yuma, Arizona (Concluded)

Month	Maximum Diurnal Temperature Range*	Expected No. of Days	Degree-Fahrenheit-Hours Over 90°F
	(a)	3	27
	(b)	6	300
SEPTEMBER	(c)	9	990
	(d)	9	1620
	(e)	2	580
		Total	3517

It must be noted that the number of actual degree-hours in a given month can be far less than anticipated. This is particularly true of months other than July. For example, June 1965 had only 1735 degree-hours as opposed to 3908 normal.

APPENDIX D

GLOSSARY OF DESERT ENVIRONMENTAL TERMINOLOGY

The following glossary was prepared to meet the needs of personnel engaged in desert environmental studies and test design. Operational reports, particularly those prepared by foreign agencies, use terms which are not defined in standard or specialist dictionaries. A further difficulty is terms that are defined having regional or technical connotations differing from the stated definitions. Examples of the latter are AMBIENT TEMPERATURE and MALPAIS.

Ambient temperature usually refers to local air temperature around an object. The term is occasionally used, however, to refer to the controlled temperature to which an item is subjected. For example, a round of ammunition is conditioned at 70°F in a van parked in the open, with outside temperatures of 90°F. Either temperature might be given if an observer was queried as to the ambient temperature.

Malpais is often used as a description of certain types of terrain, without any exact meaning. French for "badlands," the term is highly relative, and usually completely dependent on the user's backgrounds. Local use in the American southwest is directed towards description of the terrain between washes, not the much more rugged mountains surrounding the "malpais" areas.

Although not meant as a criteria for preferred usage, the glossary is coded to enable users to benefit from past experience. Words followed by an asterisk (*) will be understood by most technical readers. A cross (#) indicates potential misunderstanding unless the meaning can be clarified by the context in which the word is used. Words followed by a phi (ϕ) should not be used unless they are defined in the containing document.

- A -

ABRASION, * n. - The process of rubbing, grinding, or wearing away by friction.

ABSOLUTE HUMIDITY * - In a system of moist air, the ratio of the mass of water vapor present to the volume occupied by the mixture; that is, the density of the water vapor component.

ABSOLUTE MAXIMUM (MINIMUM) TEMPERATURE * - The highest (lowest) temperature recorded during the period of record at a station.

ABSOLUTE RANGE OF TEMPERATURE * - The difference between the highest and lowest temperatures on record at a station.

ABSOLUTE TEMPERATURE SCALE * - The KELVIN TEMPERATURE SCALE, a scale for measuring temperature from ABSOLUTE ZERO independent of the molecular motion and body heat of a substance.

ABSOLUTE ZERO * - The zero point of the ABSOLUTE TEMPERATURE SCALE (zero degree KELVIN), of fundamental significance in thermodynamics. It may be interpreted as the temperature at which the value of absolute zero in degrees CELSIUS is -273.15, by definition.

ABSORPTANCE, * n. - The ratio of the radiant flux absorbed in a body of material to the radiant flux incident upon it. Commonly, the material is in the form of a parallel-sided plate and the radiation in the form of a parallel beam incident normally on the surface of the plate. The absorptance may be measured for any radiation, for visible light (optical absorptance), or a function of the wave length of the radiation (spectral absorptance).

ABSORPTION, * n. - 1. The process whereby the total number of particles emerging from a body of matter is reduced relative to the number entering, as a result of interaction of the particles with the body. The process whereby the kinetic energy of a particle is reduced while traversing a body of matter. The loss of kinetic energy of corpuscular radiation is also referred to as moderation, slowing, or stopping. 2. The process whereby some or all of the energy of sound waves or electromagnetic radiations is transferred to the substance on which they are incident or which they traverse. 3. The process of "attraction into the mass" of one substance by another so that the absorbed substance disappears physically. 4. Hydrol. The entrance of water into the soil or rocks by all natural processes. It includes the infiltration of precipitation or snowmelt, gravity flow of streams into the valley alluvium, into sinkholes or other large openings, and the movement of atmospheric moisture.

ABSORPTION COEFFICIENT * - 1. As applied to radiation (electromagnetic and corpuscular), a measure of the rate of decrease of a beam of photons as a result of absorption by the material in which the radiation is propagating. 2. The ratio of the sound energy absorbed by a surface of a medium (or material) exposed to a sound field (or to sound radiation) to the sound energy incident on the surface.

ACCELERATION, * n. - 1. In mechanics, a change in the velocity of a body, or the rate of such change, with respect to time or direction or both. 2. In a more restricted sense but more popular usage, the act or process of moving, or of causing to move, with increasing speed; the state or condition of moving.

ACCLIVITY, * n. - An ascending slope, as opposed to DECLIVITY.

ACID SOIL # - Technically a soil with a pH value less than 7.0, but this figure is generally set at 6.6. Since pH values vary greatly with the method of determination, there is no unanimous agreement as to what constitutes an acid soil.

ACOUSTIC NOISE * - Any undesired sound. The frequencies involved include at least the band from 15 Hertz (Hz) to 20,000 Hz. (See NOISE).

ACTINIC # adj. - Pertaining to electromagnetic radiation capable of initiating photochemical reactions, as in photography or the fading of pigments. Because of the particularly strong action of ultraviolet radiation on photochemical processes, the term has come to be almost synonymous with ultraviolet, as in "actinic rays."

ACTINOMETER, # n. - The general name for any instrument used to measure the intensity of radiant energy particularly that of the sun. Actinometers may be classified, according to the quantities which they measure, in the following manner: (a) pyrheliometer, which measures the intensity of direct solar radiation; (b) pyranometer, which measures global radiation (the combined intensity of direct solar radiation and diffuse sky radiation); and (c) pyrogeometer, which measures the effective terrestrial radiation.(See RADIOMETER).

ADIABATIC PROCESS - A thermodynamic change of state of a system in which there is no transfer of heat or mass across the boundaries of the system. In an adiabatic process, compression always results in warming, expansion in cooling. In meteorology the adiabatic process is often also taken to be a reversible process.

ADOBE * - A residual black, brown or grey-brown soil, very fine grained and highly plastic. It develops on sedimentary rocks, gravelly and clay deposits, and on recent alluvium. On drying, adobe assumes a coarse, black appearance with wide fissures. (See also HARDPAN).

ADVECTION, n. # - Meteorol. The process of transport of an atmospheric property solely by the mass motion of the atmosphere; also, the rate of change of the value of the advected property at a given point. Regarding the general distinction (in meteorology) between advection and convection, the former describes the predominantly horizontal, large-scale motions of the atmosphere while convection describes the predominantly vertical, locally induced motions.

AGEBE - See AQUABA

AGGLOMERATE - Volcanic fragments of coarse to fine texture, generally unsorted and more or less firmly cemented.

AGGREGATE, # n. - Natural or manmade material, with rocklike particles ranging from 1/4 to 2-1/2 inches in diameter and with or without sand

and artificial binder used as a subgrade, base, or surface for a road. Usually refers to gravel or crushed rock. Sometimes called road metal (in England).

AGGREGATE (OF SOIL) ∅ - A single mass or cluster of soil consisting of many particles held together, such as a clod, prism, or crumb, or granule.

AGING, * n. - A gradual process involving physical change(s) in the properties or characteristics of a material which proceeds in a manner predictable chiefly as a function of time. In addition, the aging process may be accelerated or slowed when the material is also subjected to other factors than time, such as high or low temperature, ozone, etc. Aging can weaken or destroy specific properties in a material or conversely, aging can enhance the desired properties, as a curing lumber.

AGING, ACCELERATED * - Exposure of material to accelerated, simulated climatic conditions by using hot or cold chambers, intense sprays, continuous light, or other artificial means.

AGING, NATURAL * - The change of material exposed in the natural environment.

AGING, UNDISTORTED ACCELERATED * - A short-term exposure of an item which generates the same aging effects as the related long-term natural exposure.

AGUADA ∅ (Actacama) - A small natural oasis.

AIN ∅ - A spring.

AIRBORNE DUST * - Particles of mineral and other substances, usually of silt size, suspended in the air, such as those raised by operation of equipment over dry, loessal terrain, or those resulting from dust storms.

AIR CONDITIONING * - The artificial control of humidity, temperature, "purity," and motion of the air within buildings and other enclosed spaces; also the operation of equipment for such controls. The objective may be to secure either maximum human comfort or the best environment for a given industrial operation.

AIR DENSITY * - 1. The ratio of the mass of air to the volume occupied by it. In a continous medium the density is defined by a limiting process and is a point function. 2. See BALLISTIC DENSITY.

AIR-DRY, adj. ∅ - The state of dryness (of a soil) at equilibrium with the moisture content in the surrounding atmosphere. The actual

moisture content will depend upon the relative humidity and the temperature of the surrounding atmosphere.

AIR DRY, v.t. * - To allow to reach equilibrium in moisture content with the surrounding atmosphere.

AIR LOSS * - The loss in weight by an object or substance on exposure to air at room temperature for a specified period of time.

AIR MASS * - A widespread body of air that is approximately homogenous in its horizontal extent, particularly with reference to temperature and moisture distribution; in addition, the vertical temperature and moisture variations are approximately the same over its horizontal extent.

AIR, MOIST - 2. * In atmospheric thermodynamics, air that is a mixture of dry air and any amount of water vapor. 3. * Generally, air with a high relative humidity. (Ø) In environmental engineering, a mixture of air and condensed or entrained beads of airborne water, specifically air containing water in the liquid state.

AIR PRESSURE - The static pressure exerted by air. Although this is a very general term, it is best used in cases where a limited volume of air is concerned, as within an enclosed space. This term should never be used to denote a dynamic effect such as wind pressure.

AIR STABILITY - The condition of the atmosphere as affected by the gradient of air temperature in the vertical direction, which determines the extent of mixing or exchange between air layers at different altitudes.

ALBEDO, n. - The ratio of the amount of electromagnetic radiation reflected by a body to the amount incident upon it, commonly expressed as a percentage. The albedo is to be distinguished from the reflectivity, which refers to one specific wave length (monochromatic radiation).

ALBEDOMETER, n. - An instrument used for the measurement of the reflecting power (the albedo) of a surface. A pyranometer or radiometer adapted for the measurement of radiation reflected from the earth's surface is sometimes employed as an albedometer.

ALKALI FLAT * - The bed of a dried up saline lake that is heavily impregnated with alkaline salts. (See PLAYA).

ALKALI SOIL - 1. # A soil with a high degree of alkalinity (pH of 8.5 or higher) or with a high exchangeable sodium content (15% or more of the exchange capacity), or both. 2. Ø A soil that contains sufficient alkali (sodium) to interfere with the growth of most crop plants.

ALKALINE SOIL # - Generally any soil that has a pH greater than 7.0. (See ACID SOIL).

ALLIGATORING, n. - A coating failure attributed to improper use or application of paints, varnishes, lacquers, and allied formulations. It is characterized by the formation or separation of large surface cracks and segments in the characteristic pattern resembling the hide of an alligator.

ALLUVIAL APRON - See APRON, ALLUVIAL; BAJADA.

ALLUVIAL CONE - A body of alluvium, shaped like a part of a cone. Steeper than an alluvial fan, it is formed by a larger stream, of coarser material. (Present usage prefers alluvial fan for all such deposits).

ALLUVIAL FAN * - A body of alluvium, shaped like a segment or sector of a low cone, formed where a steep mountain canyon emerges into an open valley or onto a plain. The surface of an alluvial fan is normally marked by stream channels and former channels that radiate from the opening of the cone, at the mouth of the mountain canyon, in a pattern somewhat like that of the ribs of an open Japanese fan. The profile of a large alluvial fan is normally concave, the slope decreasing progressively away from the apex. See also APRON and BAJADA.

ALLUVIAL PLAIN # - Plains of depository origin including flood plain, deltas, and terraces.

ALLUVIAL SLOPES - See BAJADAS

ALLUVIUM # - A general term for all soil, sand, gravel, or similar detrital material deposited by running water. Occurs on flood plains of streams, or on alluvial fans and cones at places where streams issuing from mountains lose velocity and deposit their contained sediment on a valley floor.

ALPINE TOPOGRAPHY * - Mountainous terrain modified by glaciation to display an assortment of physiographic features such as aretes, aiguilles, cirques, and U-shaped valleys.

ALTIMETER, n. * - An instrument for indicating altitude above or below a given datum, usually the ground or sea level.

ALTIMETER SETTING * - The value of atmospheric pressure to which the scale of a pressure altimeter is set.

ALTITUDE, n. * - 1. The vertical distance between a point and a datum surface. 2. The vertical angle between the plane of the horizon and the line to the observed point, as a star. 3. The height of an airborne

object above the earth's surface; above a constant-pressure surface, or above mean sea level.

AMBIENT, adj. - Surrounding; external; unconfined.

AMBIENT TEMPERATURE - The temperature of the air or other medium surrounding an object.

AMBIENT VIBRATION - The all encompassing vibration associated with a given environment, being usually a composite of vibration from many sources near and far.

AMPHITHEATRES * - Semi-circular erosion bay formed at the head of drainage, which often scallop plateau scarps in arid regions.

ANABRANCH - 1. * A river branch that reenters the main stream. 2. ∅ A river branch that becomes absorbed by sandy ground.

ANALOG, n. - 1. (∅) Any environmental element or element-complex which has basic similarities to another element or element-complex located in a different part of the world. (Analogous does not mean homologous). 2. # In synoptic meteorology, a past large-scale weather pattern which resembles a given (usually current) situation in its essential characteristics. (1)

ANEMOMETER, n. # - The general name for instruments designed to measure the speed (or force) of the wind. These instruments may be classified according to the means of transduction employed: those used in meteorology include the rotation anemometer, pressure-plate anemometer, pressure-tube anemometer, bridled-cup anemometer, contact anemometer, colling-power anemometer, and sonic anemometer.

ANDESITE * - A volcanic rock composed essentially of andesine and/or more mafic constituents (pyroxene, hornblende, or biotite, or all three in various proportions may constitute the mafic constituents). Usually dark gray in color, andesite does not have abundant silica content.

ANFRACTUIOSITIES ∅ - A winding channel.

ANGLE OF REPOSE * - The maximum slope or angle at which a material such as soil or loose rock remains stable. When exceeded, mass movement by slipping as well as water erosion may be expected. Also called CRITICAL SLOPE.
NOTE: Angle of repose is preferred. Critical slope may refer to a vehicle's gradability limit.

ANGSTROM, n. ∅ - (Abbreviated Å or A) A unit of length used in the measurement of the wave length of light, x-rays, and other electromagnetic radiation and in the measurement of molecular and atomic diameters.

One angstrom equals 10^{-10}M or 10^{-4} microns. The wavelength of visible light ranges from about 4000 to 7000 angstroms; whereas x-ray wavelengths and atomic diameters are of the order of a few angstroms. The unit is named in honor of the nineteenth century Swedish spectroscopist, A. J. Ångstrom. Preferred use is nanometers.

ANCUD - A low knoll or outcropping of weather-resistant material, occuring in arid regions.

ANNUAL RANGE OF TEMPERATURE * - The difference between the highest and lowest temperatures recorded at a station in any given year.

ANTICLINE - A fold or arch of bedded or layered rock, dipping in opposite directions from an axis.

ANTIRESONANCE * - A system is considered to be in antiresonance, when with a constant forced excitation any change in the frequency of the excitation causes an increase in the response of the system.

APPARENT HORIZON * - The visible line of demarcation between land and sky.

APPLIED CLIMATOLOGY * - The scientific analysis of climatic data in the light of a useful application for an operation purpose. "Operation" is interpreted as any specialized endeavor, within such as industrial, manufacturing, agricultural or technical pursuits. This is the general term for all such work and includes agricultural climatology, aviation climatology, bio-climatology, industrial climatology, and probably others.

APPLIED ENVIRONMENTAL RESEARCH * - The collation of statistical, meteorological, climatic, and geographical data, the interpretation of these data, and the presentation of the evaluated information in suitable form for application to logistics problems of equipment, personnel, and operational functions, and as an aid to designers of military equipment.

APPLIED METEOROLOGY * - The application of current weather data, analyses, and forecasts to specific practical problems. It is distinguished from applied climatology, which deals with the similar application of long-period, statistically treated weather data.

APRON, ALLUVIAL - An outspread alluvial fan, deposited across the outlet of a valley. The apex of an apron is wide and relatively undefined as opposed to a FAN. See also BAJADA.

AQUABA - Gap in a symmetrical ridge which connects basins of different elevations that occur on either side of the ridge.

AREIC - A region of such small rainfall that stream beds do not form. Rain soaks into the ground or evaporates.

ARENAZES ∮ (Atacama)- Local areas of sandy wastes.

ARETE n. - An acute and rugged crest of a mountain range, or a subsidiary ridge between two mountains, or of a mountain spur, such as that between two cirques.

ARIDITY n. * - The degree to which a climate lacks effective, life-promoting moisture; the opposite of humidity, in the climatic sense of the term.

ARGUB * - A spur projecting from a ridge.

ARENACEOUS adj. - Sandy. (∮) Pertaining to sand.

ARKOSE - Sedimentary rock composed of material derived from disintegrated granite rock.

ARQ (or URUQ) * - Elongated sand dunes, dune ridges.

ARROYO (Spanish, SW U. S.) - A deep, usually dry gully or channel in an arid area. Typically, it is cut in unconsolidated material and has steep vertical walls at least several feet high. See DRY WASH and BARRANCE.

ASHAB (Sahara) ∮ - An ephemeral vegetation developing after rain.

ARTIFICIAL ENVIRONMENT * - An environment that exists in a test facility under controlled conditions, some elements of which are an imitation of conditions found in nature.

ARTIFICIAL MOONLIGHT ∮ - Illumination of an intensity between that of starlight and that of a full moon on a clear night.

ASPECT, n. * - 1. The compass direction toward which a land slope faces. The direction is taken downslope and normal to the contours of elevation.

ATMOMETER, n. ∮ - The general name for an instrument which measures the evaporation rate of water into the atmosphere. Four main classes of atmometers may be distinguished: (a) large evaporation tanks sunk into the ground or floating in water; (b) small evaporation pans; (c) porous porcelain bodies; and (d) porous paper wick devices.

ATMOSPHERE, n. * - 1. Meteorol. The envelope of air surrounding the earth and bound to it more or less permanently by virtue of the earth's gravitational attraction. The earth's atmosphere extends from the

solid or liquid surface of the earth to an indefinite height, its density asymtotically approaching that of interplanetary space. 2. Physics. A unit of pressure equal to 101,325 newtons per square meter (14.70 pounds per square inch), representing the atmospheric pressure of mean sea level under standard condition.

ATMOSPHERE, STANDARD * - A hypothetical vertical distribution of atmospheric temperature, pressure, and density which, by international agreement, is taken to be representative of the atmosphere for purposes of pressure altimeter calibrations, aircraft performance calculations, aircraft and missile design, ballistic tables, etc. The current standard atmosphere is that which was adopted on 15 March 1962 by the United States Committee on Extension to the Standard Atmosphere (COESA). The U. S. Standard Atmosphere, 1962, up to 32 km, has been adopted by the International Civil Aeronautical Organization (ICAO).

ATMOSPHERIC ACOUSTICS * - The study of (a) sounds of metecrological origin and (b) the role of the atmosphere in the propagation of sound. Examples of sounds of meteorological origin are thunder and any of the varied aeolian sounds, such as the humming of telegraph wires or the murmuring of trees when winds are blowing. The atmosphere influences the propagation of sound in many ways; the velocity of sound in the atmosphere is governed by the air temperature and by its molecular composition; sharp inversions may produce marked sound reflection; strong temperature gradients yield sonic refraction; small turbulent eddies may cause diffraction and scattering of sound that results in acoustical scintillation.

ATMOSPHERIC DENSITY * - The ratio of the mass of the atmosphere (or any part of it) to the volume occupied by it. This ratio is greatest at sea level and decreases with increasing altitude; it also may vary horizontally depending on conditions of ATMOSPHERIC TEMPERATURE and ATMOSPHERIC PRESSURE. It is usually expressed in grams per cubic meter, although any other unit system may be used.

ATMOSPHERIC OPTICS * - The study of the optical characteristics of the atmosphere and of the optical phenomena produced by the atmosphere and by particles suspended in the atmosphere, e.g. AEROSOLS and WATER VAPOR. It includes the study of refraction, reflection, diffraction, scattering, and polarization of light, but is not commonly regarded as including the study of other kinds of radiation.

ATMOSPHERIC PHENOMENON # - As commonly used in weather observing practice, an observable occurrence of particular physical (as opposed to dynamic or synoptic) significance within the atmosphere. Included are all hydrometeors (except clouds, which are usually considered separately), lithometeors, igneous meteors, and luminous meteors. From the viewpoint of weather observations, thunderstorms, tornadoes, waterspouts, and squalls are also included. The above usage excludes such

"phenomena" as the local or large-scale characteristic of wind, pressure, and temperature; it also excludes clouds, although it includes many products of cloud development and composition. In aviation weather observation, atmospheric phenomena are divided into two categories: weather and obstructions to vision.

ATMOSPHERIC PRESSURE # - The pressure exerted by the atmosphere as a consequence of gravitational attraction exerted upon the "column" of air lying directly above the point in question. Pressure is usually given in millibars (mbs), inches of mercury, pounds per square inch, or pounds per square foot. Its standard value at sea level is about 14.7 pounds per square inch (101,325 newtons per sq. m.).

ATMOSPHERIC RADIATION # - Electromagnetic radiation emitted by the atmosphere. 2. In meteorology, thermal radiation (about 3 to 80 micron wavelengths) emitted by, or propagating through, the atmosphere which interacts with the atmosphere and provides one of the important mechanisms by which the heat balance of the earth-atmosphere system is maintained; also called long-wave radiation.

ATMOSPHERIC TEMPERATURE # - The degree of heat or cold in the envelope of air surrounding the earth as measured on some definite temperature scale (usually CELSIUS or FAHRENHEIT) by means of any of various types of thermometers. (For mean or macro usage, see AMBIENT TEMPERATURE).

ATTERBERG LIMITS # - Measures of soil consistence for differentiation between materials of appreciable plasticity (clays) and slightly plastic or nonplastic materials (silts). The measures include the LIQUID LIMIT, the PLASTIC LIMIT, and the PLASTICITY INDEX.

AUDIBLE SOUND # - Sound containing frequency components lying between about 15 and 20,000 Hertz with sufficient sound pressure to be heard.

AUDIO FREQUENCY - Any frequency within the band of audible sound frequencies. Normally about 20 to 20,000 Hertz.

AVEN (French) ∅ - A sink hole.

AZIMUTH, n. # - Direction expressed as horizontal angle usually in degrees or mils and measured clockwise from north. Thus, azimuths will be true azimuths, grid azimuths, or magnetic azimuths, depending on which north is used.

- B -

BAB (Plural BEIBAND) ∅ - A North African term for a mountain pass.

BACK BLAST * - Rearward blast of gases from the breech of recoiless weapons upon the burning of the propellant charge. It is sometimes referred to as breech blast.

BACKGROUND, n. # - Ever-present effects in physical apparatus above which a phenomenon must manifest itself in order to be measured. "Background" can take various forms, depending on the nature of the measurement.

BACKGROUND LUMINANCE * - In visual range theory, the luminance (brightness) of the background against which a target is viewed. In estimating the visual range by objects on the horizon, for example, the background luminance is that of the sky near the horizon. In the problem of downward oblique visual range, the pertinent background luminance is that of the earth's surface.

BACKWARD SCATTER * - The scattering of radiant energy into the hemisphere of space bounded by a plane normal to the direction of the incident radiation and lying on the same side as the incident ray; the opposite of FORWARD SCATTER. In radar usage, BACKWARD SCATTER refers only to that radiation scattered at 180° to the direction of the incident wave.

BADIA (Syria) # - Waste of wilderness.

BADLANDS # - Terrain produced by excessive erosion of poorly consolidated materials in a semi-arid climate resulting in regions characterized by the intricate and sharp erosional sculpture of generally soft rocks. Vegetation is scanty or absent. Hills are steep, furrowed and often of fantastic forms. Drainage is intricately labyrinthine and the water courses or arroyas are normally dry.

BAJADA - A long outwash detrital slope at the base of a mountain range, resulting from the coalescence of alluvial fans (alluvial slopes, piedmont slopes).

BALLISTIC DENSITY * - A representation of the atmospheric density actually encountered by a projectile in flight expressed as a percentage of the density according to the standard artillery atmosphere. Thus, if the actual density distribution produced the same effect upon a projectile as the standard density distribution, the ballistic density would be 100 per cent.

BALLISTIC IMPACT * - The impact of a body during or at the end of its ballistic flight, i.e., target impact. The impact caused by the impingement of particles, fragments, bullets, or other objects on the target after their trajectory flight through space. This type of impact is differentiated from the impacting of components in a weapon system during environmental impact tests.

BALLISTIC TEMPERATURE * - A computed constant temperature that would have the same total effect on a projectile traveling from the gun to the target as the varying temperatures actually encountered.

BAND, FREQUENCY # - In communications and electronics, a continuous range of frequencies extending between two limiting frequencies. The term may also be applied to those frequencies which are encountered in shock and vibration excitation.

BAR, n. * - Meteorol. A unit of pressure equal to 10^6 dyne per cm^2 (10^6 barye), 1000 millibars, 29.53 inches of mercury.

BARCHAN, n. * - An independent, traveling, crescent-shaped dune or drift of windblown sand or snow, with the crescent facing toward the prevailing winds. A transverse type dune, it has an asymmetrical and crested cross-section with a steep inner-slope and a relatively gentle outerslope. Conditions under which barchans form include a relatively small to moderate supply of material and winds of almos. constant direction and moderate speed.

BARGA (Var BARQUA) - (North African) # - A sandy area (usually restricted to surface descriptions).

BARRANCE * - A Spanish term for a steep sided ravine with a narrow bed less than two meters wide. The term is also occasionally used in reference to a steep bank or bluff. (See Arroyo, Donga, Draw, Ravine and Wash).

BARRENS, n. # - A relatively desolate area, where vegetation is lacking (as in an ice-cap or desert) or is scanty and is restricted to a few species, as compared with adjacent areas, because of adverse soil, wind, or other environmental factors.

BASALT # - A dark gray to black, dense and fine grained igneous rock. May contain quartz or alkalic feldspar. (No strict definition of basalt as a mineralogic type has been agreed upon).

BASALT PLAIN # - A relatively plane surface produced by exposed, horizontally stratified, igneous rock, such as lava plateaus or shield volcanoes. Basalt plains may be dissected by deep, precipitous gorges.

BASIN, n. * - 1. An area of land which drains into a particular lake or sea through a river and its tributaries. 2. The drainage or catchment area of a stream or lake.

BATHOLITH * - A large, deep-seated igneous rock intrusion, usually granite, often forming the base of a mountain range, and uncovered only by erosion.

BATTLEFIELD ILLUMINATION * - The lighting of the zone of action of ground combat and combat support troops by artificial means other than invisible rays.

BEAUFORT WIND SCALE * - A system of estimating and reporting wind speeds, invented in the early nineteenth century by Admiral Beaufort of the British Navy. In its present form for international meteorological use it equates (a) Beaufort force (or Beaufort number), (b) wind speed, (c) descriptive term, and (d) visible effects upon land objects or sea surface. As originally given, Beaufort numbers ranged from 0, calm to 12, hurricane. They have now been extended to 17. (See BREEZE, GALE)

BED, n. * - A layer of rock differing from layers above and below, or set off by more or less well marked divisional planes; a layer in a series of stratified (sedimentary) rocks.

BEDROCK, n. * - The undisturbed rock in place either at the surface or beneath superficial deposits of gravel, sand, or soil.

BEER (Palestine) ∅ - A well, see BIR.

BEIABAN (Iran) ∅ - Salt (?) desert.

BEL, n. * - A unit expressing the relation between amounts of signal power and differences in sound-sensation levels. The number of bels is equal to the common logarithm of the ratio of the two powers or sound levels involved. Two powers or levels differ by one bell when their actual ratio is 10:1. See DECIBEL. (U. S. Army TM 11-486-11).

BELGIUM BLOCK COURSE * - A test facility for simulating the conditions of transportation. The course is a specially prepared road bed having varying degrees of roughness, waviness, and other controlled characteristics over which wheeled equipment is moved at varying speeds to study the effects of shock and vibration caused by transportation. Belgium Block is only one section of the MUNSON TEST COURSE which also includes a course washboard, a radial washboard, and a single corrugation section.

BENCH - A more or less horizontal surface between slopes (see TERRACE), in solid rock, and relatively short in comparison with width.

BERG ∅ - A South African mountain.

BEVAMETER, n. * - A mobile or portable instrument developed by the Land Locomotion Laboratory for measuring horizontal and vertical stress-deformation curves of natural soils or soil simulating materials, and consisting of one or more rotating horizontal shear heads and one or more vertical displacement penetrometers.

BIR (Syria) ∅ - A dug out spring.

BITTER LAKE - An enclosed body of water containing large deposits of salts.

BLACK BODY * - A hypothetical "body" which absorbs all of the electromagnetic radiation striking it; that is, one which neither reflects nor transmits any of the incident radiation. No actual substance behaves as a true black body, although platinum black and other soots rather closely approximate this ideal.

BLACK-BODY RADIATION * - The electromagnetic radiation emitted by an ideal black body; it is the theoretical maximum amount of radiant energy of all wavelengths which can be emitted by a body at a given temperature.

BLACK-BULB THERMOMETER # - A thermometer whose sensitive element has been made to approximate a black body by covering it with lamp black. The thermometer is placed in an evacuated transparent chamber which is maintained at constant temperature. The instrument responds to isolation, modified by the transmission characteristics of its container.

BLACK-GLOBE THERMOMETER - See BLACK-BULB THERMOMETER

BLAST EFFECT * - Destruction of or damage to structures and personnel by the force of an explosion on or above the surface of the ground. Blast effect may be contrasted with the cratering and ground shock effects of a projectile or charge which goes off beneath the surface.

BLAST WAVE * - A sharply defined wave of increased pressure rapidly propagated through a surrounding medium from a center of detonation or similar disturbance.

BLIND BASIN # - A basin of interior drainage. (See BOLSON)

BLISTERING, n. * - A coating failure common to paints, varnishes, lacquers, and related formulations. It is characterized by the formation of local or scattered blisters varying in size from small pimples to large patches, usually attributed to surface contamination or endo-osmosis of water as the result of exposure of coatings to excessive moisture.

BLOCK, n. # - Geomorphology. An elongated or quadrangular, often tilted section of a faulted part of the earth's crust, hence block mountains.

BLOCK MOUNTAIN * - An upstanding rock mass between two faults.

BLOOM, n. * - A surface coating failure associated with high gloss paints, varnishes, lacquers, and related formulations. It is characterized by the formation of a surface haze which lowers the original specular gloss, imparting a dull or semi-gloss appearance to the coating.

BLOWOUT * - A smoothly rounded hollow in a fixed dune, bonded on downward side by an active dune and caused by rapid eolian erosion of a break in vegetation cover.

BLOWING DUST * - Dust picked up locally from the surface of the earth and blown about in clouds or sheets. It may completely obscure the sky: in its extreme form it is a dust storm.

BLOWING SAND * - Sand picked up from the surface of the earth by the wind and blown about in clouds or sheets. In its extreme form, blowing sand constitutes a sand storm.

BLOWN-OUT LAND # - Areas from which all or almost all of the soil material has been removed by wind erosion. Usually barren, shallow depressions with a flat or irregular floor consisting of a more resistant layer and/or an accumulation of pebbles, or a wet zone immediately above a water table.

BLUFF, n. * - A cliff with a broad face, or a relatively long strip of land rising abruptly above surrounding land or a body of water. (See CLIFF, SCARP).

BLUSH, n. * - Of a doped fabric or surface: To become dull or pale as a result of rapid evaporation or high humidity, with a consequent weakening of the dope film.

BLUSHING, n. * - A condition in which a cloudy film appears on a newly lacquered surface. It is caused directly by the precipitation of a portion of the solid content of the material. This is usually due to oil or water mixed in the lacquer, a relatively high humidity condition, or too rapid drying.

BOLOMETER, n. * - An instrument which measures the intensity of radiant energy by employing a thermally-sensitive electrical resistor.

BOLSON * - A flat-floored basin, more or less rimmed by mountains, and draining internally to a playa. (See also DESERT FLATS).

BOTTOMING, n. - In shock and vibration mechanics, the metallic or elastomeric snubbing of resiliency-mounted devices wherein the response displacements, under shock or resonant vibration loading, exceed the normal resilient displacement limits, and applied acceleration levels are multiplied.

BOULDER, n. * - A piece of rock, separate from bedrock, more than 256 mm in maximum dimension. Sometimes considered to apply only to rounded stones of this size.

BRAIDED STREAM * - A stream flowing in several channels, which divide and reunite in a pattern resembling the strands of a braid.

BREAKAWAY ϕ - (Australia) - Scarps formed by deflation. Form around the margins of desert hollows by wind plantation. Rarely a hundred feet high.

BREAKS, n. ϕ - An area in rolling land eroded by small ravines and gullies: also used to indicate any sudden change in topography, as from a plain to hilly country.

BRECCIA (Italian) ϕ - Rocks consisting of angular fragments cemented together in a matrix. (See CONGLOMERATE).

BREEZE, n. ϕ - 1. Wind of force 2 to 6 (4-31 miles per hour or 4-27 knots) on the Beaufort scale. Wind of force 2 (4-7 miles per hour or 4-6 knots) is classified as a light breeze; wind of force 3 (8-12 miles per hour or 7-10 knots), a gentle breeze: wind of force 4 (13-18 miles per hour or 11-16 knots), a moderate breeze: wind of force 5 (19-24 miles per hour or 17-21 knots), a fresh breeze; and wind of force 6 (25-31 miles per hour or 22-27 knots), a strong breeze. 2. Any light wind. A land breeze flows from the land to the sea, and usually alternates with a sea breeze blowing in the opposite direction. A mountain breeze blows down a mountain slope due to gravity flow of cooled air, and a valley breeze blows up a valley or mountain slope because of the warming of the mountainside and valley floor by the sun. A puff of wind, or light breeze affecting a small area, may be called a cat's paw. Absence of wind is sometimes called ash breeze.

BRICK FIELDER ϕ - (The Australian Desert) - Very hot, dry and dusty winds from the deserts of the interior. Hot spells many days in duration often occur while the brick fielder blows.

BUMP, n. * - A mechanical shock of relatively low magnitude.

BUGOR (Arabic) - Hill.

BUR (Arabic) - Hill, mountain.

BURAN (Gobi) ϕ - A desert sandstorm. Also, the cold, fierce, northerly or northeasterly wind experienced mainly during the winter.

BURG (Arabic) - Tower, fort, or cliff.

BURJ (Arabic) - Tower, turret.

BURNU, OR BURUN (Turkish) ϕ - A cape or headland.

BURTA (Arabic) - Hill, mountain.

BUTTE * - An isolated, flat-topped hill or mountain with steep sides. Buttes are most common in arid regions. (See also MESA and CUESTA).

BYAR (Arabic) - Wells.

- C -

CABLE EFFECT - In electrical cables used to transmit TRANSDUCER output signals to associated instrumentation, the effect of cable weight and stiffness upon the response of the measured structure, the introduction of electrical noise resulting from mechanical cable distortion, and the effect of cable resistance, capacitance, and inductance upon the frequency response of the signal.

CALCAREOUS SOIL * - Soil containing sufficient calcium carbonate (often with magnesium carbonate) to effervesce visibly when treated with cold 0.1N hydrochloric acid.

CALDERA, n. * - A basin-shaped volcanic depression with a diameter many times greater than that of the included volcanic vent or vents. Many calderas contain one or more volcanic cones within them.

CALICHE * - The lime-rich deposits formed in the soils of certain arid and semi-arid regions. Caliche is believed to have formed as a result of capillary action drawing lime-bearing waters to the surface where by evaporation the lime-rich caliche is deposited.

CALM, n. - The absence of apparent motion of the air. In the Beaufort wind scale, this condition is reported when smoke is observed to rise vertically, or the surface of the sea is smooth and mirror-like. In United States weather observing practice, the wind is reported as calm if it is determined to have a speed of less than one mile per hour (or one knot).

CAMPO (Greek) - Plain.

CAÑADA ϕ - A Spanish term designating a wide and flat valley.

CANAL (Greek) - Canal.

CANYON * - A deep narrow valley with high, steep slopes. Syn: CHASM, GORGE AND RAVINE, GULCH.

CAPO (Greek) - Headland, cape.

CARCUR (Arabic) - Gorge.

CARIN (Arabic) - Pass.

CATENA, n. ∅ - Pedology. A sequence of soils of about the same age, derived from similar parent material and occurring under similar climatic conditions, but having different characteristics due to variation in relief and in drainage.

CAVITATION, n. * - The formation of local cavities in a liquid or vapor, as a result of the reduction of total pressure. For non-degassed liquids, these cavities are filled with the gases dissolved in the liquids and are produced whenever the instantaneous pressure falls below the vapor pressure. This effect is sometimes called pseudo-cavitation, to distinguish it from the effect in pure degassed liquids, where an actual rupture of the medium occurs (at much higher sound pressures). Collapse of such cavities produces very large impulsive pressures that may cause considerable mechanical damage to neighboring solid surfaces.

CAVITATION DAMAGE * - Wearing away of solid material through the formation and collapse of cavities in an adjacent liquid.

CEILING, n. - The height above the earth's surface of the lowest layer of the clouds or obscuring phenomena that is reported as broken, overcast, or obscuration, and not classified as thin or partial.

CELSIUS TEMPERATURE SCALE * - Same as CENTIGRADE TEMPERATURE SCALE, by recent convention. The Ninth General Conference on Weights and Measures (1948) replaced the designation "degree centigrade" by "degree Celsius." (Originally, Celsius took the boiling point as 0 degrees and the ice point as 100 degrees).

CENTIGRADE TEMPERATURE SCALE ∅ - A temperature scale with the ice point at 0 degrees and the boiling point of water at 100 degrees. See CELSIUS.

CENTRIPETAL DRAINAGE * - Drainage in an enclosed basin in which all runoff waters move toward the low point of the basin. The drainage found in a basin in which there are no through streams. See BOLSON.

CERRO ∅ (Spanish) - A hill or peak.

CHALKING, n. * - A surface coating failure common to paints, varnishes, lacquers, and related formulations, particularly when exposed to exterior environmental weathering. It is characterized by the formation of a chalklike powder on the surface attributed to film deterioration by the blue and ultra-violet wavelengths of the sun's radiant energy. In white exterior paints, chalking may be desirable to impart self-cleaning properties. In colored exterior paints on buildings or equipment, chalking imparts a faded-out appearance and dullness from accumulation of surface chalk.

CHAPARRAL, n. * - Low dense scrub vegatation, principally drought-resistant shrubs and bushes, which is characteristic of regions having a sub-tropical summer-dry (Mediterranean) climate: usually applied to that part of California which enjoys this climate. It corresponds to the maquis of the Mediterranean area in Europe. In some places it is almost impenetrable, consisting of thickets of stiff or thorny shrubs or dwarf trees.

CHAPP - A dry wash found in the Gobi.

CHARCO ∅ - A natural tank or watering place formed by a small reservoir in crystalline rocks or (rarely) in clayey material. It contains water during the rainy season and is often kept full during the remainder of the year by seepage from higher elevations. See TINAJA, REPRESO and TANK.

CHASM ∅ - A deep cleft or fissure caused by disruption or benching of earth or rock. See also CANYON, CREVASSE, RIFT.

CHECKING, n. * - A surface coating failure of paints, varnishes, lacquers, and related formulations. It is characterized by the formation of small surface breaks in the coating which do not penetrate to the underlying surface. If the underlying surface is visible, crackling is the term used to denote these breaks.

CHERGUI ∅ - (Sahara-Morocco) - A hot desert wind.

CHILI ∅ - (Sahara-Tunis) - A hot, dry, southerly wind. See SOROCCO.

CHOTT ∅ - Var. of SHOTT, a shallow saline lake of Northern Africa. See also PAN.

CHUBASCOS (Spanish for squalls) ∅ - Tropical hurricanes occurring in late summer or fall, with winds to 100 mph. Commonly start about 15 degrees North along the west coast of Mexico.

CIENEGA ∅ - A swamp or swampy place. Cienegas usually form when underground waters become ponded behind an impermeable layer and then rise to the surface.

CINDER SURFACE * - Small part of vesicular lava blown from a volcano, many feet deep around the vent, thinning out to a layer no thicker than the individual cinder to distances of a very few miles. Generally black, most commonly basaltic in composition. (See also SCORIFY DEPOSITS).

CLASTICS ∅ - Sedimentary rocks, composed of cemented particles, that have been deposited mechanically by a transporting agent such as water.

CLAY, n. * - 1. Soil mechanics. In the Unified Soil Classification System, defined as a soil that contains more than 50 percent particles with diameters less than 0.047mm and has a plasticity in relation to its LIQUID LIMIT. Types are identified as CL (lean clay), CH (heavy clay), OL (organic clay of low plasticity) and OH (organic clay of high plasticity). (Mil Std 619) 2. A soil separate consisting of particles less than 0.002mm in equivalent diameter. 3. Pedology. The U. S. Dept. of Agriculture textural class name for soil that contains 40

percent or more of clay, less than 45 percent of sand, and less than 40 percent of silt.

CLAY LOAM ∅ - Soil that contains 20 to 45 percent sand and 27 to 40 percent clay.

CLAYPAN, n. ∅ - A dense compact layer in the subsoil having a much higher clay content than the overlying material, from which it is separated by a sharply defined boundary; formed by downward movement of clay or by synthesis of clay in place during soil formation. Claypans are usually hard when dry, and plastic and sticky when wet. Also, they usually impede the movement of water and air, and the growth of plant roots.

CLIFF, n. - A high steep face of rock. A cliff of considerable length is often called an ESCARPMENT or SCARP. Cliffs are usually produced by erosion, less commonly by faulting.

CLIMATE, n. - The long-term manifestations of WEATHER, however, they may be expressed. More rigorously, the climate of a specified area is represented by the statistical collective of its weather conditions during a specified interval of time (usually several decades).

CLIMATIC TEST ∅ - A generic term describing any test designed to evaluate the effects of climatic conditions on the equipment undergoing the test. Climatic tests usually include sunshine, rain, hail, snow, sleet, wind, humidity, sand, dust, temperature, fungus, salt spray, etc.

CLIMATIZATION, n. * - All measures taken to provide for the satisfactory operation, packaging, transportation, and storage of equipment under specified climatic conditions.

CLO, n. * - The unit of measurement used in evaluating the insulative quality of clothing. A clo is the amount of insulation needed to assure a mean skin temperature of 92°F in an ambient temperature of 70°F, with relative humidity not over 50 percent and air movement of 20 feet per minute or less, and with assumed metabolic rate of 50K calories per square meter per hour. Allowing 76 percent heat loss through clothing, a clo has been defined as the amount of insulation required to permit the escape of one Kcalorie per square meter per hour with a temperature gradient of 0.18°C between the two surfaces.

CLOD, n. ∅ - A compact, coherent mass of soil ranging in size from 5 to 10 mm to as much as 8 to 10 inches; produced artificially, usually by the activity of man by plowing, digging, etc., especially when these operations are performed on soils that are either too wet or too dry for normal tillage operations.

COASTAL PLAINS # - Flat areas, usually sedimentary in origin, bordering the sea.

COBBLE (COBBLESTONE), n. * - Rounded or partially rounded rock or mineral fragment between 3 and 10 inches in diameter.

COCKSCOMB RIDGE ∅ (Kalahara) - A wind-chiselled ridge. See YARDANG.

COHESION, n. - Soil Mechanics. The capacity of sticking or adhering together. In effect, the cohesion of soil is that part of its shear strength which does not depend upon inter-particle friction.

COL, n. * - A short ridge connecting two higher elevations. 2. # A narrow pass joining two valleys; a pass between adjacent peaks in a mountain chain. See AQUABA.

COLD DRY - In military climatology, a weather condition in which cold, or very cold temperatures are unaccompanied by wet precipitation or wetness on the ground, except that dry snow may be falling or dry snow or ice may be underfoot.

COLINA ∅ - A hill (Spanish).

COLLOID, SOIL # - Organic or inorganic matter of very small particle size and very large surface area per unit of mass. Inorganic colloidal matter consists almost entirely of clay minerals of various kinds. Not all clay particles are colloids; usually only particles smaller than 0.00024 mm are so designated.

COLLUVIUM, n. ∅ - A deposit of rock fragments and soil material accumulated at the base of steep slopes as a result of gravitational action. See TALUS (preferred).

COMPACTION, n. - Soil Mechanics. Any process by which soil grains are rearranged to decrease void space and bring them into closer contact with one another, thereby increasing the weight of solid material per cubic foot. Noncohesive soils are most effectively compacted by vibration; moderately cohesive soils are compacted by sheepsfoot or other types of rollers.

COMPLIANCE, n. ∅ - The reciprocal of STIFFNESS.

CONCRETION, n. ∅ - A local concentration of a chemical compound, such as calcium carbonate or iron oxide, in the form of a grain or nodule of varying size, shape, hardness, and color.

CONDENSATION, n. * - The physical process by which a vapor becomes a liquid or solid; the opposite of evaporation. In meteorological usage, this term is applied only to the transformation from vapor to liquid;

any process in which a solid forms directly from its vapor is termed sublimation, as is the reverse process. In meteorology, condensation is considered almost exclusively with reference to water vapor which changes to dew, fog, or cloud. It is indispensable to avoid confusing condensation with precipitation, for the former is by no means equivalent to the latter, though it must always precede the latter.

CONDUCTION, n. - The transfer of energy within and through a conductor by means of internal particle or molecular activity, and without any net external motion. Conduction is to be distinguished from convection (of heat) and radiation (of all electromagnetic energy). Heat is conducted by molecular motion within a few centimeters of the heat source (e.g., the earth's surface). The distribution of heat away from that source is accomplished by convection and (in analogy to molecular conduction) by eddy heat conduction.

CONE, ALLUVIAL - See ALLUVIAL FAN.

CONE INDEX # - Soil Mechanics. An index of the shearing resistance of soil obtained with the CONE PENETROMETER; a number representing resistance to penetration into the soil of a 30-degree cone with a one-half inch base (actually, load in pounds on cone base area in square inches).

CONE PENETROMETER * - An instrument used to measure the ability of a soil to support traffic movements.

CONGLOMERATE, n. # - Hard rock formed by the natural cementing together of rounded pebbles (gravel). A similar rock formed of larger fragments may be called a cobble conglomerate or a boulder conglomerate, as the case may be.

CONOPLAIN Ø - A pediment.

CONSOLIDATION, n. - 1. Geology. Any or all of the processes whereby loose, soft, or liquid earth materials become firm and coherent. Any action that increases the solidity, firmness, and hardness is important in consolidation. Cementation is probably the most important factor, followed by mechanical rearrangement of constituents through pressure, crystallization, and loss of water. The term also describes the change of lava or magma to firm rock. 2. Soil Mechanics. The adjustment of a saturated soil in response to increased load, involving the squeezing of water from the pores and decrease in void ratio. The rate of consolidation depends upon the rate at which the pore water escapes, and hence upon the permeability of the soil.

CONVECTION, n. - 1. Mass motions within a fluid resulting in transport and mixing of the properties of that fluid. Convection, along with conduction and radiation, is a principal means of energy transfer. 2. Meteorol. Atmospheric motions that are predominantly vertical,

resulting in vertical transport and mixing of atmospheric properties; disguished from advection. 3. Atmospheric Electricity. A process of vertical charge transfer by transport of air containing a net space charge, or by motion of other media (e. g. rain) carrying net charge. Eddy diffusion of air containing a net charge gradient may also yield a convection current.

COQUINA, n. * - Soft porous limestone composed of broken shells, with or without corals and other organic debris.

CORDILLERA (Spanish) Ø - A series of more or less parallel ranges of mountains, together with intervening plateaus and basins; in western hemisphere occasionally applied to individual ranges. (See SIERRA).

CORDUROY ROAD * - A form of support or roadway over soggy or soft terrain, usually made from logs laid crosswise to the direction of travel.

CORIOLIS EFFECT * - 1. The apparent deflection of an object (e.g. a missile, airplane, or mass of air) in motion above the surface of the earth relative to positions on the surface, which is rotating beneath the moving object; the deflection is to the right in the northern hemisphere and to the left in the southern hemisphere. 2. A phenomenon observed in rotating systems; see CORIOLIS FORCE.

CORIOLIS FORCE * - An apparent force on a body moving within a rotating system. It is always at right angles to the direction of the body's motion and proportional to the angular velocity (w) of the rotating system and to the body's momentum (mv); the magnitude is 2 wmv. See CORIOLIS EFFECT.

CORRASION, n. - Mechanical erosion (Ø) performed by moving agents such as wear by glacial ice, wind, running water, etc., but generally restricted to basal rather than lateral excavation.

CORROSION, n. - The gradual deterioration of material by chemical processes, such as oxidation or attack by acids; if caused by atmospheric effects, a form of WEATHERING. Of great significance is the corrosion due to the combined effects of atmospheric temperature, humidity, and suspended impurities; for example, the rusting of iron.

COULEE Ø - A steep-walled, trench-like valley.

COULOIRS Ø (India) - Wide, flat areas of dune sand beyond the zones of the highest active dune.

CRACKING, n. * - Deterioration of a coating characterized by breaks that extend through to the parent material.

CRATER, n. * - 1. The bowl-shaped depression around the vent of a volcano or a geyser. 2. A hole formed by the impact of a meteorite, the detonation of a mine, or the like.

CRAZING, n. - A network of checks or cracks caused by extremes of temperature, appearing on a surface. It may also be caused in plastics by certain cleaning fluids, age, and ultraviolet exposure.

CREST, n. # - 1. The summit land of any eminence; the highest natural projection that crowns a hill or mountain, from which the surface dips downward in opposite directions. (Preferred topographic crest; see also MILITARY CREST). 2. The highest part of a wave or swell. 3. The more or less narrow, irregular longitudinal top of an elevation of the sea bottom, such as a ridge or seamount. 4. A terrain feature of such altitude that it restricts fire or observation in the area beyond resulting in dead space, or limiting the minimum elevation or both.

CREVASSE ∅ - A deep crevice or fissure, usually applied to openings in glaciers or snow fields. See CHASM, CANYON.

CRITICAL POINT * - A point where there is a change in direction or change in slope in a ridge or stream.

CROSS-COUNTRY TERRAIN # - Terrain not specifically improved for vehicular traffic.

CROSSWIND * - That wind vector component which is perpendicular to the course of an exposed moving object. A wind blowing in a direction approximately 90° from a ship's heading is called a beam wind. In common usage these two expressions are often used synonymously, crosswind being favored by aviators, and beam wind by mariners.

CRUST, n. # - A surface layer, up to 100mm thick, significantly differing in mechanical properties from the material immediately beneath it.

CRYSTALLINE ROCK, # - Rock consisting of closely fitted mineral crystals rather than of cemented grains or volcanic glass; e.g., most metamorphic and igneous rocks.

CUESTA * - A long ridge, formed by gently dipping resistant strata, with one face steep and the opposite a sloping plain.

CUEVA(S) (Greek) - Cave(s).

CUMBRE ∅ - (Spanish) - A crest or peak.

CUMEADA (Spanish) - Mountain ridge.

CUP ANEMOMETER * - A rotation anemometer whose axis of rotation is vertical. Cup anemometers usually consist of three or four hemispherical or conical cups mounted with their dissetrical planes vertical and distributed symmetrically about the axis of rotation. The rate of rotation of the cups which is a measure of the wind speed, is determined indirectly by gearing a mechanical or electrical counter to the shaft.

- D -

DABA (Arabic) - Sand hill.

DABH (Arabic) - Mountain.

DAHANA # - A sandy area having a water-table high enough to seriously affect, or even prohibit trafficability. (Frequently produces quicksand conditions).

DAHL (Arabic) # - Deep sink hole or solution cavity.

DAHR (DAHAR) # - Steppe-like terrain or table lands (North Africa).

DAIA (or DAIET) (Arabic) # - A marsby depression.

DAIB # - A North African track or unimproved road.

DAILY MEAN - 1. The average value of a meteorological element over a period of twenty-four hours. The "true daily mean" is usually taken as the mean of twenty-four hourly values between midnight and midnight, either as continuous values taken from an autographic record or as point readings at hourly intervals. When hourly values are not available, approximations must be made from observations at fixed hours. 2. The long period mean value of a climatic element on a given day of the year.

DAMBO # - An ill-defined drainage channel that is extremely flat and contains broad grassy clearings. (In Northern Rhodesia).

DAQQ (Arabic) - Salt flat, salt depression.

DARB (Arabic) # - Road.

DARIACHE (Iran) - A lake.

DADARREH (Arabic) - Valley, stream.

DARYA (Arabic) - Lake.

DASHT # (Gobi) - A desert or plain.

DAVAN ∅ (Gobi) - A pass between or among sand dunes. A blowout.

DAWHAT (Arabic) - Bay, or inlet.

DAYA - A depression in limestone or sandstone plateaus in the Sahara. Lined with vegetation dependent on subterranean circulation of water.

DEAD SPACE - 1. An area within the maximum range of a weapon, radar, or observer, which cannot be covered by fire or observation from a particular position because of intervening obstacles, the nature of the ground, or the characteristics of the trajectory, or the limitations of the pointing capabilities of the weapon. 2. An area or zone which is within range of a radio transmitter but in which a signal is not received. 3. The volume of space above and around a run or guided missile system into which it cannot fire because of mechanical or electronic limitations.

DEBB(A) ∅ - A sandy plain.

DEBRIS - An accumulation of loose detached fragments of rock. When occurring at the foot of a steep slope it is identified as TALUS.

DECAY * - The natural breaking down of a rock due to chemical action (oxidation, solution, etc.). See also DISINTEGRATION.

DECIBEL, n. - (See BEL) - 1. In general, a unit which denotes the magnitude of a quantity with respect to an arbitrarily established reference value of the quantity in terms of the logarithm (to the base 10) of the ratio of the quantities. 2. A unit for expressing the loudness of sounds, one decibel being approximately the least change detectable by the average human ear. The difference in decibels of two sounds is exactly equal to 10 times the common logarithm of the ratio of their powers.

DECIDUOUS, adj. * - In botany, losing the leaves during a certain period of the year, generally either the cold season or dry season.

DECLIVITY, n. * - A descending slope, as apposed to ACCLIVITY.

DEFILE, n. # - A deep, narrow mountain pass.

DEFLATION * - The removal or "blowing out" of fine grained material by the wind.

DEFILADE, n. * - 1. Protection from hostile ground observation and fire provided by an obstacle such as a hill, ridge, or bank. 2. A vertical distance by which a position is concealed from enemy observation.

DEGRADATION # - Deterioration, usually in the sense of a physical or chemical process rather than a mechanical one. There may be a specific amount of degradation permitted as a result of performance of environmental testing.

DEGREE DAY # - 1. Generally, a measure of the departure of the mean daily temperature from a given standard: one degree day for each degree (°C or °F) of departure above (or below) the standard during one day. Recently, degree days have been applied to fuel and power consumption, with the standard being 65°F. 2. As used by U. S. Army Corps of Engineers, degree days are computed as departure above and below 32°F, positive if above and negative if below. Also called freezing degree-day.

DEGREES-OF-FREEDOM * - In a mechanical system, the minimum number of independent coordinates required to define completely the positions of all parts of the system at any instant of time. In general, it is equal to the number of independent displacements that are possible.

DEGREE HOUR # - As used by the U. S. Army Corps of Engineers, the departure (in °F) of the hourly temperature from a standard of 90°F, positive if above and negative if below. Degree hours may be accumulated (summed) over any period of time, depending upon the use to which they are applied.

DEIR ∯ - A depression.

DEMOISELLE ∯ - An erosional feature formed by the weathering of volcanic breccia or soft sediments resulting in pillars or columns capped by large boulders or fragments which protect the loose, poorly consolidated mass beneath. (See PEDESTAL ROCK, ∯)

DENSITY # - The unit weight of a material (such as soil), in pounds per cubic foot. The type of density, i.e., natural or in place, wet, dry, remolded, natural, relative, etc. should be specified.

DEPOSIT, n. - Material left in a new position by a natural transporting agent such as water, wind, ice, or gravity, or by the activity of man. (See ALLUVIUM).

DEPRESSION, n. # - 1. Meteorol. An area of low pressure; a low or a trough. This is usually applied to a certain stage in the development of a tropical cyclone, to migratory lows and troughs, and to upper-level lows and troughs that are only weakly developed. 2. Geomorph. A low place of any size on a plain surface, with drainage underground or by evaporation; a hollow completely surrounded by higher ground and having no natural outlet for surface drainage. (See BOLSON, DEPRESSION PLAIN).

DEPRESSION PLAIN # - A low lying plain with interior drainage, usually bounded on two or more sides by scarps.

DESERT * - A region with an arid climate, in which the potential evaporation rate exceeds the precipitation rate. The arid climate results, over a long period of time, in the scant vegetation which is characteristic of such a climate (xerophytic or drought resistant). The lack of vegetation cover in turn results in soil with a low organic content, and contributes directly to the distinctive shaping of the topography by water and eolian forces. See also by type: STONY DESERT, ROCKY DESERT and SANDY DESERT.

DESERT CRUST # - A hard layer, containing calcium carbonate, gypsum, or other binding material, exposed at the surface in desert regions. (Do not confuse with DESERT PAVEMENT)

DESERT FLATS # - Essentially flat surfaces extending from the edges of playas to the alluvial fans or alluvial aprons. See also: VALLEY FLATS, ALLUVIAL PLAINS, and BOLSON.

DESERT PAN - See PAN, also PLAYA.

DESERT PAVEMENT * - A mosiac of flat-lying, closely packed and interlocking pebbles and broken rock fragments caused by wind removal of silt, clay and sand particles. Often only a single layer thick overlaying softer alluvium, the upper surface is usually coated with a stain or crust of manganese or iron oxide, (see DESERT VARNISH) giving a black appearance.

DESERT PLAIN # - An interior plain not readily classifiable as alluvial, coastal, or depression plain. Often formed or significantly modified by eolian deposition or erosion.

DESERT VARNISH - A smooth and shining surface imparted to rocks by the combined forces of solar radiation stimulated atmospheric reaction with mineral contents and erosion by windblown sand and dust.

DESSICANT, n. - A drying or dehydrating agent which absorbs water vapor by physical or chemical means.

DESSICATION * - The drying up or loss of moisture from a material, usually resulting in shrinkage and cracking.

DESSICATOR, n. - An enclosed apparatus in which substances can be kept in a dry atmosphere. The latter is obtained by the inclusion of drying agents such as phosphorous pentoxide or concentrated sulphuric acid.

DETECTOR, INFRARED - A device for observing and measuring infrared radiation, such as the solometer, radiomicrometer, thermopile, pneumatic cell, photocell, photographic plate, and photoconductive cell.

DETERIORATION, n. - 1. The loss in the value of a material or a decrease in the ability of a product to fulfill the function for which it was intended. 2. A process of transition from a higher to a lower energy level.

DETERIORATION PATTERN - Listing of the various deterioration processes noticed on an item in the order of their intensities or rates of progress or in the order of their deterioration potentials.

DETERIORATION POTENTIAL - The minimum change resulting from a deterioration process which affects the suitability of the item to serve its intended purpose.

DETERIORATION PROCESS - Any change in physical characteristics or any chemical reaction occurring as the result of the storage or use of an item. As a rule, a deterioration process is the result of the environmental exposure of the item. It can also be generated by internal conditions and promoted by the environmental stresses.

DETERIORATION PRODUCT - New or changed compounds formed as a result of a particular deterioration process.

DETERIORATION RESISTANCE - The ability of an item to withstand the effects of environmental exposures and to prevent deterioration which might result from internal item conditions.

DETRITUS * - Any loose material that results directly from rock disintegration especially when composed of rock fragments or debris-contrasted with soil. (See TALUS).

DEW CELL * - An instrument used to determine the DEW POINT. It consists of a pair of spaced bare electrical wires wound spirally around an insulator and covered with a wicking wetted with a water solution containing an excess of lithium chloride. An electrical potential applied to the wires causes a flow of current through the lithium chloride solution which raises the temperature of the solution until its vapor pressure is in equilibrium with that of the ambient air.

DEW POINT * - The temperature to which a given weight of air must be cooled at constant pressure and constant water vapor content in order for SATURATION to occur. When this temperature is below 0°C, it is sometimes called the frost point.

DIABLO Ø - A dust devil or small, localized whirlwind. See also TORNILLO.

DIBDIBA Ø - A limestone plain with cherty gravel and low sinks.

DIFFRACTION, n. * - 1. The bending of the rays of radiant energy around the edges of an obstacle or when passing near the edges of an opening, or through a small hole or slit, resulting, in the case of light, in the formation of a spectrum or alternate light and dark bands.

DIFFUSE SKY RADIATION (or SKYLIGHT) * - Radiation reaching the earth's surface after having been scattered from the direct solar beam by molecules or suspensoids in the atmosphere. Of the total light removed from the direct solar beam by scattering in the atmosphere (approximately 25 percent of the incident radiation), about two-thirds ultimately reaches the earth as diffuse sky radiation.

DIKE * - A hardened, tabular mass of igneous rock that has butted across the bedding or other layered structure of the country rock. On eroding, if resistant, they form narrow sharp crested ridges which may extend for miles. Weaker dikes may form ditches. (also STILL).

DIP * - A hardened, tabular mass of a rock layer, vein, or fissure, measured from a horizontal plane.

DIRECT SHEAR TEST * - Soil Mechanics. A test to determine the maximum shearing strength and angle of friction of soils for use in stability analyses.

DIRECTION OF WIND ! - The direction <u>from</u> which a wind is blowing. (i.e. a north wind).

DIRECT SOLAR RADIATION * - In actinometry, that portion of the radiant energy received at the instrument or pyrheliometer "direct" from the sun, as opposed to DIFFUSE SKY RADIATION, effective terrestrial radiation, or radiation from any other source.

DISINTEGRATION # - The natural breaking down of a rock due to mechanical forces, including weathering (spalling, gravity, friction, etc.). See also DECAY.

DJEBEL Ø - An isolated mountain peak (North Africa). See JEBEL.

DIURNAL, adj. * - Daily, especially pertaining to actions which are completed within twenty-four hours and which recur every twenty-four hours; thus, most reference is made to diurnal cycles, variations, ranges, maxima, etc.

DIVIDE, n. * - The line of separation between drainage systems; the summit of an interfluve. The highest summit of a pass or gap.

DOME * - An anticline broad in comparison with length and consequently circular or elliptical in plan. Weathering and sheet flooding may produce convex dunes cut on bedrock.

DONGA ∅ - A steep-walled branching gully cut by rainwash, or a dry watercourse.

DONGA EROSION ∅ - A series of steep-walled gullies resulting in the formation of badlands.

DOPPLER EFFECT * - The phenomenon evidenced by the change in the observed frequency of a sound or radio wave caused by a time rate of change in the effective length of the path of travel between the source and the point of observation.

DOR ∅ - A grove of hills (North Africa), also DUER or DUEIR.

DOSIMETER, n. * - An instrument for measuring and registering total accumulated exposure to ionizing radiations.

DOWNWIND, adj. & adv. * - In the direction toward which the wind is blowing. The term applies particularly to the situation of moving in this direction, whether desired or not. Before the wind implies assistance from the wind in making progress in a desired direction. Leeward applies to the direction toward which the wind blows, without implying motion. The opposite is upwind.

DRAINAGE BASIN # - A part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

DRAW ∅ - A natural drainage way or gulley, generally more shallow or more open than a ravine or gorge. See also ARROYO.

DREIKANTER * - A pebble faceted and polished by the wind. Dreikanters have three distinct edges.

DRY AIR # - 1. In atmospheric thermodynamics and chemistry, air that contains no water vapor. 2. Generally, air with low relative humidity.

DRY-BULB TEMPERATURE * - The temperature of the air.

DRY-BULB THERMOMETER * - A thermometer with an uncovered bulb, used with a wet-bulb thermometer to determine atmospheric humidity. The two thermometers constitute the essential parts of a PSYCHROMETER.

DRY WASH * - A dry drainage channel characterized by a relatively flat, gravel and sand bed (over 5 meters in average width), with nearly vertical walls. Called WADI in Africa, CHAPP in the Gobi, and LAAGTE in the Kalahari.

DUEIR (DUER) ∅ - See DOR.

DUNE, n. # - 1. A heap of sand or other material accumulated by wind. The external form may be that of a hill or ridge. A sand wave of approximately triangular cross section (in a vertical plane in the direction of flow) with gentle upstream slope and steep downstream slope, which travels downstream by the movement of the sediment up the upstream slope and the deposition of it on the downstream slope. For types, see BARCHAN, LONGITUDINAL DUNE, STAR DUNE, TRANSVERSE DUNE, WHALEBACK, and SIEF DUNE.

DURICRUST ∅ - Hard surface layer found in the arid regions of Australia consisting of indurated layers of concretionary structure formed by the capillary rise of ground water.

DUST, n. * - 1. Solid materials suspended in the atmosphere in the form of small irregular particles, many of which are microscopic size. Dust is due to many natural and artificial sources: volcanic eruptions, salt spray from the seas, blowing solid particles, plant pollen and bacteria, smoke and ashes of forest fires and industrial combustion processes, etc. 2. Particles smaller than 75 microns in diameter.

DUST DEVIL * - Whirlwinds due to the local heating of the air above the flat desert floor. Most common on calm summer and autumn days around dry lakes or on the valley floor. Refer also to TORNILLO and DIABLO.

DUST STORM * - An unusual, frequently severe weather condition characterized by strong winds and dust-filled air over an extensive area. A thick mass of airborne dust may obscure the atmosphere to the extent that it reduces visibility very considerably--sometimes practically to zero.

DUST WHIRL ∅ - A rapidly rotating column of air, usually about 100 to 300 feet in height, carrying dust, straw, leaves, or other light material. It has no direct relationship to a dust storm, and usually develops on a calm, hot afternoon with clear skies, mostly in desert regions. See DUST DEVIL.

DYNAMIC AGING, n. * - Accelerated aging of rubber in the presence of dynamic stresses, in which strain exposes new areas of the molecular structure to attack, the resulting cracks being caused by a combination of dynamic fatigue and oxidation or ozone attack.

- E -

EARTH PILLAR ∅ - Columns or pillars of soft material often 20 to 30 feet high, protected by a cap rock of more resistant material. See HOODOO COLUMN, DEMOISELLE, and PEDESTAL ROCK.

EDAPHIC, adj. - 1. Of or pertaining to the soil. 2. Resulting from or influenced by factors inherent in the soil or other substrate, rather than by climatic factors.

EFFECTIVE TEMPERATURE # - 1. The temperature at which motionless, saturated air would induce, in a sedentary worker wearing ordinary indoor clothing, the same sensation of comfort as that induced by the actual conditions of temperature, humidity, and air movement. 2. With respect to radiation, ascribed to an imperfectly radiating body: the temperature at which a perfect radiator (black body) would emit radiation at the same rate. Thus, the effective temperature is always less than the actual temperature.

EFFECTIVE TERRESTRIAL RADIATION - The difference between the outgoing (positive) terrestrial radiation of the earth's surface and the downcoming (negative) counterradiation from the atmosphere. It is to be emphasized that this difference is a positive quantity, of the order of several tenths of a langley per minute at all times of day (except under conditions of low overcast clouds). It typically attains its diurnal maximum during the mid-day hours when high soil temperatures create high rates of outgoing terrestrial radiation. However, in daylight hours the effective terrestrial radiation is generally much smaller than the insolation, while at night it typically dominates the energy budget of the earth's surface.

EINKANTER * - A wind-faceted and polished pebble on which only two facets that meet at an edge are cut.

ELECTROMAGNETIC, adj. - Pertaining to the combined electric and magnetic fields associated with radiation or with movements of charged particles.

ELECTROMAGNETIC LINE-OF-SIGHT - The maximum distance at which direct wave transmission is possible between transmitting and receiving antennas of given height, neglecting propagation anomalies.

ELECTROMAGNETIC RADIATION - Energy propagated through space or through material media in the form of an advancing disturbance in electric and magnetic fields existing in space or in the media. The term radiation, alone, is used commonly for this type of energy, although it actually has a broader meaning.

ELECTROMAGNETIC SPECTRUM # - The ordered array of all known electromagnetic radiations, extending from the shortest gamma rays through x-rays, ultra-violet radiation, visible radiation, infrared radiation, and including microwave and all other wavelengths of radio energy.

ELEVATION * - The vertical distance of ground forms, usually measured in feet or meters, above mean sea level (plus elevation) or below mean sea level (minus elevation).

ELUVIUM * - Rock debris produced by the weathering and disintegration of rock in situ.

EMBRITTLEMENT * - An increase in the susceptibility of a metal to fracture under stress caused by the introduction of gas or other foreign atoms, by segregation of brittle constituents, by internal oxidation, or by certain types of corrosion.

EMISSIVITY, n. * - The ratio of the rate of emission of radiant energy in a given wavelength interval from a given surface to the rate of emission of a black body at the same temperature in the same wavelength interval with the radiation emitted by the surface is due solely to its temperature (i.e. excluding transmitted radiation, heat generated by chamical or other reactions, etc.).

ENDOERIC # - A term applied to a region of internal drainage. Rain collects into streams but they do not reach the sea.

ENVANAL, n. * - An empirical method of recording data that reflects the performance of equipment and material when operated under various worldside conditions. It is formed from a contraction of the words environment and analysis.

ENVIRONMENT, n. # - 1. The totality of natural and induced conditions occurring or encountered at any one time and place. 2. The integrated total of all stresses which influence the performance capability of man and equipment during transit, in storage (or confinement) or under field operating conditions.

ENVIRONMENTAL CONTROL * - A method by which the severity of a damaging environmental stress is reduced to a level tolerable by equipment or personnel.

ENVIRONMENTAL DESIGN CRITERIA - Environmental parameters which represent a given degree of severity of conditions existing in nature, in equipment operation, or in storage, which are to be incorporated in the design of equipment.

ENVIRONMENTAL FACTOR # - One of the components of an environment; an environmental element. Environmental factors may be either (a) induced, including those conditions resulting from the operation of a structure or item of equipment, or (b) natural, including those conditions generated by the forces of nature and whose effects are experienced when the equipment or structure is at rest as well as when it is in operation. The distinction between natural and induced environmental factors cannot always be clearly discerned nor precisely defined.

ENVIRONMENTAL PROTECTION # - Research and its application designed to maintain or improve the degree of effective performance of man and equipment under all types of environmental stress.

ENVIRONMENTAL RESEARCH # - The systematic study and investigation of any environmental factor or combination of factors for the purpose of discovering basic rules or principles governing their cause and behavior, extending knowledge of their occurrence and distribution, or ascertaining the relation between them and other aspects of the environment, both natural and induced. See also RESEARCH and APPLIED ENVIRONMENTAL RESEARCH.

ENVIRONMENTAL RESISTANCE FEATURES # - The characteristics or the properties of an item which protect the item against the effects of an environmental exposure and which prevent internal conditions that might lead to deterioration.

EPHEMERAL LAKES ∅ - See PLAYAS.

ERG, n. (Pl. ERGH) ∅ - Geol. An extensive area in a desert where the surface is loose or almost unconsolidated sand, usually forming high dunes. Sometimes called a sand sea.

EROSION, n. * - 1. Geol. The wearing away of the land surface by detachment and transport of soil and rock materials through the action of moving water, wind, or other geological agents.

EROSION, ACCELERATED # - Erosion much more rapid than normal, natural; geological erosion, primarily as a result of the influence of the activities of man or, in some cases, of animals.

ERRATIC, n. # - A rock fragment, usually of large size, that has been transported from a distant source.

ESCARPMENT, n. * - A long CLIFF or steep slope facing in one general direction and continuing for a considerable distance. Escarpments may be produced by faulting or by erosion. See SCARP.

ESPINAZO ∅ - The crest or backbone of a ridge (Spanish).

E'TANG (French) ∅ - A shallow pool or lake lying between sand dunes.

ETESIAN WINDS (also MELTEMI) (Middle East) ∅ - Strong, constant, northerly winds of summer prevailing during the day and declining at night. Hot and dry, they frequently carry considerable dust.

EVAPORATION, TOTAL * - The sum of water lost from a given land area during any specific time by transpiration from vegetation and building of plant tissue; by evaporation from water surfaces, moist soil, and snow; and by interception. It was been variously termed evaporation, evaporation from land areas, evapotranspiration, total loss, water losses, and fly off.

EVAPOTRANSPIRATION, n. * - The combined processes by which water is transferred from the earth's surface to the atmosphere; evaporation of liquid or solid water, plus transpiration from plants.

EXFOLIATION * - The process by which successive sheets or layers of rocks are split off from the parent mass and caused by wide temperature changes or other causes.

EXOERIC * - A condition or normal run-off where the rivers collect the drainage and carry it to the sea.

EXPOSURE, n. # - 1. State of being open to the effects of a certain natural or simulated element of condition. Natural exposure refers to the subjection of a material to normal service conditions; accelerated exposure refers to subjection to more stringent conditions. 2. In meteorology, the physical location of an instrument. 3. The general surroundings of a site, with special reference to its openness to winds and sunshine.

EXTINCTION, n. - The ATTENUATION of light; that is, the reduction in ILLUMINANCE of a parallel beam of light as the light passes through a medium wherein ABSORPTION and SCATTERING occur.

EXTREME, n. - In climatology, the highest and, in some cases, the lowest value of a climatic element observed during a given period or during a given month or season of that period. If this is the whole period for which observations are available, it is the absolute extreme.

EZ (Arabic) Ø - A farm village or hamlet (also EZBA(ET)).

- F -

FACIES SUITE Ø - A collection or series of rocks that exhibits variations in a single rock mass.

FADING, n. # - The resultant change or loss in the original color or protective coatings or materials due to exposure to solar radiant energy, heat, chemical fumes, or combinations of these.

FAGGETT (Arabic) - Defile.

FAIDHAT (Arabic) - Dry river bed.

FAJ (Arabic) Ø - A wide, elongated hollow or valley with no continuous wadi channel.

FALDA Ø - (Sp) - A hillside.

FAN, n. - See ALLUVIAL FAN.

FANHEAD TRENCHES # - Washes incised considerably below the upper surface of an ALLUVIAL FAN.

FARANGI (Greek) - Gorge.

FARAYID, FARĀ'ID (Arabic) Ø - A chain of rather isolated hills.

FARIDAH (t) (Arabic) Ø - Hill or mountain detached from main mass; singly grouped, or in linear form.

FASHT (Arabic) - A reef or shoal.

FASSULET (Arabic) - A gap.

FATIGUE, n. * - A reaction which takes place in material under repeated cyclic stressing, resulting in a tendency for that material to fail below its static ultimate strength.

FATIGUE LIFE * - The number of cycles of stress or stress reversals that can be sustained prior to failure for a stated test condition.

FATIGUE LIMIT * - The maximum stress below which a material can presumably endure an infinite number of stress cycles. If the stress is not completely reversed, the value of the mean stress, the minimum stress, or the stress ratio should be stated. The fatigue limit of a material is frequently referred to as its endurance limit.

FAULT * - A movement or displacement of the rock on one side of a fracture or break in the earth's crust past the rock on the other side.

FAYDAY (t) Ø - Closed basin with firm, flat, vegetation-covered mud surface, occasionally rocky and sandy.

FAUNA, n. # - 1. The animals of a region, zone or environment. 2. A list, catalogue, or systematic report with keys or descriptions pertaining to the animals of a specific region, hence desert fauna, alpine fauna.

FEJJ (Sahara) - A long, sand-free passage in an ERG region.

FESH-FESH (Sahara) Ø - A tract of dust, covered with a firm crust.

FINE-GRAINED SOIL * - A soil of which more than 50% of the grains, by weight, will pass a No. 200 sieve (smaller than 0.074mm in diameter). (TM 3-240).

FINISH, n. * - 1. The quality of a surface as determined by color, brightness, texture, and general surface appearance. 2. Any surface treatment accomplished for the purposes of protecting equipment against

environmental depreciation, enhancing appearances, for camouflage purposes, or for identification.

FIRST-ORDER CLIMATOLOGICAL STATION * - As defined by the World Meteorological Organization (1956), a meteorological station at which autographic records or hourly readings of atmospheric pressure, temperature, humidity, wind, sunshine, and precipitation are made, together with observations at fixed hours of the amount and form of clouds and notes on the weather.

FLAKING, n. * - A protective coating failure associated with paints, varnishes, lacquers, and allied formulations. It is characterized by actual detachment of pieces of the coating either from its substratum or from paint previously applied. Flaking is sometimes referred to as scaling and is generally preceded by checking or cracking. Flaking is attributed to loss of adhesion of the coating.

FLATIRON ∅ - The slanting plate-like surface left by differential weathering of a CUESTA protected by a resistant strata.

FLORA, n. ∮ - 1. The vegetation of a region, zone, or environment. 2. A list, catalogue, or systematic report with keys or descriptions pertaining to the plants of a specific region, hence alpine flora, bog flora.

FLOTATION, n. * - 1. The capacity of a vehicle, gun, or trailer to negotiate water obstacles without being in contact with the bottom. 2. The capacity of a vehicle to negotiate soft, unfavorable terrain such as mud, sand, or snow.

FLOW ∅ - An igneous mass which was implaced in a molten state.

FOLD * - A bend or warp in rock layers or beds.

FOEHN (or FOHN), n. ∅ - A warm, dry wind on the lee side of a mountain range, the warmth and dryness of the air being due to adiabatic compression upon descending the mountain slopes. The foehn is characteristic of nearly all mountain areas. It is associated with cyclonic-scale motions, being produced only when the circulation is sufficiently strong and deep to force air completely across a major mountain range in a short period of time. In different mountain regions the foehn has a variety of names, as the CHINOOK of the Rocky Mountains.

FOOTHILL ∅ - One of the lower subsidiary hills at the foot of a mountain or of high hills. Commonly used in the plural.

FORWARD SCATTER * - The scattering of radiant energy into the hemisphere of space bounded by a plane normal to the direction of the incident radiation and lying on the side toward which the incident radiation was advancing; the opposite of BACKWARD SCATTER.

FORWARD SLOPE * - Any slope which descends towards the enemy.

FRAGILITY ϕ - The capability of a piece of equipment to withstand shock and vibration, expressed as a maximum permissible acceleration.

FRONT, n. * - In meteorology, generally, the interface or transition zone between two AIR MASSES of different density. Since the temperature distribution is the most important regular of atmospheric density, a front almost invariably separates air masses of different temperature. Along with the basic density criterion and the common temperature criterion, many other features may distinguish a front, such as a pressure trough, a change in wind direction, a moisture discontinuity, and certain characteristic cloud and precipitation forms.

FUENTE ϕ - A spring or well.

FULGURITE ϕ - A long tube of sand fused by lightning which reaches dendritically downward into a dune. At Witsands in the Kalahari more than 2,000 fulgurites are present in an area of 4,000 acres.

FULLIS * - Depressions formed in the leeward of barchan dunes.

- G -

GALE, n. * - 1. In general, and in popular use, an unusally strong wind. 2. In storm-warning terminology: moderate gale, 28-33 knots: fresh gale, 34-40 knots: strong gale, 41-47 knots: and whole gale, 48-55 knots.

GALIB (Pl. GULBAN) (Arabic) - A well.

GALLING, n. * - The localized mutual seizure of two metal surfaces during sliding friction accompanied by the removal of metal particles from one or both surfaces.

GAMMA RAY * - Electromagnetic radiation of extremely short wavelengths, emitted by nuclei. The wavelengths of the highest energy gamma rays are shorter than x-rays, but there is an overlapping wavelength region where the only distinction is the mode of origin: i.e., the gamma rays are produced by nuclear transitions whereas the x-rays are produced by atomic processes. Gamma rays, produced in the atmosphere by interactions of cosmic rays with the nuclei of air molecules, are of some importance to atmospheric electricity because they contribute to the ionization of the atmosphere.

GANNTRA (Arabic) - A ridge.

GAP, n. ϕ - Geol. Any deep notch, ravine, or opening between hills or in a ridge or mountain chain.

GARA (Pl. GOUR) ϕ - Rock structure produced by wind abrasion, undercut at the base, resembling mushrooms. (Local name in Sahrar). See ZEUGEN.

GARAT (Arabic) - Small or low hill.

GARDANEH (Arabic) - Mountain pass.

GARIGUE (Mediterranean) Ø - A scattered low scrub, interspersed with extensive patches of bare soil, found on poor or dry land.

GASSI PLAIN * - The sand-free areas between dunes.

GEBEL (Pl. GUBAL) Ø - (North African) - A hill or mountain formed by scoric deposition, also seen as GHELB.

GECIDI (Arabic) - A pass or strait.

GEODOSY * - The investigation of any scientific question concerned with the shape and dimensions of the earth. The term is often used to include both the science which must depend upon determinations of the figure and size of the earth from direct measurements made on its surface (triangulation, leveling, astronomic, and gravity determinations), and the art which utilizes the scientific determinations in a practical way.

GEODETIC CONTROL * - Horizontal position of points on the earth's surface in the computation of which the curvature has been taken into account.

GEZIRET (Arabic) - Island or peninsula.

GHADA (Arabic) - Sand area with many shrubs.

GHADIR (Arabic) - A pool left by rain or a rivulet.

GHAR (Arabic) - A sheltering recess of overhang in the side of any steep elevation.

GHARD Ø - Sand dunes (North Africa).

GHAT Ø - In the singular, a mountain pass. In the plural, refers to a mountain range (India).

GHELB Ø - A rocky hill (North Africa).

GHOR Ø - A deep valley (North Africa).

GHOUBET (Arabic) - A bay.

GHUBBAH (Arabic) - A gulf or deep water box.

GIBBER (Australia) Ø - A residual fragment or lay gravel.

GIBBER PLAIN ϕ (Australia) - Desert pavement.

GIBLI (Libya) - See SIROCCO WINDS.

GILF ϕ - A cliff or escarpment.

GIVAT (Arabic) - Hills.

GLARE, n. - Any hindrance to vision caused by scattering or reflection of light into an observer's line of sight.

GLYPTOLITH ϕ - A ventifact.

GNEISS * - A coarse-grained rock in which bands rich in granular minerals alternate with bands in which schistose (coarse-grained metamorphis rock with dominating micacross minerals) minerals predominate.

GORGE * - A deep ravine, having steep, rocky walls. See also CANYON.

GOUR ϕ - See GARA.

GOZES ϕ (Sahara) - Gentle, large-scale undulations apparently associated with slight present, past, or periodic rainfall and its resulting light intermitten vegetation.

GRABEN ϕ - A depressed tract (due either to down faulting or to uplift of adjacent areas) bounded on at least two sides by faults or scarps, and generally of considerable length as compared to its width.

GRADATION * - The distribution and size of grains in a soil. Gradation is determined by gradating analysis of soil, or passing the soil through a series of screens of increasing fineness. The result is usually presented in the form of a cumulative grain-size curb in which particle sizes are plotted to a logarithmic scale with respect to percentage retained (or passing), by weight of the total sample, plotted to a linear scale. See MECHANICAL ANALYSIS.

GRADE, n. # - 1. Engineering. The rate of ascent or descent: deviation from a level surface to an inclined plane: stated: (1) as so many feet per mile, (2) as one foot rise or fall in so many of horizontal distance: (3) as so much in a hundred feet, or, (4) as a percentage of horizontal distance: as a grade of twenty feet per mile, or 1 in 264, or a 10 percent grade. 2. Geomorph. The continuous curve of descent of a stream floor which everywhere is just steep enough to serve the need of the current for its flow and the transportation of its sediment load. It is commonly said that a river is at grade when its active downcutting ceases.

GRADEABILITY * - Capability of a vehicle to negotiate a slope, either ascending or descending, measured in percent (not in grades).

GRADIENT, n. * - 1. Slope expressed as a fraction in which the vertical distance is the numerator and the horizontal distance is the denominator. 2. Rate of change of temperature or pressure in a given direction; mathematical expression giving the direction and amount of the most rapid rate of decrease of temperature or pressure. 3. Meteorol. The space rate of decrease of a function. The ascendent is the negative of the gradient.

GRAVEL * - Loose or unconsolidated course, granular material, larger than sand, resulting from reduction of rock by natural or artificial means. Sizes range from 3/16-inch (No. 4 sieve) to 3 inches in diameter (minimum). Coarse gravel ranges from 3 inches to 3/4-inch, while fine gravel ranges from 3/4- to 3/16-inch.

GROUND COVER * - All herbaceous plants and low growing shrubs on a specific area, and the organic materials in various stages of decay.

GROUND ENVIRONMENT # - 1. The environment that surrounds and affects a system or a piece of equipment that operates on the ground.

GRUS * - Deposits resulting from the weathering of the various minerals forming igneous rock. The deposits consist of the accumulation of countless discrete particles on the surface of granite and sometimes extending to over a meter in depth.

GUD (Arabic) - A hole or cave.

GUDAR (Arabic) - A pass.

GUE (Greek) - A fording.

GUELE ∅ (unknown) - A desert mountain range.

GULBAN (Arabic) - Unlined wells.

GULCH ∅ - A deep or precipitous cleft or ravine.

GULLY * - A miniature valley or gorge excavated by running waters, but through which water commonly runs only after rains.

GUST, n. * - A sudden brief increase in the speed of the wind. It is of a more transient character than a SQUALL and is followed by a lull or slackening in the wind speed. Generally, winds are least gusty over large water surfaces and most gusty over rough land and near high buildings. According to U. S. weather observing practice, gusts are reported when the peak wind speed reaches at least 16 knots and the variation in wind speed between the peaks and lulls is at least 9 knots. The duration of a gust is usually less than 20 seconds.

HABL (Arabic) - A line of (sand) hills.

HABOUB (HABOOB) - An Egyptian term used in the Egyptian Sudan to designate severe dust storms that occur chiefly between May and September.

HADH (Arabic) - A sand area with many (hadh) scrubs.

HADHLUL (Pl. HADH`alīl) (Arabic) - Sha'ibs including inverted drainage channels.

HAGER (Arabic) - Rock or stone.

HAGFET (Arabic) - An unroofed cistern.

HAGIAG Ø - (North Africa) - An escarpment.

HALAT (Arabic) - An islet or reef. (Also HALAH).

HALGH (HALEIGH) Ø - A gorge or deep valley (North Africa).

HALLET (Arabic) - A village.

HALOPHYTE * - A plant with great tolerance to salt and alkali.

HAMMADA, n. * - A desert surface that is either bedrock or else bedrock covered only by a very thin veneer of sand or pebbles. The term was originally applied in the Sahara (where it referred to a desert plateau of stones) but is now used for similar desert surfaces in other parts of the world. (See also **ZEUGEN and YARDANGS**).

HAMMADE Ø - See HAMMADA.

HAMMAM (Arabic) - A hot spring.

HAR (Arabic) - A hill or mountain (pl. HAREI).

HARABET (Arabic) - A cistern.

HARD PAN # - A cemented or compacted layer of soil (often containing some proportion of clay) through which it is difficult to dig or excavate. It results from the accumulation of cementing material.

HARMATTAN Ø (Sahara) - A strong, very hot, dry and dusty wind from the east or northeast.

HARRAH (Sahara) Ø - A lava field.

HARRAT ∅ - Lava beds with sand-filled hollows (Middle East).

HASA (Arabian) ∅ - Gravel.

HASI (also HASSI) ∅ (Greek) - A water hole.

HAUA ∅ - A cave.

HAUT (Greek) - High or tall.

HATIET (Arabic) - An area of vegetation.

HAVZ (Arabic) - A tank reservoir.

HAWA'IR (Arabic) - A terminal basin of a wadi.

HAYSTACK ∅ - A discontinuous ridge or pinnace, almost invariably steep sided. (See MESA).

HAZE, n. * - A suspension in the air of extremely small, dry particles invisible to the naked eye and sufficiently numerous to give the air an opalescent appearance. Haze imparts a yellowish or reddish tinge to distant bright objects or lights seen through it, while dark objects appear bluish. This effect is mainly a result of scattering of light by the haze particles. These particles may have a color of their own which also contributes to the coloration of the landscape.

HEAT, LATENT * - The heat released or absorbed per unit mass by a system in a reversible isobaric-isothermal change of phase. In meteorology, the latent heats of VAPORIZATION (or CONDENSATION), FUSION, and SUBLIMATION of water substance are of importance. At 9°C these are, respectively,

$$L_v = 597.3 \text{ cal/gm}$$
$$L_f = 79.7 \text{ cal/gm}$$
$$L_s = 677.0 \text{ cal/gm}$$

HEAT RESISTANCE * - The ability of a material to show little or no deterioration on continuous or intermittent exposure to a predetermined elevated temperature.

HEAT, SPECIFIC * - The heat capability of a system per unit mass, i.e., the ratio of the heat absorbed (or released) by unit mass of the system to the corresponding temperature rise (or fall).

HEAT TRANSFER * - The transfer or exchange of heat by RADIATION, CONDUCTION, or CONVECTION in a fluid or between the fluid and its surroundings. These three processes occur simultaneously in the atmosphere, and it is often difficult to assess the contributions of their various effects.

HEISHA ∅ - A light humic soil saturated with salt and swollen by the combined action of heat and underground water.

HELIOGRAPH, n. ∅ - 1. An instrument which records the duration of sunshine and gives a qualitative measure of the amount of sunshine by the action of the sun's rays upon blueprint paper; a type of sunshine recorder. 2. Originally an instrument used for signaling during the Red Indian Wars in the southwestern U. S.

HOGBACK * - A ridge with a sharp crest and abruptly sloping sides, often formed by the outcropping edge of tilted rock strata. See CUESTA.

HOMAD (Syria) ∅ - A stony desert.

HOODOO COLUMN ∅ - A pillar of soft material protected by cap rocks of more resistant material. Formed by rainwash, generally in arid or semi-arid regions. See EARTH PILLAR and DEMOISELLE.

HORST * - An upstanding rock mass between two faults.

HUERFANO ∅ - A term used in southwestern United States to designate the isolated remnants of an old mountain surface rising above a pediment or bajada. The literal meaning is orphan. See INSELBERG.

HUMMOCK ∅ - A low, rounded hill or knoll.

HUMUS, n. - That more or less stable fraction of the soil organic matter remaining after the major portion of added plant and animal residues have decomposed. Usually it is dark colored.

HUQUNA (Sahara) ∅ - A sand hollow.

HURRICANE-FORCE WIND - In the Beaufort wind scale, a wind whose speed is 64 knots (73 mps) or higher.

HYDROPHILLIC, adj. * - Having an attraction for water, i.e., readily wet by water, said of films capable of swelling in water.

HYDROPHOBIC, adj. * - Having little or no affinity for water. Water repellent or not wet by water.

HYDROPHYTE, n. * - A plant that typically grows in water or in saturated soil. Hydrophytes may be rooted or free-floating; submerged, with floating leaves; or with leaves emergent above the water level.

HYGROMETER, n. - An instrument for measuring the water vapor content of the air. The most common type is a PSYCHROMETER, consisting essentially of dry-bulb and wet-bulb thermometers.

- I -

IGNEOUS ROCKS * - Rocks formed by solidification of hot mobile rock material (magma) including those formed and cooled at great depths (plutonic rocks), which are crystalline throughout, and those which have poured out on the earth's surface in the liquid state or have been blown as fragments into the air (volcanic rocks).

INDUCED ENVIRONMENT # - Any man-made or equipment-made environment which directly or indirectly affects the performance of man or materiel.

INSELBERG * - An isolated mountain partly buried by the debris derived from and overlapping its slopes. (See also MONADNOCK).

INSOLATION, n. # - 1. In general, solar radiation received at the earth's surface. 2. * The rate at which direct solar radiation is incident upon a unit horizontal surface at any point on or above the surface of the earth.

INTERFLUVE, n. # - 1. The area between two rivers. 2. * The surface area of ALLUVIAL FANS between DRY WASHES.

INTRUSIVE ROCK, n. * - Igneous rock that has ascended in a hot mobile state from the depths of the earth, but that has been arrested and cooled before reaching the surface. (See STOCKS and BATHOLITHS).

INVERSION, n. * - In meteorology, a departure from the usual decrease or increase with altitude of the value of an atmospheric property; also, the layer through which this departure occurs (the "inversion layer"), or the lowest altitude at which the departure is found (the "base of the inversion"). This term almost always means a temperature inversion; however, a moisture inversion and precipitation inversion are also defined.

IRMAK (Turkish) - River (also IRMAGI).

IRQ - See ARQ.

ISOLA, n. (Greek) - Island.

ISTOCHNIK (Arabic) - Spring.

- J -

JABAL (Arabic) - A mountain.

JAL (Arabic) - A cliff, or escarpment.

JANDALTYAH(t) (Arabic) - A long, narrow sand-free band of scattered rock outcrops between Uruq.

JARF (North Africa) ϕ - A steep bank or cliff.

JAU (JAUB, JAUF) ϕ - A valley.

JAWB - Sandy-floored hollow, depression or valley.

JAWW (Arabic) - A pronounced sandy bottom depression or basin with gentle slopes.

JAZIRAT (Arabic) - An island. (Pl. JAZA'IR).

JBOILET (Arabic) - A hill.

JEBEL ϕ - Mountain.

JERK, n. * - A vector that specifies the time rate of change of acceleration with respect to an inertial reference frame. Jerk is the first derivative of the acceleration with respect to time.

JIBAL (Arabic) - Mountains.

JILH (Arabic) - Barren ground.

JLIB (Greek) - An unlined well.

JOLT * - Instantaneous acceleration of an object resulting from the application of an external force.

JOLT TEST * - The application of repeated shocks to equipment.

JUMBLE TEST * - The application of repeated tumbling to equipment in a box being rotated around its diagonal axis.

JURUBAH (Arabic) - Depressions with sink holes or solution cavities.

- K -

KAL (Arabic) - A ditch.

KALATEH (Arabic) - A village or hamlet.

KAMAR (Arabic) - A mountain, hill or ridge.

KANAL (Arabic) - A canal.

KAND (Arabic) - A village.

KANKAR ϕ - Beds of earthy limestone or layers of calcareous concretions. Used most commonly in the deserts of India, but occasionally used in the United States. (Compare with CALICHE).

KARABURAN ∅ - A strong, hot northesterly wind experienced in the Tarim Basin of Sinkiang. It sweeps up clouds of dust from the desert, carrying the lighter particles long distances.

KARKUR (Arabic) - A gorge.

KARST * - A limestone region in which numerous sinks, caverns and solution valleys combined to form a peculiar topography with many surface depressions, unsystematic drainage patterns and disappearing streams known as KARST Topography.

KASBA (Greek) - A fortified village.

KASHM (Arabic) - A headland.

KATABATIC WIND * - 1. Any wind blowing down an incline; the opposite of anabatic wind. If the wind is warm it is called a FOEHN; if cold, it may be a fall wind (such as the bora), or a gravity or drainage wind (such as a mountain wind).

KATIB (Arabic) - Dune shifting.

KAVIR ∅ - A salt desert. (See PAN).

KAYA (Turkish) - A rock.

KAVOS (Greek) - Cape (of land).

KELVIN TEMPERATURE SCALE (abbreviated K) * - Same as ABSOLUTE TEMPERATURE SCALE (See ABSOLUTE ZERO). In the Kelvin scale, the freezing point of water is 273.15°K (zero degree Celsius) and the boiling point of water is 373.15°K (100°C).

KETET (Arabic) - A hill.

KEWIRE (Persia) ∅ - See PAN.

KHABB (Arabic) - Narrow bands of plains between IRQ, commonly without rock outcrop.

KHABRA (Arabic) - Shallow well or pool after a rain.

KHABRAT (Greek) - A lake.

KHANAN (Arabic) - A water course, generally dry.

KHALIT (Arabic) - A motorable pass.

KHAMASIN (Egypt) ∅ - A hot, dry, wind of fifty consecutive days, corresponding to the SIROCCO of North Africa. Also loosely applied to any hot, dry wind blowing off the desert.

KHARAFISH * - Wind-scored limestone, forming ridges of low relief.

KHASHM (Arabic) - Spur or peak.

KHATS (Arabic) - A pond in a natural depression.

KHAYT (Pl. KYUYUT) (Arabic) - Narrow, steep crescentic dunes elegonated transversely to prevailing wind direction; singly, grouped or in a chain form.

KHAWR (Arabic) - Saline bay or inlet; valley, long depression.

KHERS (Greek) - A peninsula.

KHIRN (Arabic) - A Wadi or Sha'ib with natural dikes partially impeding its course.

KHOR (Pl. KHEIRAN) ∅ - A watercourse (North Africa. See RAVINE).

KHOSHK (Iran) ∅ - Dry or arid.

KHUSHUM (Arabic) - Headlands.

KNOBS ∅ - Rounded, isolated hills or small mountains. They usually constitute the surface expression of weathered plutonic intrusions.

KOFFIEBUS (Kalajari) ∅ - A conical hill or table mountain that is generally lava-capped.

KOLLEKTOR (Arabic) - Main irrigation canal.

KOLODETS (Arabic) - A well.

KOLPAS (Greek) - A gulf.

KOM (Arabic) - A mound.

KOMA (Arabic) - A volcano.

KONIMETER, n. * - An instrument for determining the dust content of a sample of air. One form of the instrument consists of a tapered metal tube through which a sample of air is drawn and allowed to impinge upon a glass slide covered with a viscous substance. The particles caught are mounted and measured with the aid of a microscope. Also spelled CONIMETER.

KOPJES (or KOPPIE) (Kalajari) ∅ - Scattered small rocky hills.

KOPRU (Turkish) - A bridge.

KORFEZ (Arabic) - A gulf or Bay.

KOTAL (Arabic) - A Pass.

KOUH (Iran) ∅ - A hill or knoll.

KOUM (Turkestan) ∅ - A sand desert. See ERG.

KOY (Turkish) - A bay or inlet.

KPANS (Kalahari) ∅ - Butte of sandstone capped by rounded lava flow.

KUM (Gobi) ∅ - Sand desert.

KUMBANK (Arabic) - A beach.

KURKAR (Palestine) ∅ - Dune or beach sand indurated into sandstone by calcareous cement.

- L -

LAAGTE ∅ (South Africa) - An abandoned stream bed. See DRY WASH.

LACCOLITH ∅ - A lens-shaped mass of igneous rock intrusive into layered rocks. It has a flat floor and is more or less circular in ground plan. (In order that an intrusive mass be classified as a laccolith, it must have a floor).

LACUSTRINE TERRACES * - Terraces which mark the shore lines of ancient lakes, or earlier high-water states of existing lakes. Nearly horizontal surfaces with relatively steep slopes facing the central portion of the lake.

LAG GRAVEL * - Gravel, generally on the flat portion of the valley fill, left behind after the fine material has been removed by wind action.

LANDES (French) ∅ - Low-lying sandy plains bordered by dunes.

LANDFORM, n. # - The physical expression of the land surface. Syn. Geomorphology.

LANDSCAPE, n. * - The sum total of the characteristics that distinguish a certain kind of area on the earth's surface and give it a distinguishing pattern in contrast to other kinds of areas. Any one kind of soil is said to have a characteristic natural landscape, and under different uses it has one or more characteristic cultural landscapes.

LANDSCAPE TYPE - A region throughout which a specific assemblage of environmental factor classes occurs and throughout which factor classes are related to each other in a similar way.

LANGLEY, n. - A unit of energy equal to one gram-calorie per square centimeter.

LAPSE RATE - The decrease of an atmospheric variable with height, the variable being temperature, unless otherwise specified.

LATERAL OBSTACLE * - An insurmountable terrain feature or combination of such features that forces a vehicle to deviate laterally from a desired path.

LENTISQUE Ø - Tall brush on mountain sides.

LEVECHE (Spanish) Ø - A hot, dry southerly wind in S.E. Spain corresponding to the SIROCCO.

LIME PAN * - A PLAYA, the surface layer of which is calcium carbonate, precipitated as the water evaporates. (Not necessarily a true PAN, which see).

LIQUID LIMIT * - Soil Mechanics. One of the measures of soil consistence (see ATTERBERG LIMITS). The water content, expressed as a percentage of the weight of the oven-dried soil, at the boundary between the liquid and plastic states. The water content at this boundary is arbitrarily defined as the water content at which two halves of a soil cake will flow together for a distance of 0.5 inches along the bottom of the groove separating the two halves, when the cup is dropped 25 times for a distance of 1 cm (0.3937 inches) at the rate of two drops per second.

LLANO (Atacama) Ø - Broad, high, and level tracts whose borders are the gathering grounds of waste from the mountains.

LOAM, n. Ø - The U.S. Department of Agriculture textural class name for soil having a moderate amount of sand, silt, and clay. Loam soils contain 7 to 27 percent of clay, 28 to 50 percent of silt, and less than 52 percent of sand.

LOAMY SAND, n. ∅ - The U.S. Department of Agriculture textural class name for soil containing more than 70 percent sand and less than 15 percent clay, and less than 85 percent sand at 0 percent clay and more than 10 percent clay at 0 percent silt.

LOCAL RELIEF * - The difference in elevation between the highest and lowest points in a limited area. (In terrain studies, it is usually one square mile).

LOESS ∅ - A deposit of fine-grained dice-like fragments blown in place by wind.

LOMA (Greek) - Hill.

LONGITUDINAL DUNES * - A series of earlier deposits occuring as ridges parallel to the direction of the prevailing winds. The cross-sectional shape is generally rolling, but not infrequently small, sinours, subsidiary ridges, form on the summits of the primary dunes, in such instances, the cross-sectional shape is crested.

LONGITUDINAL OBSTACLE * - A surmountable terrain feature (e.g. tall, thick grass) that inhibits the movement of a surface vehicle by forcing it to slow down as the feature is negotiated.

LOUDERBACK # - The remnant of a lava flow that has been unheaved and tilted during block faulting. Used by Louderback as evidence in favor of the fault block origin of Basin and Range topography and named by Davis in his honor.

LOW, n. * - In meteorology, elliptical for "area of low pressure," referring to a minimum of atmospheric pressure in two dimensions (closed isobars) on a constant-height chart or a minimum of height (closed contours) on a constant-pressure chart. Since a low is, on a synoptic chart, always associated with cyclonic circulation, the term is used interchangeably with CYCLONE.

LUMINESCENCE, n. * - Emission of light other than incandescence. Emission of a result of and only during absorption of radiation from some other source is called flourescence.

LUMINOUS EFFICIENCY # - For a given wavelength of visible radiation, the ratio of the flux that is effectively sensed by the human eye to the flux that is intrinsic in the radiation. Also called luminosity.

LUT (Arabic) - A waterless and barren desert.

- M -

MA (Arabic) - A well or spring.

MACCHIA - Copselike growth of shrubs found along the Mediterranean Coast, similar to CHAPARRAL.

MAELEN ∅ (North Africa) - A well.

MAGHARET (Arabic) - A cave.

MAHIR (Arabic) - Terminal drainage basin, usually with taller bushes or trees.

MAHOZ (Arabic) - Primary Administrative Division.

MAIDAN ∅ - An open space or plain in the Middle East.

MAJDAL (Arabic) - A village.

MAKASSA (Arabic) - Broken ground.

MAKHTESH (Arabic) - A depression.

MALCA (Arabic) - Ford or watering place for animals.

MALLEE ∅ - A dense brushwood forming thickets throughout Australia, similar to CHAPARRAL.

MALPAIS ∅ - Badlands based on a basaltic lava; also used for topography formed by weathering of very soft material in arid regions.

MAMLAHAH ∅ - See PAN. (Arabian term).

MANJAM (Arabic) - A mine.

MAQUIS ∅ - See CHAPARRAL.

MAR (Greek) - A sea.

MARISMA (Greek) - A marsh.

MARL ∅ - The preferred meaning is a calcareous clay. Many other connotations exist, and the term should be used with caution.

MARSA (Arabic) - An anchorage, or port.

MASRAB (Arabic) - A camel track.

MASSIF, n. # - A block of the earth's crust bounded by faults or flexures and displaced as a unit without internal change; a large fault block of mountainous topography.

MAURID (Syria) ∅ - A waterhole.

MEAN ANNUAL RANGE OF TEMPERATURE * - The difference between the absolute maximum and minimum temperatures for a year, averaged over a given number of years.

MEAN DAILY MAXIMUM (MINIMUM) TEMPERATURE * - Average of the maximum (minimum) temperatures for each day within a given period, usually a month, over a period of years.

MEAN HOURLY TEMPERATURE * - Average of the daily temperatures at a given hour for an indicated period generally a month, averaged over a period of years.

MEAN MONTHLY CLOUDINESS * - Average of the mean cloud cover of each day within a month, averaged over a period of years.

MEAN RADIANT TEMPERATURE * - The temperature at which an object gives out as much radiation as it receives from its surroundings. In a room it is approximately the mean temperature of the walls, floor and ceiling.

MEAN SEA LEVEL * - The average height of the surface of the sea for all stages of the tide, used as a reference for elevations.

MEAN SOLAR DAY * - The duration of one rotation of the earth on its axis, with respect to the mean sun. The length of the mean solar day is 24 hours of mean solar time or 24 hours 03 minutes 56.555 seconds of mean sideral time. A mean solar day beginning at midnight is called a civil day; and one beginning at noon, 12 hours later, is called astronomical day.

MECHANICAL ANALYSIS - See PARTICLE-SIZE ANALYSIS.

MECHANICAL SHOCK ϕ* - A pulse or transient excitation of a system that is characterized by its suddenness and severity and which occurs in a relatively short period of time.

MEDANOS (Spanish) ϕ - Sand dunes.

MELTEM - See ETESIAN WINDS.

MERDJAS ϕ - (Moroccan) See PAN.

MESA * - An isolated residual prominence with distinctly flat top and with very steep or precipitous slopes left as erosional remnants of a plateau ares. (See CUESTA).

MESHRA (North African) ϕ - A ford or watering place.

MESOCLIMATE, n. * - The climate of small areas of the earth's surface which may not be representative of the general climate of the district.

MESOCLIMATOLOGY, n. * - The study of MESOCLIMATES: the climatology of relatively small areas which may not be climatically representative of the general region. The data used in mesoclimatology are mostly standard observations. The size of the area involved is rather indefinite and may include topographic or landscape features from a few acres to a few square miles, such as a small valley, a forest clearing, a beach, a village site.

METEOROLOGICAL DATA * - Meteorological facts pertaining to the atmosphere, such as wind, temperature, air density and other phenomena which affect military operations.

METEOROLOGY, n. * - The study dealing with the phenomena of the atmosphere. This includes not only the physics, chemistry, and dynamics of the atmosphere, but is extended to include many of the direct effects of the atmosphere upon the earth's surface, the oceans, and life in general. The goals often ascribed to meteorology are the complete understanding, accurate prediction, and artificial control of atmospheric phenomena.

MICROBAR (or DYNE PER SQUARE CENTIMETER) * - A unit of pressure commonly used in ACOUSTICS. One microbar is equal to one dyne per square centimeter. See BAR and MILLIBAR. Note: The term "bar" denotes a pressure of 10^6 dynes per square centimeter. Unfortunately, the bar was once used in acoustics to mean one dyne per square centimeter. It is recommended, therefore, in respect to sound pressure that the less ambiguous terms "microbar" or "dyne per square centimeter" be used.

MICROCLIMATE, n. * - The fine climatic structure of the air space which extends from the very surface of the earth to a height where the effects of the immediate character of the underlying surface no longer can be distinguished from the general local climate (meso-climate or macro-climate).

MICROCLIMATOLOGY, n. * - The study of MICROCLIMATE. It includes the study of profiles of temperature, moisture and wind in the lowest stratus of air, the effect of the vegetation and of shelterbelts, and the effect of towns and buildings in modifying the macroclimate.

MICRORELIEF, n. * - Small-scaled differences in relief, such as small mounts, swales, or pits that are a few feet across and have differences in elevation of a few inches to around three feet that are significant to soil-forming processes, to growth of plants, or to preparing the soil for cultivation.

MIGREH (MIQREH) (North Africa) Ø - A water shed.

MILITARY CREST - A terrain feature of such altitude that it restricts fire or observation in the area beyond resulting in DEAD SPACE (which see), or limiting the minimum elevation, or both (AR 320-5), see also CREST.

MILLIBAR, n. * - A unit of pressure equal to 1,000 dynes per square centimeter of 1/1,000 of a BAR. The millibar is used as a unit of measure of atmospheric pressure, a standard pressure, a standard atmosphere being equal to 1,013.25 millibars or 22.92 inches of mercury.

MINGAR Ø - (North Africa) A cliff or bluff.

MIRAGE, n. * - Simple mirages may be any one of three types, the <u>inferior</u> mirage, the <u>superior</u> mirage, or the <u>lateral</u> mirage, depending, respectively, on whether a spurious image appears below, above, or to one side of the true position of the object.

An optical phenomenon produced by a stratum of hot air of varying density across which the observer sees reflections, often inverted, of some distant objects. Most commonly the illusion of water is seen as a result of the reflection from the further sky.

MISHASH (Arabic) - A shallow hand dug well.

MITLA (North Africa) ∅ - A pass.

MOBILITY, n. * - A quality or capability of military forces which permits them to move from place to place while retaining the ability to fulfill their primary mission.

MOGOTES (Sp SW, Mex) ∅ - Hillock or mound covered with shrub thickets.

MONADNOCKS * - Rock masses that are resistant to mechanical weathering and remain projected above the surface of the plain.

MOUNTAIN ∅ - A mass of land in which summit area is small in proportion to basal dimensions, rising more than 1000 feet above the surrounding terrain. The characteristic slope is declivitous (14 to 26.5 degrees) or steep (26.5 to 45 degrees).

MOUNTAIN AND VALLEY WINDS ∅ - A system of diurnal winds along the axis of valley, blowing uphill and upvalley by day, and downhill and down-valley by night; they prevail mostly in calm, clear weather. The upvalley component or valley wind is due to the temperature difference between the air heated over the slopes and that at the same height in the free air. The downvalley component or mountain wind at night is due to nocturnal cooling and is somewhat weaker, up to 9 mph.

MUD CRACKS * - Cracks that form in fine-grained sediments as they dessicate or lose contained water. Very common on playa surfaces and along the edges of dry washes after rains.

MUD FLOW * - Debris-laden water so charged with mud and sand that it forms a fluid far denser than water and capable of carrying huge blocks and boulders which are buoyed up by the viscous mass.

MUD POLYGON ∅ - The polygon-shaped surface of dried sedimentary deposits, bounded by mud cracks.

MUNHADAR (Arabic) - Slope, escarpment.

MUNSON TEST COURSE * - An extensive network of automotive test courses lain out at Aberdeen Proving Ground, MD. Each of the test courses has been based on a specific requirement for test operation. The course covers the following: amphibious lands, rolling hills, mud, slopes (30° left and right), washboard, straightaway, imbedded rock, fording, wave course, soil dynamometer, cobblestone, bowl, staggered bump, corduroy, loose rock, shell hole, bridging device, vertical wall, gravel road, turning circles, slope grade of 5, 10, 15, 20, 30, 40, 50 and 60 percent and Belgian block.

MUSHASH (Arabic) - A waterhole.

MUSHROOM ROCK ∅ - A mushroom-shaped rock mass formed by differential weathering. The thin base of the mushroom is made up of soft sedimentary material which cannot withstand the effects of disintegration and decomposition as well as the more resistant upper layers of the rock mass. May also be cut from hard rock by sand abrasion at the base. Refer to PEDESTAL ROCK.

MYS (Arabic) - A cape.

- N -

NA'D (Arabic) - Moist ground.

NAGB (North Africa) (Also Naqb) ∅ - A pass.

NAGOR'YE (Arabic) - A highland.

NAHR (Middle East) ∅ - A stream or river.

NAMAK (Arabic) - Salt.

NAQ (Arabic) - A marshy depression.

NASB (Arabic) - A ravine or water course.

NASIB (Arabic) - A knoll or bluff.

NASLAH (Arabic) - A butte.

NATURAL ENVIRONMENT # - That part of the total environment which comprises the complex of conditions found in nature. The term is loosely used for an environment dominated by natural ENVIRONMENTAL FACTORS.

NAZIYAH (Pl. NAWAZI (Arabic) - A dune.

NEGHEB (Arabic) - A pass, or depression.

NIZMENNOST (Arabic) - A lowland plain.

NECHN ∅ - A column of molten rock that has hardened in the passage connecting a volcanic crater with the underground source of the lava and has been exposed later by weathering.

NEFUD (Syria) ∅ - A high sand dune.

NEGGAZA (North Africa). ∅ - A cliff.

NISI (Greek) - An islet.

NEHIR (Turkish, Arabic) ∅ - A river.

NOISE, n. - Any undesired sound. Or any unwanted disturbance within a useful frequency band, such as undesired electric waves in a transmission channel or device.

NOQA (Arabic) - Isolated large prominent sand dune.

NOR (Gobi Desert). See PAN.

NOTUD (Arabic) - Large area of sand dunes.

NUBBINS ∅ - Residual boulders, usually found on the surface of a pediment.

NUDO (Spanish) ∅ - A barren peak.

NUGRAT (Arabic) - A water hole or depression.

NULLAH (India) ∅ - A wadi.

NUSB (North Africa) ∅ - A steep sided knoll.

- O -

OASIS, n. * - An isolated area within a DESERT, with GROUND WATER at or near the surface, resulting in a fertile or green sopt, varying in size from a small grove of palms to an area of over a hundred square miles.

OBO, * - A stone cairn found in the GOBI, used as both a religious monument and a guidepost.

OCHURD, * - More massive summits above the general sand dune level. A massive mountainous dune formed by some underlying rocky topographical feature.

OFF-ROAD, adj. * - Away from terrain specifically improved for vehicle use.

OJO (Spanish) ∅ - A waterhole or tank.

OMURAMBAS ∅ - Comparable to washes, but not steep banked-incised slightly below the levels of gravel washes. (Central Namib Desert).

OPEN IMPROVED STORAGE SPACE * - Open area which has been graded and hard surfaced or prepared with topping of some suitable material so as to permit effective material handling operations.

OPERATIONAL ENVIRONMENT * - 1. As pertains to the military, it is a composite of the conditions, circumstances, and influences which affect the employment of military forces and which bear on the decisions of the commander.
2. ∅ - Any environment associated with the operation of a structure or equipment.

ORM (Greek) ∅ - A bay.

OROS (Greek) ∅ - A mountain.

OSTROV (Arabic) - An island.

OTERO (Spanish) ∅ - A knoll.

OUED (North Africa) ∅ - A stream channel.

OUTCROP, n. 1. * - A part of a body of rock that appears, bare and exposed, at the surface of the ground. 2. ∅ In a more general sense the term applies also to areas where the rock formation occurs next beneath the soil, even though it is not exposed.

OUTLIER ∅ - A minor part of a formation separated by erosion from the main body or outcrop.

OUTWASH # - The surface formed by the deposition of materials from perennial (or nearly perennial) streams. Outwash plans may by fact be regarded as a variety of alluvial apron having a very low regional dip.

OVERPACKING, n. - Repacking of containers or items into more substantial and suitable containers to withstand handling and transportation hazards, or the addition of packing materials such as steel strapping, waterproof case-liners, fiberboard sleeves onto fiberboard boxes, etc., to render the existing container less susceptible to damage or pilferage during handling transporatation and storage.

OZERA (Arabic) - Lakes.

OZONE, n. * - A form of molecular oxygen, each molecule consisting of three atoms. Ozone has a characteristically pungent odor. It is formed by electrical discharge in air, but in the upper atmosphere is believed to be produced by the effect of ultraviolet radiation from the sun on oxygen.

- P -

PACKING, n. * - Application or use of exterior shipping containers and assembling of items or packages therein, together with necessary blocking, bracing, or cushioning, weatherproofing exterior, strapping and marking of shipping containers.

PALMERAIR ∅ - A palm grove.

PAN # - Flat-floored, shallow depressions that commonly do not contain thick evaporite deposits, differing therefore from PLAYAS (which see). Also called KEWIRE (Iran), REI (India), CHOTTS (Algeria). NOR (Gobi), MERDJAS (Morrocco), KAVIR (Iran) and MAMLAHAM (Arabia).

PARTIAL PRESSURE - The pressure that the water vapor would have at constant temperature if the air in a space were removed. Equivalently, the total pressure times a mole fraction of water vapor.

PARTICLE-SIZE ANALYSIS * - Soil Mechanics. Determination of the various amounts of the different separates in a soil sample, usually by sedimentation, sieving, micrometry, or combinations of these methods. Formerly termed mechanical analysis.

PEDESTAL ROCKS * - Wide caps supported by slender columns resulting from differential weathering.

PEDIMENTS * - Surfaces cut on bedrock at the foot of an uplifted mountain block, as the latter is eroded back. The pediment may be bare or mantled by a thin layer of ALLUVIUM which is in transit to the adjoining basin. Some pediments resemble ALLUVIAL FANS in outward form. This term is used freely by some writers to include fans, and hence the reader should be cautious when encountering it.

PEDREGAL (Spanish) ∅ - A lava field or boulder field.

PELAR (Spanish) ∅ - A large rock.

PENASCO ∅ - A large rock. Often applied to a projecting rock isolated by the recession of cliffs or mountain slopes.

pH * - A numerical designation of relatively weak acidity and alkalinity as in soils and other biological systems. Technically, pH is the common logarithm of the reciprocal of the hydrogen-ion concentration of a solution. A pH of 7.0 indicates precise neutrality, higher values indicate increasing alkalinity, and lower values indicate increasing acidity. See HYDROGEN ION CONCENTRATION, and SOIL REACTION.

PHREATOPHYTE * - Water-loving plant and particularly one, the roots of which will go to great depths for ground water.

PICACHO ∅ - A peak or sharply pointed mountain or hill.

PIEDMONT ALLUVIAL DEPOSIT - The blanket deposit of heterogenous material found at the base of desert mountain ranges. Formed by the coalescing of alluvial fans and cones. Synonomous with ALLUVIAL APRON AND BAJADA.

PIEDMONT SLOPES ∅ - See BAJADAS.

PINNACLES ∅ - Any structure or formation suggesting a pinnacle (upright architectural member) height and tapering slenderness.

PLAINS # - Extensive tracts of land characterized by flat to gentle slopes and having few inequalities of surface. See types: ALLUVIAL, COASTAL, DEPRESSION, and DESERT PLAINS.

PLATEAU * - An elevated mass of land characterized by extensive, more or less flat-lying summit areas bounded on one or more sides by scraps.

PLAYA # - The flat or nearly flat low part of an enclosed basin - essentially dry lakes which have expanded and contracted several times - frequently used interchangeably with PAN (which see), a feature with similar appearance but different structure. Playas include dry, moist (SALINE), crystal body (SALT PAN /sic/), compound, and artificial types. Also called SALARES (Atacama).

PLINITH * - The lower and outer portions of a self dune beyond the sli-face boundaries which have never been subjected to sand avalanches.

POGONIP ∅ - (U.S. Great Basin) - Ice fog occurring in December or January.

POROSITY, SOIL * - The degree to which the soil mass is permeated with pores or cavities. Porosity can be generally expressed as a percentage of the whole volume of a soil horizon that is unoccupied by solid particles.

POTHOLE, n. * - A more or less circular hole formed in the rocky beds of rivers by the grinding action of stones or gravel whirled around by the water in a particular spot.

PRECIPITATION, n. * - 1. Any or all of the forms of water particles, whether liquid or solid, that fall from the atmosphere and reach the ground. Precipitation includes DRIZZLE, RAIN, SNOW, SNOW PELLETS, SNOW GRAINS, ICE CRYSTALS, ICE PELLETS, and HAIL. 2. The amount, usually expressed in inches of liquid water depth, of the water substance that has fallen at a given point over a specified period of time.

PRESSURE, n. * - 1. A type of stress characterized by uniformity in all directions. In dynamics, it is that part of the stress tensor that is independent of VISCOSITY and depends only upon the molecular motion appropriate to the local temperature and density. It is a scalar quantity expressed in units of force per unit area. 2. In meteorology, commonly used for ATMOSPHERIC PRESSURE.

PRESSURE ALTITUDE * - 1. The altitude in the STANDARD ATMOSPHERE at which a given pressure will be observed. It is the indicated altitude of a pressure altimeter at an altimeter setting of 29.92 inches of mercury (1013.2 mb); therefore, it is the indicated altitude above the 1013.2 mb constant-pressure surface. 2. The simulated altitude condition created in an altitude chamber by changing (usually by lowering) the pressure in the chamber.

PRESSURE, STATIC * - 1. The pressure exerted upon an object by air or other fluid by virtue solely of its own molecular activity resulting from its density and temperature, no gain being due to outside work. 2. Acoustics. The pressure that would exist at a point in the absence of sound waves.

PREVAILING WIND DIRECTION * - The wind direction most frequently observed during a given period. The periods most frequently used are the observational day, month, season, and year.

PROFILE, n. * - A geometric representation of a terrain surface as an elevation-distance curve.

PUSTEH (Arabic) - A hill.

PSYCHROMETER, n. * - An instrument for measuring the water vapor content of air. It is a type of HYGROMETER with two thermometers, one a wet-bulb and the other a dry-bulb.

PUITS Ø - A well.

PYRHELIOMETER - Instrument used to measure solar radiation. (See ACTINOMETER).

PYROCLASTIC Ø - Material blown out during volcanic eruptions.

- Q -

QA' (Arabic) - A mudpan.

QAAYID (Pl. of QAIDAH) (Arabic) - Rasied sand area

QA'ID (Sahara) - A relatively static, lobate dune.

QALAMAH (Arabic) - Drilled water well equipped with pipe.

QALAT (Arabian) Ø - Crag, peak.

QALB (Pl. QULBAN) (Arabic) - A well.

QALEH (Arabic) - A Fort.

QALLAH (Arabic) - A summit.

QALT (Arabic) - Natural rock basin.

QANAT (Arabic) - An aqueduct.

QANTATA (Arabic) - Saddle.

QARAH (Arabic) - A flat-topped hill, usually rounded.

QARAT (QARET, QUR, QURET) (Arabic) Ø - A low hill or knoll.

QARN (Arabic) - Prominent mountain front.

QATN (Arabic) - Crest or summit of a mountain or mountain range.

QAWZ (Arabic) - Sand mounds or hummocks accumulated about shrubs.

QELTI (N. Africa) (Pl. QULUT) Ø - A rock pool. (See also TANK).

QEIZAN Ø - Plural of QOZ.

QI'AH (Arabic) - Depressed plains.

QOZ (Pl. QEIZAN) (North African) Ø - A dune formation.

QUALAT (Arabic) Ø - A crag, or peak.

QUATRITE Ø - A rock composed of sand grains cemented by silica into an extremely hard mass (usually dry).

QUEBRADA Ø - 1. A GAP and valley complex, including the gorge to ravine features of arid topography. 2. Individual features of a break or fissure area.

QUWAIRAT (Arabic) - A small hill.

QUWID (Arabic) - A line of hills.

QULUT (Pl. of QELTI).

QUOZ (Gobi) Ø - A sand ridge.

- R -

RA's (Arabic) - A point of land.

RABADH (Sahara) Ø - A barchan dune.

RABAL, n. * - Meteorol. 1. A method of determining wind speeds and directions at various heights in which the height data are obtained from RADIOSONDE observations and the speed from visual tracking of the ballon. 2. Determination of varying atmospheric conditions by use of a RADIOSONDE ballon. Rabals are reports obtained in this manner.

RADIOMETER, n. - Any of a variety of instruments used to measure thermal radiant energy or the energy to electromagnetic radiation at wavelengths longer than visible radiation, i.e., infrared, microwave and radio wave regions. See ACTINOMETER.

RAML (Pl. RIMAL) ϕ - (North Africa) - Sand.

RAMLAH (Arabic) - Sand area.

RAMLAT (Arabic) - Rolling sand.

RAMAT (Arabic) - Mountains.

RAND (Afrikanni) ϕ - A low ridge of hills, often covered with scrub.

RANGE * - An elongated belt of massive mountains.

RANKINE TEMPERATURE SCALE * - A temperature scale with the degree of the FAHRENHEIT TEMPERATURE SCALE and the zero point of the KELVIN TEMPERATURE SCALE. The ice point is thus 491.67 degrees RANKINE and the boiling point of water is 671.67 degrees Rankine.

RAQADA - A small, narrow, steepsided valley, larger than a gully and smaller than a canyon and usually worn down by running water. (See DONGA, DRAW, RAVINE and WASH).

RASS (Arabic) - A cape or headland.

RAVDA (Arabic) - Damp or grassy ground.

RAVINE, n. - A depression worn out by running water, larger than a gully and smaller than a valley; a small gorge or canyon, the sides of which have comparatively uniform steep slopes.

RAVNINA (Arabic) - A plain.

RAWDAH (t) - (Arabic) - A closed basin with firm, flat, vegetation-covered mud surface, occasionally rocky and sandy.

RAWIN, n. * - Winds aloft observation made by balloon and electronic methods without optical aid.

REG, n. ϕ - An extensive, nearly level area in a desert with a smooth floor consisting of a layer of stones too large to be moved by the wind. The desert pavement of stones is commonly only one stone thick and may overlie loose unconsolidated material. (See also SERIR).

REGBEL (North Africa) ∅ - A water course.

REGOLITH ∅ - The loose, weathered bedrock which lies above solid rock.

REI (India) - See PAN.

REKHES (Arabic) - A ridge.

RELATIVE HUMIDITY - The ratio of the weight of water vapor in a volume to the maximum weight of water vapor in the same volume at the same temperature, also equal to the ratio of the partial pressure of the water vapor to the vapor pressure of water at the same temperature. These two definitions are equivalent.

RELIEF, n. - The irregularities of the land surface.

REPRESO ∅ - A natural tank or CHARCO.

RESONANCE * - A system is considered to be in resonance, when with a constant forced excitation any change in the frequency of the excitation causes a decrease in the response of the system.

RESULTANT WIND - In climatology, the vectorial average of all wind directions and speeds for a given level at a given place for a certain period, as a month.

REVERSE SLOPE - 1. Any slope which descends away from a given point of reference. 2. In military usage a slope which descends away from the enemy.

RHYOLITE - A lava, generally of light color, corresponding in chemical composition to granite.

RI - (Arabic) Passage in a cleft or gap of the mountains.

RIDGE, n. * - 1. A long narrow and usually sharp crested land form that may be more or less independent or a part of a large mountain or hill. 2. In meteorology, an elongated area of relatively high ATMOSPHERIC PRESSURE, almost always associated with and most clearly identified as an area of maximum anticyclonic curvature to wind flow.

RIBAT (Arabic) - An inn, or halting place.

RIFT ∅ - An elongated valley formed by the depression of a block between two faults or fault zones of approximately parallel strike. See also CHASM, GRABEN.

RIG (Arabic) - Sand gravel.

RIGM (Arabic) - A cairn, heap of stones.

RISH (Arabic) - A long row or ridge of low broken hills.

RIVER WASH ∅ - Barren alluvial land, usually coarse-textured, exposed long streams at low water and subject to shifting during normal high water.

ROCCA (Greek) - A rock or crag.

ROCKY DESERT ∅ - A desert caused by wind erosion, resulting in a desolate surface of bedrock with local patches of rubble and sand (such as the HA'RLADA of Northern Africa).

ROD (Arabic) - Tributary Wadi.

RODNIK (Arabic) - A spring.

ROUSS (Arabic) - Mountains.

RUD (Arabic) - A river or stream.

RUDKHANEH (Arabic) - A riverbed.

RUISSEAU (Greek) - A stream.

- S -

SABAKHA * - In No. Africa, a smooth, flat often saline, plain sometimes occupied after a rain by a shallow lake. (See SEBKRA, PLAYA).

SABKHAH (t) (Arabic) - Silt, clay and sand flats often with saline incrustations.

SAEI (Arabic) - ∅ - Dust.

SAFAWIYAT (Arabic) - Dry watercourse. (See WADI).

SAFRA (Arabic) - Stony, rocky.

SAHL (Arabic) - A plain, open ground.

SAHRĀ' (Arabic) - Desert.

SAI (Gobi desert) ∅ - A WADI or ARROYO.

SALADO (Spanish) ∅ - A salt flat or alkali playa.

SALARES (Atacoma Desert) ∅ - (See PLAYAS).

SALĪL (Arabic) - Equivalent to sayh: or the lower and broader portion of a sayh as it approaches the RUBAL KHALI sands. (See SAYH).

SALINE SOIL * - A non-alkali soil containing sufficient soluble salts to impair its productivity. This name was formerly applied to any soil containing sufficient soluble salts to interfere with plant growth.

SALINITY, n. * - A measure of the quantity of dissolved salts in water. It is formally defined as the total amount of dissolved solids in water in parts per thousand by weight when all the carbonate has been converted to oxide, the bromide and iodide to chloride, and all organic matter is completely oxidized. These qualifications result from the chemical difficulty in drying the salts in sea water. In practice, salinity is not determined directly but is computed from chlorinity, electrical conductivity, refractive index, or some other property whose relationship to salinity is well established.

SAMOOM (or SAMUN) ∅ - A hot dry wind which blows from the mountains of Kurdistan.

SAND, n. * - 1. Soil mechanics. In the Unified Soil Classification System, defined as a soil that contains more than 50 percent particles greater than 0.074 mm and more than 50 percent of that fraction less than 4.76 mm. Types are identified as SW (well-graded sand), SP (poorly graded sand), SM (silty sand), and SC (clayey sand). 2. Individual rock or mineral fragments in soils having diameters ranging from 0.5 mm to 2.0 mm. Usually sand grains consist chiefly of quartz, but they may be of any mineral composition. 3. Pedology. The U.S. Department of Agriculture textural class name of any soil that contains 85 percent or more of sand and not more than 10 percent of clay.

SAND DUNE ∅ - A mound, ridge, or hill of sand piled up by the wind on the shore or in a desert. See DUNE.

SANDS, DRY * - Sandy deposits, with low water-holding capacity, in which there has been no clear development of soil characteristics since deposition.

SANDSTORM, n. * - A strong wind carrying sand through the air, the diameter of most of the particles ranging from 0.08 to 1 mm. In contrast to a DUSTSTORM, the sand particles are mostly confined to the lowest ten feet, and rarely rise more than fifty feet above the ground.

SANDY CLAY ∅ - Soil of the U.S. Department of Agriculture textural class containing 35 percent or more of clay and 45 percent or more of sand.

SANDY DESERTS * - A desert caused by deposition of fine material and resulting in sand dunes or sheets (such as the Algadones dunes or the great ERGS of the Sahara).

SANDY LOAM ∅ - Soil of the U.S. Department of Agriculture textural class that contains either 20 percent of clay or less, and the percentage of silt plus twice the percentage of clay exceeds 30, and 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 percent and 52 percent sand.

SANYET (Arabic) - Deep wells.

SAR (Arabic) - A cape.

SARMANA (North Africa). Ø - A flinty plain.

SAYH (Arabic) - Small, poorly defined wadi channel; more broadly, the southern steppe desert, as opposed to that of the northern sandy steppe deserts.

SCABLANDS Ø - Level or slightly rolling rock outcrops that have practically no soil cover.

SCARP, n. Ø - An escarpment, cliff, or steep slope of some extent along the margin of a PLATEAU, MESA, TERRACE, OR BENCH.

SCHIST, n. * - A crystalline METAMORPHIC ROCK that has closely spaced foliation and tends to split readily into thin flakes or slabs. There is complete gradation between slates and schists on the one hand and schists and gneisses on the other.

SCORIA DEPOSITS, Ø - Accumulations of volcanic ejecta (usually vascular, rounded but rough fragments 50 to 200mm in diameter).

SCREE - See TALUS (Ø).

SEBCHA (SEBKHA) Ø - North African salt flat. See also SEBKRA/PLAYA (Ø).

SEBKRA Ø - A North African salt marsh. See SABAKHA.

SEDIMENTARY ROCK Ø - Those rocks composed of sediment; mechanical, chemical, or organic. They are formed through the agency of water, wind, glacial ice, or organisms and are deposited at the surface of the earth at ordinary temperatures.

SEEP Ø - A spot where water " . . . oozes out slowly and gathers in a pool."

SEIF Ø - An elongated dune or range of dunes.

SEIL Ø - (North Africa). - A flood bed.

SEISTAN Ø - A strong northerly wind, often exceeding seventy miles per hour, experienced throughout the summer in the province of Seistan in eastern Iran. Also known as the "Wind of 120 days."

SERIR Ø - Gravel plains, almost completely undissected, with monotonously flat surfaces covered with gravel or angular rock fragments and barren of vegetation.

SHA'ATAN (Arabic) - Brushy, partially sandy covered peak or mound with exposed rocky windows and debris.

SHABKA (India) Ø - An Arabic term signifying network or fiber. Used to denote a type of desert landscape formed by wind erosion of alluvial basins.

SHAHALI (Sahara) Ø - A native term signifying wind from the South.

SHA'IB (Arabic) Ø - A watercourse.

SHAOOH (Arabic) Ø - A valley or depression between 'Irqq.

SAOIYAH (Arabic) - A ditch.

SHARM' (Arabic) - A Harbor or bay.

SHAYYIT (Arabic) - A long watercourse or wadi.

SHEBKA (India) Ø - A "net." A limestone area that has been eroded and fashioned by waters so that it appears as if cut into a confused and irregular series of steep-walled ravines which look like the entangled threads of a net.

SHATT (Arabic) - A large river.

SHEB (Greek) - A watercourse.

SHEET FLOOD * - Run-off waters covering a wide surface and spreading widely in a film a few inches deep.

SHELUHAT (Arabic) - Hill, mountain or spur.

SHI'B (Arabic) - A rocky shoal or reef.

SHIELD VOLCANO - See BASALT PLAIN.

SHILIB (North Africa) Ø - A Branch Wadi.

SHORMA (North Africa) Ø - A saddle.

SIF DUNE * - A LONGITUDINAL SAND DUNE of great height and length. In cross-section it has a knife-edge crest, one side of which is rounded and the other side of which falls abruptly as a collapsing front facing normal to the axis of the dune. The side on which the front occurs depends on the side to which the wind has temporarily veered out of its prevailing direction.

SIERRA (Spanish) ∅ - A mountain or mountain range.

SIGNATURE * - The visible, identifying characteristics of a weapon or vehicle caused by operating in a specific environment. For example, the dust cloud caused by BACK BLAST of a recoilless rifle or the dust generated by an armor column in the desert.

SIHLAH (a) - A small plain.

SILL * - A sheet of igneous rock intruded between beds or sheets of parent rock.

SILT, n. - * 1. Soil mechanics. The Unified Soil Classification System defines silt as a fine-grained soil possessing low plasticity in relation to the liquid limit. Types are identified as ML (inorganic silt of low plasticity), OL (organic silt of low plasticity), and MH (inorganic silt with liquid limit greater than 50).
2. * Individual mineral particles of soil that range in diameter between the upper size of clay, 0.002 mm, and the lower size of very fine sand, 0.05 mm.
∅ 3. Pedology. Soil of the U.S. Department of Agriculture textural class containing 80 percent or more of silt and less than 12 percent of clay.
∅ 4. Sediments deposited from water in which the individual grains are approximately the size of silt.

SILT LOAM ∅ - Soil of the U.S. Department of Agriculture textural class having (1) 50 percent or more of silt and 12 to 27 percent of clay or (2) 50 to 80 percent of silt and less than 12 percent of clay.

SILTY CLAY ∅ - Soil of the U.S. Department of Agriculture textural class having 40 percent or more of clay and less than 20 percent of sand.

SILTY CLAY LOAM ∅ - Soil of the U.S. Department of Agriculture textural class having 27 to 40 percent of clay and less than 20 percent of sand.

SIMOOM ∅ - The desert. Also sometimes used to designate a desert wind.

SINK (or SINKHOLE) * - A circular or elongated depression of varying size formed by solution and collapse in areas of limestone or evaporated rock. Sinks have subsurface draining only, through natural holes and caverns or by seepage into a lower table.

SIROCCO (or SCIROCCO) - The hot, a.m., southerly desert wind in the Middle East and North Africa.

SKY TEMPERATURE * - The effective temperature of the sky, used in determining the heat lost from the earth's surface by radiation to the sky. (MIL-STD 210A).

SLICKENSIDE * - Polished and grooved surface caused by friction during faulting.

SLIPFACE - The leeward side of a DUNE, whose slope equals the ANGLE of REPOSE of the sand.

SOAK, n. * - The exposure of equipment to a given temperature for a period of time long enough for the temperature of the equipment to reach that of the environment in which the equipment is to be prepared.

SPECIFIC HUMIDITY - The weight of water vapor per weight of air.

SPITZKOP ∮ - (Afrikaans) Butte.

SPRING, n. * - A place where ground water issues naturally from the rock or soil upon the land or into a body of surface water.

STANDARD ARTILLERY ATMOSPHERE * - A set of values describing atmospheric conditions on which ballistic computations are based, namely: no wind, a surface temperature of 15°C; a surface pressure of 1000 millibars; a surface relative humidity of 78%; and a lapse rate which yields a prescribed density-altitude relation.

STAR DUNES * - Eolian deposits which are normally very large peaks from which four or more ridges radiate. The cross-sectional shapes may include combinations of rolling and crested ridges.

STARLIGHT * - The illumination received on a moonless night. Under clear conditions, starlight illumination is approximately 9×10^{-5} foot candles.

STATE-OF-THE-GROUND CODE * - A standardized surface synoptic observation which describes the condition of the ground surface. Basically, the states-of-the-ground are recognized as dry, moist, wet, frozen, and ice or snow covered. The system has been used by the World Meteorological Organization since its creation in 1950 and by its predecessor, the International Meteorological Organization, since 1923.

STEPPE ∮ - A large tract of arid land characterized by zerophilous vegetation and found mostly in regions of extreme temperature range.

STICKINESS * - The ability of soils to cling to and build up on the running gear of vehicles.

STIFFNESS - The ratio of change of force (or torque) to the corresponding change in translational (or rotational) deflection of an elastic element.

STOCKS * - Small intrusive igneous bodies without known floors. See also BATHOLITH.

STONE, n. * - A rock fragment greater than ten inches in diameter if rounded, and greater than fifteen inches along the greater axis if flat.

STONY DESERT * - A desert caused by wind or water transport of selected grades of material, leaving a surface of rubble, gravel, or pebbles (such as the DESERT PAVEMENT of the Sonoran Desert, the REG of the Arabian Desert, and the SERIR of the North African Deserts).

STRAAT (Kalahari) ∅ - Hollow area between dunes (100-150 yards wide).

STRATH ∅ - A continuous, more or less flat valley floor cut from the bedrock and thinly covered with stream deposits.

STRESS, CLIMATIC # - The stresses which are components of the climatic phase of the environment, such as temperature, moisture, solar radiation, atmospheric pressure, wind, rain, etc

STRESS, ENVIRONMENTAL # - The component force of an ENVIRONMENT. (Temperature, humidity, solar radiation, etc. are environmental stresses).

STRESS, INDUCED # - A stress which is a component of the man-made phase of the environment, such as acceleration, shock, and vibration.

STRESS, STATIC * - Stress induced in an elastic element by the static deflection applied to it.

STRIKE, n. - The direction of a line formed by the intersection of a bedding plane, fault, or similar geologic structure, with a horizontal plane. It is at right angles to the dip.

"SUKHOVEI" - A dry wind (in the dry areas of the USSR).

SUBIDA ∅ - A rock-floored strip produced by wind scars (may reach to the Piedmont).

SUBSIDENCE, n. * - 1. Meteorol. A descending motion of air in the atmosphere, usually with the implication that the condition extends over a rather broad area. 2. Soil Mechanics. A settling of surface soils, particularly unconsolidated materials, either by the introduction of moisture into upper layers and resulting lubrication, or by removal of moisture (either by pumping or lowering the water table) from lower strate, leaving voids filled by weight of the overburden.

SUBSURFACE RUNOFF - That part of precipitation which infiltrates the surface soil, and moves toward the streams as ephemeral, shallow, perched ground water above the main ground-waterlevel.

SUMIDERO (Spanish). ∅ - A sink.

SUMMAN (Arabian). ∅ - A hard rock plain.

SUNSHINE, n. - * Direct radiation from the sun, as opposed to the shading of a location by clouds or by other obstruction.

SURFACE GEOMETRY * - The three-dimensional configuration of the terrain surface.

SURFACE INVERSION * - A TEMPERATURE INVERSION based at the earth's surface; that is, an increase of temperature with height beginning at the ground level. This condition is due primarily to greater radiative loss of heat at and near the surface than at levels above.

SURFACE RUNOFF * - That part of the runoff which travels over the soil surface to the nearest stream channel. It is also defined as that part of the runoff of a drainage basin that has not passed beneath the surface since precipitation.

SWALE ∅ - A slight depression or valley, marshy and rank with vegetation.

SWIMMING CAPABILITY * - As applied to vehicles, the ability of a vehicle to negotiate water obstacles by propelling itself across without being in contact with the bottom.

- T -

TABLELAND, n. # - A flat or undulating elevated area; a plateau or mesa.

TAFELBERG (Afrikaans) ∅ - Mesa.

TAKYR ∅ - A patch of absolute desert found in flat areas where salt has accumulated.

TALL (TELL) ∅ - An Arabian mound.

TALUS, n. * - A collection of fallen disintegrated material that has formed a slope at the foot of a steeper declivity.

TANK * - A natural or artificial water storage feature found in desert areas -- usually of pond size. Natural tanks are frequently formed by highly localized erosion, such as the foot of falls of intermittent streams. See also CHARCO and REPRESO.

TEMPERATE CLIMATE # - Very generally, the climate of the "middle" latitudes; the variable climate between the extremes or tropical climate and polar climate.

TEMPERATURE GRADIENT - The rate of change in temperature between one point and another.

TEMPERATURE INVERSION - A layer of air in which temperature increases with altitude. The principal characteristic of an inversion layer is its marked static stability, so that very little turbulent exchange can occur within it.

TEMPERATURE, SURFACE - 1. In meteorology, the temperature of the air near the surface of the earth, almost invariably determined by a thermometer in an INSTRUMENT SHELTER. 2. Do not confuse with GROUND TEMPERATURE.

TEMPERATURE SHOCK * - 1. A sudden, severe change in the temperature of a piece of equipment. 2. An environmental test intended to simulate the effect of such a change.

TENEZROUFT ϕ - A region of maximum aridity.

TERRACE * - A remnant of alluvial surfaces that formed at some time in the past at a higher level than the floor plain of the current stream flowing in the valley. See also BENCH.

TERRAIN FACTOR * - A specific attribute of the terrain that can be described in quantitative terms.

TERRAIN PROFILE * - A geometric representation of the earth's surface as an amplitude distance curve.

TERRAIN TYPE * - A region throughout which a specified assemblage of factors occurs.

TERRESTRIAL RADIATION (or EARTH RADIATION) * - The total INFRARED RADIATION emitted from the earth's surface; to be carefully distinguished from effective terrestrial radiation, atmospheric radiation, and INSOLATION.

TESSELATION ϕ - The fractured and irregular surface of the salty crust found on some Australian playas.

THALWEG * - The path of a theoretical water drop that flows, without changing in volume, along the bottom of the valley from the point where the valley originates to its lowest point. The average slope of the thalweg is the average GRADIENT of the valley.

THAMILAT (Arabic) - A water hole.

THANIYAH (Arabic) - A pass or defile between heights, usually shorter than a RI.

THAQA (Arabic) - A rainpool.

THEMILA (North Africa) - Water hole.

THERMAL, n. * - A relatively small-scale, rising current of air produced when the atmosphere is heated enough locally by the earth's surface to produce absolute instability in its lowest layers. For example, glider pilots seek out and ride "thermals", showing how strong and persistent the thermal updraft may be.

THERMAL DETERIORATION # - Impairment of physical properties due to effects of high or very low temperatures.

THERMAL EFFICIENCY ∅ - In climatology, an expression of the effectiveness of temperature in determining the rate of plant growth, assuming sufficient moisture.

THERMAL EXPOSURE * - The total normal component of thermal radiation striking a given surface throughout the course of a detonation; expressed in the units; calories per square centimeter.

THERMAL HEATING * - Aerodynamic heating produced by supersonic and hypersonic travel through the atmosphere; transfer of heat from a laminar or turbulent flow around the nose of a re-entry body as it loses kinetic energy.

THERMAL INSTABILITY * - 1. The instability resulting in free CONVECTION a fluid heated at a boundary. 2. In meteorology, the instability of a body of air with respect to its temperature distribution.

THERMAL LOAD * - Stresses imposed upon a missile structure because of expansion or contraction (or both) of certain structural elements by aerodynamic heating during flight and reentry, by exposure to the heat of a rocket flame, or by cooling effects of liquid oxygen in the oxidizer system.

THERMAL RADIATION * - 1. The heat and light produced by a nuclear explosion. 2. Electromagnetic radiation emitted by any substance as a result of thermal excitation of its molecules.

THERMAL SHOCK * - See TEMPERATURE SHOCK.

THERMISTOR, n. * - A device whose electrical resistance varies markedly and monotonically and which possesses a negative temperature coefficient or resistivity. The thermistors used in meteorology are composed of solid semiconducting materials whose resistance decreases 4 percent per C°. They are constructed in a variety of sizes, and may be obtained with thermal time-constants of a milli-second or less. Meteorological applications include THERMOMETERS, ANEMOMETERS, and BOLOMETERS.

THERMOCOUPLE, n. # - A temperature-sensing element which converts thermal energy directly into electrical energy. In its basic form it consists of two dissimilar metallic electrical conductors connected in a closed loop. One pair of junctions form a thermocouple, several pairs form a thermopile. If electrical energy is passed through a thermocouple it creates a "cold" (Peltier effect) which can be used for refrigeration.

THERMOMETER, n. * - An instrument for measuring temperature by utilizing the variation of the physical properties of substances according to their thermal states.

TI (Arabic) - A peak.

TINAJA ∅ - A natural tank or represo.

TOGH (Arabic) - A watercourse, usually dry.

TOPOGRAPHY, n. ∅ - The physical features, both natural and man-made, of the earth's surface. In terrain analysis the following categories of topographical features are considered: relief, drainage, surface materials, vegetation, special physical phenomena and man-made (cultural) features. (FM 30-10).

TORNILLO ∅ - A whirlwind or dust devil. Also applied to the screw bean mesquite.

TORRE (Greek) - A tower.

TRAB (Sahara) ∅ - Sand or sandy ground.

TRAFFICABILITY * - Capability of terrain to bear traffic. It refers to the extent to which the terrain will permit continued movement of any and/or all types of traffic.

TRAFFICABILITY SCALE * - A classification system (See Table 1) developed to describe the ability of various surfaces to support vehicular traffic. This system should be used only when quantitative data is not available.

TRANSVERSE DUNES * - A series of eolian deposited ridges occurring at right angles to the direction of the prevailing wind. Cross-sectional shape is generally asymmetric and erected, with some areas rolling.

TRINCHERA ∅ - An entrenchment or earth-wall found in primitive irrigation systems in Mexico and the Southwestern United States.

TUFF ∅ - A rock composed of the finer kinds of volcanic detritus, usually more or less stratified, and in various states of consolidation.

TULUL (Arabic) - Hills.

TURBIDITY, n. * - In meteorology any condition of the atmosphere which reduces its transparency to RADIATION, especially to visible radiation.

TURBULENCE, n. * - A state of fluid flow in which the instantaneous velocities exhibit irregular and apparently random fluctuations so that in practice only statistical properties can be recognized and subjected to analysis.

TABLE 1. Trafficability Scale for Desert Work

Roads; paved, good	1_2 - 2-lane 1_3 - 3-lane 1_4 - 4-lane 1_6 - 6-lane		
Roads; paved, poor	2b - pavement broken 2d - partially drifted over 2n - narrow 2w - partially washed out 2/ - steep grades		
Roads; unpaved, graded	3g - gravelled; 3/g - gravelled, steep 3d - dirt; 3/d - dirt, steep		
Roads; unpaved, not graded	4f - firm surface 4g - loose gravel 4m - muddy when wet 4r - rocky 4s - sandy 4w - deep washes	4/f 4/g 4/m 4/r 4/s 4/w	same, but steep
No roads; surface firm; passable any type vehicle	5g - packed gravel 5m - packed mud or clay 5p - stone pavement 5r - rock surface 5s - packed sand	5/g 5/m 5/p 5/r 5/s	same, but steep
No roads; surface yields slightly; passable ordinary passenger car.	6g - gravelly 6m - muddy or clayey 6r - rocky 6s - sandy 6w - shallow washes	6/g 6/m 6/r 6/s 6/w	same, but steep
No roads; surface passable with difficulty for 2-wheel drive vehicles	7g - gravelly 7m - muddy or soft clay 7r - rocks scattered 7s - sandy 7w - washes	7/g 7/m 7/r 7/s 7/w	same, but steep
No roads; passable for 4-wheel drive vehicles only.	8g - heavy gravel 8m - deep mud or soft clay 8r - many large rocks 8s - deep sand 8w - steep-sided washes	8/g 8/m 8/r 8/s 8/w	same, but steep
Impassable for wheeled vehicles.	9b - many large boulders 9bd - badlands 9m - very deep mud 9g - very heavy gravel 9s - deep sand 9v - thick vegetation 9w - very deep washes 9o - other		9/ excessively steep

TWILIGHT, n. * - The periods of incomplete darkness following sunset (evening twilight) or preceding sunrise (morning twilight). Twilight is designated as civil, nautical, or astronomical, as the darker limit occurs when the center of the sun is 6°, 12°, or 18° below the celestial horizon, respectively.

- U -

UADI (Arabic) - See Wadi.

UGLAH (Arabic) - A shallow well, usually of constant supply.

ULTRAVIOLET RADIATION * - Electromagnetic radiation of shorter wavelength than visible radiation, but longer than x-rays; roughly, radiation in the wavelength interval from 10 to 4000 angstroms.

UNDISTURBED, adj. * - 1. Geol. Applied to geologic structures in which the strata lie essentially horizontal or, as in a coastal plain, with gentle seaward dip. 2. Soil Mechanics. Undisturbed samples may be defined broadly as samples in which the material has been subjected to so little disturbance that it is suitable for all laboratory tests and thereby for approximate determination of the strength, consolidation, and permeability characteristics and other physical properties of the material in situ.

UQAILAT (Arabic) - Cultivated depression with wells.

UQLAT (Arabic) - A group of shallow wells.

URAYA (Arabic) - Small sand ridge.

URUQ (Arabic) - Long, linear sand ridge. (See ERG).

USHCHEL 'YER (Arabic) - A gorge.

UWAYNAT (Arabic) - Wells.

'UYUM (Arabic) - Springs.

- V -

VADI (Turkish) - A valley.

VALAH (Arabic) - Shallow sand well.

VALLALA (Arabic) - A wide valley.

VALLE (Greek) - A valley.

VALLEY, n. # - A depression in the land surface, generally elongated and usually containing a stream; low land bounded by hills or mountains.

VEGA (Atacama) ∅ - A small natural oasis.

VEHICLE CONE INDEX (Abbreviated VCI)* - The index assigned to a given vehicle that indicates the minimum soil strength required for 40 to 50 passes of the vehicle.

VEHICLE GROUND MOBILITY * - The measure of the ability of an automotive vehicle to traverse the variety of terrain conditions, including inland waterways, found on the surface of the earth and in a minimum time with minimum support and remaining capable of performing its design function.

VENTIFACT * - A wind polished or sharpened pebble.

VERTICAL OBSTACLE * - An obstacle that forces a vehicle to move in the vertical plane while surmounting it.

VIBRATION * - Continuous oscillatory motion of a body or point about a position of equilibrium.

VISIBILITY, n. * - In U.S. weather observing practice, the greatest distance in a given direction at which it is just possible to see and identify with the unaided eye (a) in the daytime, a prominent dark object against the sky at the horizon, and (b) at night, a known, preferably unfocused, moderately intense light source.

VISIBLE RADIATION * - Electromagnetic radiation lying within the wavelength interval to which the human eye is sensitive, and spectral interval from approximately 0.4 to 0.7 micron (4000 to 7000 angstroms).

VISIBLE SPECTRUM * - That portion of the electromagnetic spectrum occupied by the wavelengths of VISIBLE RADIATION.

VOID RATIO ∅ - The ratio of volume of voids to the volume of solid substance in any material consisting of solid material and voids.

VOLCANIC ASH * - The unconsolidated fine-grained material thrown out in volcanic eruptions. It consists of minute fragments of glass and other rock material, which in color and general appearance may resemble organic ashes.

VOLCANIC BRECCIA ∅ - More or less indurated volcanic rocks consisting chiefly of angular ejecta 32mm or more in diameter.

VOLCANIC CINDERS ∅ - Uncemented volcanic fragments that range from 4 to 32mm in diameter. Such fragments are usually glassy or vesicular.

VOLCANIC CONE ∅ - A cone-shaped eminence formed by volcanic discharges.

VOLCANIC NECK ϕ - The solidified material filling a vent or pipe of a dead volcano. If or when a volcanic neck has resisted degradation better than the mass of the mountain, it will stand alone as a column, tower or crag, of igneous rock.

VRAKHOL (Greek) - Rocks.

VYSOLY (Arabic) - Heights.

- W -

WADI (or Ovady, Wady) (North Africa and Middle East). A desert watercourse characterized by sandy or gravelly bed and steep, often vertical, banks. Usually dry, but subject to flooding in rainstorms. See also WASH.

WARTA (Arabic) - Small rain pool or dew pond.

WASHES - See DRY WASH.

WBGT INDEX (Abbrev. for : WET BULB, GLOBE TEMPERATURE INDEX) * - A measure of the severity of a hot climate by taking into account relative humidity and radiant heat load as well as the dry-bulb temperature. The WBGT Index is made up by weighting the wet-bulb temperature by 0.7 (for relative humidity), the black globe temperature by 0.2 (for radiant temperature), and the dry-bulb temperature by 0.1 (shade temperature).

WEATHER, n. * - 1. The state of the atmosphere, mainly with respect to its effects upon life and human activities. 2. As used in the making of surface weather observations, a category of individual and combined atmospheric phenomena which must be drawn upon to describe the local atmospheric activity at the time of observation.

WEATHERING, n. # - The mechanical, chemical, or biological action of the atmosphere, hydrometers, and suspended impurities on the form, color, or constitution of exposed material; to be distinguished from EROSION.

WEATHERING, ACCELERATED # - An artificial means used to accelerate and duplicate the effects of rain modified sunlight, etc.

WEIN (Arabic) - Great.

WET-BULB DEPRESSION * - The difference in degrees between the DRY-BULB TEMPERATURE and the WET-BULB TEMPERATURE.

WET-BULB TEMPERATURE * - The lowest temperature to which air can be cooled at any given time by evaporating water into it at constant pressure, when the heat required for evaporation is supplied by the cooling of the air. This temperature is indicated by a well-ventilated WET-BULB THERMOMETER.

WHALEBACK - A tremendous sand ridge built by movement of dunes over the same path for long periods of time. Ridges are elongated in plan and exhibit gentle crests, although one or more longitudinal dunes may be superimposed.

WHITE BODY * - A hypothetical "body" whose surface absorbs no electromagnetic radiation of any wavelength, i.e., one which exhibits zero absorptivity for all wave-lengths; and idealization exactly opposite to that of the BLACK BODY.

WIDYAH (Arabic) - See WADI.

WIND, n. * - Air in motion relative to the surface of the earth. Since vertical components of atmospheric motion are relatively small especially near the surface of the earth, meteorologists use the term to denote almost exclusively the horizontal component.

WINDCHILL, n. * - The combined cooling effect of wind and air temperature on heated bodies. Windchill is expressed in kilogram calories per square meter per hour.

- X -

X-RADIATION (or X-Rays) * - Electromagnetic radiation in the wavelength region from about 100 to 0.1 Angstroms, which overlaps the ultraviolet region at long x-ray wavelengths and the gamma ray region at short x-ray wavelengths. The distinction is that x-rays and ultraviolet radiation are produced by different processes. See GAMMA RAY.

XEROPHILOUS, adj. - Drought resistant or drought tolerant; able to withstand the absence or scarcity of moisture.

XEROPHYTE - A xerophilous plant; a plant structurally adapted for growth with a limited water supply.

XEROPHYTIC, adj. - See XEROPHYTE.

- Y -

YARDANGS, n. - Irregular ridges or mounds, commonly alternating with round-bottomed troughs, formed by wind erosion of silt and clay, often of ancient PLAYA surfaces.

YARIMADA-SI (Turkish) - A peninsula.

YAYLA, -SI (Turkish) - A camp.

YK (Arabic) - Upper.

YUKARI (Turkish) - Upper.

YUZHRYY (Arabic) - Southern.

- Z -

ZALIV (Arabic) - A gulf or bay.

ZAWR (Arabic) - A peninsula or neck of land protruding into the sea.

ZEUGEN ∅ - Tabular mass of rock produced by wind abrasion separting by differential weathering hard caps from soft underlying stratum. (See also GARA).

ZWEIKANTER ∅ - Wind polished and sharpened pebbles having two sharp edges.