

AN ANALYSIS OF PLANATIONAL TERMS— AN ADDITION.*

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A paper under a somewhat different title† published in 1928 has aroused comments chiefly of two types: the one questions etymology and the other desires exact definitions of the terms considered in the original report.

An introductory word on terms in general may not be amiss. A non-progressive science has little need for new terms. But in an advancing science new phenomena will come under notice; new ideas will be born; new relations will become evident; and facts already known will gradually break up into parts easily differentiated once they are recognized. An idea cannot become useful public property until it is christened; it cannot be handled, inspected, tested, talked about, circumscribed, and related until a name brings to focus the light of individuality and separate entity. However, the term of the highest value is the one that makes possible the recognition of a new phenomenon or conception for the first time, and fosters its detailed study. If a name thus calls attention to a process which would otherwise go unnoticed it has served a very useful purpose indeed.

The caution employed in regard to the introduction of a new term should be equaled only by the care exercised in its subsequent use. A few of the tests to which a term should be subjected are as follows: first, it must be a step forward in an advancing science; second, progress has discovered an idea and its corresponding phenomenon and a new term is necessary to facilitate recognition and development; and third, the term proposed should so delineate, clarify, and etch into relief the idea or fact that both will be instantly recognized in all their relationships. Utility and expressiveness should be the critical tests. The striking connotation and the clear-cut emphasis surrounding a well-chosen term may be illustrated aptly by the

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† An analysis of erosional terms: Amer. Jour. Sci., XV, 471-483.

words "island universe" in astronomy, "barchane" in physiography, "dinosaur" in paleontology, and "electron" in physics, to mention only a few. The entrance of the word "barchane" into a discussion, for instance, arouses a definite mental picture definitive, descriptive, and causative—the term is particularly rich in suggestion. How great the difference between barchane and dune!* Names symbolical of a rich and precise nomenclature not only should aid the advancement of science but should also placard the steps of progress as they appear before us.

Let it be stated that the proposals were made not with the idea of creating an omnibus of terms to plague elementary students but with the purpose of emphasizing and perhaps predicting the trend and ramifications of physiography in relation to other phases of geology. The terms were proposed more particularly for the purpose of making it possible to direct attention upon certain processes from the standpoint either of physiography or of sedimentation, to isolate each process under a separate name so that its own peculiar characteristics stand out with utmost distinctness, and to promote an intensive analysis of the nature and method of that process.

It may be argued that a single word is sufficient to cover a number of roughly similar processes, e.g., corrasion for the destructive activities of streams, glaciers, and the wind. Yet who would wish to discard the word "plucking," a term of great utility and vividness of expression. After the same fashion abrasion by glaciers contrasts sharply with corrasion by streams in nature, method, and results. A further remark on the significance inherent in the type of term suggested will suffice, perhaps, to illustrate geologic utility. Does mariposition, for example, merit our attention? Why not use marine deposition? Strictly speaking, marine deposition means deposited in or by the sea—a rather loose definition on the whole. Mari position, on the contrary, signifies sea deposited, the agent being specifically designated. Sediments completely reworked by the sea and then subjected to mariposition receive the impress of a pure marine environment whereas those placed in the sea and scarcely touched by it receive much slighter indications of true marine surroundings. In the first case the sea is the

* W. M. Davis tells us that the Arabs have different names for dunes of different shapes. *Essays*, page 54.

active agent while in the second it is the passive receiver, surely a fact of significance to sedimentation.

The definitions below are appended in answer to the second comment mentioned in the initial paragraph. The scheme of terms refers exclusively to the physiographic processes and not to the surface forms. The usage of "erosion," it may be added, excludes "weathering" and restricts the word to a subject inherently active and mobile. Erosion comprehends motion; it represents part of the strikingly dynamic interlude, involving space translation, between original and derived physiographic forms.

- I. PLANATION. Planation refers to the geologic activities of all the physiographic processes at work on the surface of the lithosphere tending to bring that surface to a common level.
- II. EROSION. Erosion includes the acquisition of load by the physiographic agents of transportation, the actual transportation of the material, and the destruction of topographic forms and comminution of rock materials because of such transportation.
- III. EOLATION. (Latin *Aeolus*, god of the winds; *-ationem*, or French *-ation*, that which is made or done by. Hence, "that which is done by the wind".) Eolation includes all the direct geologic activities of the wind, both destructive and constructive.
 - A. EOLIROSION. (From "eolian erosion." Latin *Aeolus*; *e* and *rodere*, to gnaw away. Hence, "wind gnawed" or "eaten away by wind".) Eoliroasion includes the pick-up and transportation of materials by the wind and the geologically destructive effects accomplished because of such transportation.
 1. *Eoliportation*. (Latin *Aeolus*; *portare*, to carry; *-ation*, the act of. Hence, "the act of wind carrying," or "carried by the wind".) Eoliportation refers to the transfer of (chiefly) rock materials on the earth's surface by the agency of the wind.
 2. *Blastation*. (AS. *blaest*, a puff of wind, a blowing, plus *-ation*, the act of. Hence, "the act of blowing or rending rock".) Blastation includes the geologically destructive processes in which sand and dust particles strike rock faces or grind upon each other.
 - B. EOLIPPOSITION. (Latin *Aeolus*; *ponere*, *positum*, to place. Hence, "wind placed".) Eoliposition refers to the

deposition of materials which have been transported by the wind; it is the process which occurs when transportation ceases or becomes ineffective.

IV. GLACIATION. (Latin *glacies*, ice, plus *-ation*. Hence, "that which is done by ice".) Glaciation includes all the geologic activities of glaciers, both destructive and constructive.

A. GLACIROSION. Glacirosion includes the pick-up and transportation of materials, produced or supplied, and the geologically destructive activities of glaciers.

1. *Glaciportation*. Glaciportation refers to the transfer of materials by the agency of glaciers.
2. *Abrasion* refers to the process by which a glacier scours and wears away a rock surface, or the fragments undergoing transportation.
3. *Plucking* refers to the process whereby a glacier lifts or tears away rock fragments or projections to which the ice has become attached.

B. GLACIPOSITION. Glaciposition refers to the deposition or rock materials which have been transported by glaciers.

V. FLUVIATION. (Latin *fluvius*, river, plus *-ation*. Hence, "that which is done by rivers".) Fluviation includes all the geologic activities of streams, both destructive and constructive.

A. FLUVIROSION. Fluvirosion designates the geologic work of pick-up, transportation, and destruction carried on by streams.

1. *Fluviportation* refers to the transfer of materials by the agency of streams.
2. *Corrasion* refers to the process whereby the channel of a stream is worn away chiefly by the impact of rock materials which themselves suffer wear during the procedure.
3. *Corrosion* is the process whereby a stream by its own solvent action, but predominantly by the help of solutes undergoing transportation, dissolves or chemically alters materials along its course of flow.

B. FLUVIPOSITION. Fluviposition refers to the deposition of rock materials which have been transported by streams.

VI. PLUVIATION. (Latin *pluvia*, rain, plus *-ation*. Hence, "that which is done by rain".) Pluviation includes all the geologic activities of rain and rainwash, both destructive and constructive.

A. **PLUVIROSION.** Pluviosion refers to the geologic work of pick-up, transportation, and destruction carried on by rain and rainwash.

1. *Pluviportation* refers to the transfer of materials by the agency of rain.

B. **PLUVIPOSITION.** Pluviposition refers to the deposition of rock materials which have been transported by rain or rainwash.

VII. **MARIATION.** (Latin *mare*, sea, plus *-ation*. Hence, "that which is done by the sea".) Mariation includes all the direct geologic activities of the sea, both destructive and constructive.

A. **MARIROSION.** Mariosion refers to the geologic work of pick-up, transportation, and destruction carried on by the sea.

1. *Mariportation* refers to the transfer of materials by the agency of the sea.

B. **MARIPOSITION.** Mariposition refers to the deposition of rock materials which have been transported by the sea, chiefly waves, currents, and tides.

VIII. **COLLUVIATION.** (Latin *colluvies*, a mixture;* plus *-ation*. Hence, "that which is done by a mixture" or, better, "by mixing".) Colluviation includes all the geologic activities of gravity, both destructive and constructive.

A. **COLLUVIROSION.** Colluviosion includes the movement of rock materials under the influence of gravity and the destructive effects accomplished.

1. *Colluviportation* refers to the movement of (chiefly) rock material under the influence of gravity.

B. **COLLUVIPOSITION.** Colluviposition refers to the deposition, by coming to rest, of rock materials which have undergone colluviportation.

IX. **TERRAQUIATION.** (Latin *terra*, earth; *aqua*, water; plus *-ation*. Hence, "that which is done by earth water".) Terraquiation includes all the geologic activities performed by ground water, both destructive and constructive.

A. **TERRAQUIROSION.** Terraquiosion refers to the pick-up and transportation of materials and the geologically destructive activities performed by ground water.

1. *Terraquiportation* refers to the transfer of materials by the agency of ground water.

B. **TERRAQUIPOSITION.** Terraquiposition refers to the deposition, or precipitation, of materials which have been transferred by ground water.

*See G. P. Merrill: *Rocks, Rock-Weathering and Soils*, 1913, 307-8.

PLANATION.

| DENUDATION | | SEDIMENTATION | |
|-------------------|-------------------------|-------------------|-----------------|
| <i>Weathering</i> | <i>Erosion</i> | <i>Deposition</i> | |
| | Eoliroasion..... | Eoliposition | = Eolation |
| | Eoliportation | | |
| | Blastation | | |
| " | Glaciroasion..... | Glaciposition | = Glaciation |
| | Glaciportation | | |
| | Abrasion | | |
| | Plucking | | |
| " | Fluvirosion..... | Fluviposition | = Fluviation |
| | Fluviportation | | |
| | Corrasion | | |
| | Corrosion | | |
| " | Pluvirosion..... | Pluviposition | = Pluviation |
| | Pluviportation | | |
| | Corrasion (?) | | |
| " | Marirosion..... | Mariposition | = Mariation |
| | Mariportation | | |
| | Corrasion (?) | | |
| " | Colluvirosion..... | Colluviposition | = Colluviation |
| | Colluviportation | | |
| | Corrasion (?) | | |
| " | Terraquirosion..... | Terraquiposition | = Terraquiation |
| | Terraquiportation | | |
| | Solution (or corrosion) | | |
| | Corrasion | | |

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